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The Testing of Cement.



SOME difference of opinion exists as to the chief purpose to be attained by the testing of cement. There are engineers who contend that the objective is not the establishment

of standards, but the certainty that given brands of cement will conform with specified requirements. According to this view, the end is not to compare one brand of cement with others, but to determine whether the maker of an accepted brand has fulfilled the promised conditions throughout the whole of the material delivered. Other engineers and investigators attach importance to the attainment of a system of examination calculated to afford uniform results for uniform qualities of cement when examinations are conducted by different individuals. This second way of looking at the subject is certainly more comprehensive than the first, and it is not easy to conform with the ideal it expresses. Hitherto, no entirely satisfactory system has been devised which will eliminate the personal equation from the conduct of tests, and variations must, therefore, occur, rendering the results not only relative, but more or less inaccurate. We have also to remember that while most other materials of construction are tested as finished products, cement is tested in a form made by the tester, and not by the manufacturer, or even by the user. Hence the result obtained in every case is false, having been qualified by variable and indeterminate co-efficients, arising from the actual skill and experience of the tester, and from variations of the water used and of the temperature

and laboratory conditions. To use a simple illustration, we may liken existing methods of cement testing to an attempt to ascertain and compare the properties of flour by investigating the chemical, physical, and mechanical attributes of bread made by different bakers, or of cakes made by different housewives. Just as the same quality of flour will give varying results when mixed by persons of varying temperament and skill, and cooked in ovens of varying characteristics, so one sample of cement will give differing results under different treatment. Yet a near approach to uniformity might be attained if chemical and physical conditions could be standardised, and if manual preparation were replaced by mechanically applied treatment. No organised attempt has been made in this country to secure uniformity of tests, although a great deal of work has been done in this direction by the American Society of Civil Engineers and the International Association for Testing Materials. The subject is now engaging the attention of the laboratories of the "Ponts et Chaussées" service in France, the Royal Testing Laboratory at Charlottenburg, in Germany, and the testing laboratory at Zurich. Hope may therefore be entertained that some definite conclusions may be approached before long. In the meantime there is every reason for believing that existing methods afford sufficiently adequate safeguards for architectural and engineering practice, and much useful information may be derived from a study of the records available. A somewhat lengthy paper recently read before the Franklin Institute, Philadelphia*, presents an excellent summary of the various systems of examination adopted, and a valuable series of notes upon the characteristics of Portland cement.

While the author puts forward a plea for uniform methods of examination, he does

not attempt to formulate a system of his own. After some preliminary remarks of more or less historical nature, he proceeds to trace the development of modern testing methods, and acknowledges in Mr. Grant, the engineer for the Metropolitan Main Drainage Scheme, the pioneer of systematic examination. The tensile testing machine devised by Mr. Grant formed the basis of modern machines of similar class, and his work was ably followed up by Faija, Michaelis, and other investigators. After a brief reference to the development of testing methods, the author proceeds to consider in detail various matters to which we may usefully allude.

Before any testing operations are undertaken the user must determine the place at which the examination shall be conducted, this point being left by the author to be decided according to circumstances. There is no doubt whatever that from the time the clinker is reduced to powder its physical and chemical properties are constantly undergoing changes which affect the quality of the cement as a building material, and even after it has been made into mortar similar changes take place. Therefore it cannot be expected that tests conducted at the destination of a consignment will yield results precisely similar to those obtained at the maker's works. As the user is concerned chiefly with the quality of the cement when received by him, it seems the most natural course that it should be examined at the place where it is to be used. If foreign-made cement is employed, such procedure is absolutely necessary; but in the case of home-made cement tests can often be performed at the maker's works, or when brands of known reliability are bought the manufac-

* "The Inspection and Testing of Cements." By Richard L. Humphrey. "The Journal of the Franklin Institute, Philadelphia," 1901-2.

turer's certificate may be accepted. When important works are concerned check tests should be made upon the site, if the original tests have been carried out elsewhere. Upon the subject of sampling cement received the author presents some useful notes, suggesting that the general condition of every consignment should be carefully observed, so that it may be ascertained whether the cement has become caked, lumpy, or has been otherwise damaged during transit, also recommending that samples should be taken from the heart of each package. The latter stipulation is important, as the quality of the outer layers may be impaired, and the shaking due to transportation tends to separate the coarser particles. This method of sampling leads to a reliable indication of the properties of the cement, although it is, if anything, somewhat in favour of the maker.

On the general subject of testing Mr. Humphrey says that the simplest methods yield the most uniform tests, an opinion that will be endorsed by every one having practical experience of such work. Purely scientific investigation usually requires expensive and complicated apparatus and the expenditure of much time for the determination of obscure points. Practical tests, on the other hand, should be few in number and simple in execution, for they need not do more than establish the essential characteristics of the material. While chemical analysis rarely forms part of a commercial test, the scheme given in the paper to which we refer will be of interest to those who wish to obtain for themselves data as to the composition of different qualities of cement. In the ordinary way, the most important chemical test is that for sulphuric anhydride, and we may here mention that some Continental specifications demand the rejection of cement containing more than 1 per cent. of anhydride, which is equal to 1.7 per cent. of calcium sulphate. The latter substance is sometimes added by manufacturers for the purpose of securing good results under the ordinary test for soundness, with the effect that cements so treated may show subsequent decrease of strength when exposed to the air in the form of mortar. As a general rule the qualities for determination are—fineness, activity, soundness, and strength: but in the comprehensive paper now before us other properties of cement are considered in detail.

In dealing with the question of fineness, the author chiefly confines his remarks to methods of sieving. The fineness of cement can be much more accurately ascertained by air separation with the aid of an apparatus such as the "fluorometer" lately described in our columns. The latter mode of separation is favourably mentioned by the author, who thinks it "not improbable that it will eventually supersede the unsatisfactory method by sieves." Fineness of grinding, we may remark, is chiefly a matter of economy, if the strength of the mortar or concrete afterwards made be duly taken into account, for finely-ground cement will stand a larger proportion of sand than coarsely-ground material. Very often, however, when two such samples are tested neat, the coarse cement will give results as high as the finer quality; and unless inquiry be made as to the strength of the mixture of cement and sand, it is certain that unexpected weakness will follow. Referring to the specific gravity of cement, the

author says that this property is of considerable value in detecting adulterations. He does not add that specific gravity is the only true test for thoroughness of burning, apparently assuming his readers to be already aware of the fact. The test for specific gravity is not recommended, except in permanent laboratories, as it is one requiring considerable skill and accuracy. Le Chatelier's apparatus is mentioned as the most convenient for this test, being also less liable to error from retained air bubbles and leakage at the connexions than most other forms. A common test, intended to show the activity of cement, is to observe the time required for setting. Information as to the activity of a cement is necessary, for its strength will be seriously impaired if the mortar be disturbed after it has commenced to solidify. Various automatic appliances have been devised for recording the setting of cement, but for ordinary use the most suitable apparatus appears still to be the Vicat needle. The time of setting can only be determined approximately, as it is affected by prevailing conditions, and in the case of slow-setting cements it will be variously estimated by different observers. Sometimes, as an auxiliary test, the rise in temperature during the setting of a cement paste is recorded, but this test is valueless and misleading except in the hands of an expert. One of the difficulties at present in the way of uniform results is the absence of a standard consistency for the cement paste, used in some ordinary tests. Ideas upon consistency vary in different countries, and frequently according to individual fancy. Perhaps the most rational method of fixing the proper proportion of water to be used is to adopt the normal consistency apparatus, in which the condition of the paste is judged by the penetration of a weighted rod. Other methods are generally primitive in the extreme, and seem to be altogether out of place in these days of scientific precision. For instance, the percentage of water is sometimes determined by mixing the cement to a sirupy paste, so that it will run from a knife in thin threads without forming lumps. Another way is to mould the paste into a ball which is then dropped from a height of 1 ft., and if it does not crack, or flatten materially, the consistency is said to be correct. In this case everything depends upon interpretation of the term "materially."

Passing on to consider tests of strength, the author correctly observes that the shape of the briquette is very important, and he appends an illustration showing various briquette sections suggested by Grant, and the final one recommended by him which has been generally adopted in this country. The form advocated by the American Society of Civil Engineers, and that adopted in France and Germany, are also illustrated in the same plate. It may be remarked that the section adopted in America would be improved by rounding off the sharp corners, as these render moulding unnecessarily troublesome. The section used in France and Germany, consisting of two rounded heads with a nicked neck, is intended to assist fracture in the central part, but as the author says, experience does not show that this effect is attained in practice.

Mixing is another operation in which mechanical devices afford little help to the tester of cement. The objection to most

mixing machines, on the part of the author, is to be found in the tendency of the material to "ball," and in the difficulty of telling when the process is completed. A certain amount of experience is always necessary to ensure the proper mixing of cement for testing. Mr. Humphrey mentions that he has known an inexperienced person to continue working upon cement which had actually set, whilst wondering why he could not get the mass into a plastic condition. It is true that many cements appear dry when first mixed, becoming quite wet after having been kneaded for a few minutes, but such a case is different from that of a batch which gradually becomes mealy and non-adhesive. The latter conditions indicate that setting has commenced, and the mass should be thrown away. Operators will do well to bear in mind the caution given by Mr. Humphrey as to the atmospheric conditions of the room where mixing is performed. A high temperature and dry air have the effect of causing "checks," or air cracks, and of checking the process of hardening, as well as of reducing tensile strength. Some of the illustrations of mechanical mixing machines are worthy of notice, particularly the "Faija" mixer, and one used at the Cornell laboratory.

Moulding is another operation in which hand manipulation is generally preferred to machine work. Here, again, there are openings for variable results, but as a matter of fact greater uniformity of density can be secured by hand than by machine moulding. The objections stated by the author against mechanical moulding are:—That the operation is very slow; that existing appliances it is only possible to form one briquette at a time; and that uniform density cannot be ensured owing to insufficient control over the pressure, and to the fact that pressure is applied from one side only. A useful practice recommended by the author is to weigh all briquettes before immersion in water, rejecting those which vary more than 3 per cent. from the mean weight. Some serviceable, practical hints upon the preservation of briquettes are given in the paper. For the twenty-four hours' test briquettes are sometimes simply covered by a damp cloth. This is clearly inadvisable, for, as the author remarks, the cloth may become dry in some places, and in others its contact may make the briquettes too moist. If a cloth be used at all it should be placed over a wire screen, but the most suitable appliance for preserving briquettes is the moist closet. For the longer time tests, the briquettes are immersed in water after twenty-four hours' exposure in moist air. It is still a matter of opinion whether running water has solvent action sufficient to reduce the strength of cement appreciably within the short period of immersion adopted for testing purposes. Mr. Humphrey is inclined to think it has not, for he has noticed that the loss is just as great in still water. As a rule, the use of pans for still-water immersion will be found most convenient for preserving briquettes upon the site of works, while tanks provided with more elaborate arrangements for water supply and overflow are desirable for permanent laboratories.

When the briquette comes to be broken in the testing machine, differences of preparatory treatment must be represented in the records, although it is quite possible

that they may not always be recognised. As the author truly says, it often happens that the last moulded, and usually the densest briquettes, are broken at twenty-four hours or seven days, and the first moulded, or less dense, at twenty-eight days or longer. Then the tests may show an apparent falling off in strength, and thus lead to incorrect conclusions. Again, the cement may have begun to set before the last briquette was moulded, giving indications upon testing of reduced strength or even of disintegration. Other false results may have their origin in cross strains due to improper centring, in too sudden application of the load, or in the absence of proper bearing owing to particles of foreign matter on the clips, or on the briquettes themselves.

The soundness of cement is of paramount importance, and numberless methods have been suggested for ascertaining the extent to which this property exists in any given sample. In the paper under discussion, only the well-known Fajra hot-water test is mentioned, since this is now practically universal. It appears that in America the test in question, especially when temperature is raised to the boiling point, is the *bêlé-noir* of the cement manufacturer, who uses sulphate of lime as an adulterant in his endeavour to make the material pass the required ordeal. In the opinion of competent judges, the rational and careful use of sulphate of lime is desirable to render cement slow setting, while excessive admixture is clearly to be deprecated. Mr. Humphrey appears to fully realise the difficulties which are attendant upon hot water or boiling tests, and he suggests the sample pats should be immersed in water, maintained at a temperature not exceeding 70 deg. Fahr., after setting hard, for a period of twenty-four hours. At the end of that time well-made Portland cement should develop no objectionable qualities, the cement ought also to be perfectly sound in cold water. The suggestion comes as a mean between accelerated tests and the normal test adopted in Germany, which is as follows:—Small pats of the cement are made and allowed to stand twenty-four hours in damp air, and are then placed, some in water and some in the air, and observed until twenty-eight days old. If they do not become distorted or cracked during that time, the cement is considered to be sound. The opinion of Mr. Humphrey is that this test is not sufficient to develop the unsoundness of cement in time to be of practical value. On the other hand, after a lengthy investigation, the German Society of Cement Manufacturers recently arrived at the conclusion that the normal test is not of less value than the so-called accelerated tests. As the Society in question includes the heads of all the important departments of public works in Germany, and the head of the German testing laboratory, this expression of opinion is one that cannot be readily set aside. Yet, as the accelerated test is of sufficiently trying character to induce manufacturers to admix substances with the object of enabling cement to pass muster, we are inclined to think that the test ought not to be abandoned. It can certainly be employed with advantage by the manufacturer for his own information and guidance, and by the user for similar purposes, and if it were no longer regarded as affording a criterion by which the acceptable or non-acceptable character of a

cement should be judged, there would be no temptation for the manufacturer to add an excess of sulphate of lime in his product. A difficulty attending tests for soundness is found in making the pats. On this point Mr. Humphrey makes the practical remarks that, "Simple as the making of these pats may appear to be, it is extremely difficult for inexperienced persons to make them correctly. Pats may be so trowelled as to give initial strains which develop cracks during the test." If the pats should dry out shrinkage will follow, giving an impression of unsoundness, and if the cement should set before the pat is finished the lifting of the outer edge may mislead the inexperienced. The soundness and constancy of volume of cement is undoubtedly of great importance, but from what we have said it will be realised that room for improvement still exists in connexion with tests for its determination.

Beyond the tests made for ascertaining the acceptable quality of cement as delivered for use, there are many others which belong more properly to the regularly equipped laboratory. Operations for determining compressive, transverse, and adhesive strength, and others for ascertaining the effects of frost, sea water, and porosity are extremely useful, for they are the means of contributing general information for the guidance of those concerned in the design of structures where cement is used. With regard to the ordinary tests, it may be remarked that the interpretation of results is not the least of the difficulties to be encountered. It is never possible to insist upon an exact compliance with the terms of a specification, because it is difficult to define the influence of fortuitous circumstances connected with testing. For example, as the author hints, the sand used may be of poor quality, water used in mixing may have been excessive for deficient in quantity, the strength of the briquettes may be effected by drying out, or by the conditions under which they were preserved. Again, the operator may not apply the same amount of energy to each test, the influence of this factor being particularly remarkable when a large number of tests is in question. Altogether, there can be no doubt that present methods of testing are capable of improvement. It is nevertheless equally clear that the practical trials demanded by engineers have been largely responsible for the very great improvement in the quality of cement that has taken place during the past twenty years. What we now want is the formulation of a scheme by the aid of which uniform and readily comparable tests can be obtained, and we trust that the deliberations to which allusion has previously been made may conduce to so desirable a result.

IRISH OPINION ON ARCHITECTURAL EDUCATION.

THE Appendix to the Second Report of the Royal Commission on University Education in Ireland contains the evidence, at some length, of Sir Thomas Drew and of Mr. Arthur Hill (an architect who also holds the position of Lecturer on Architecture at Queen's College, Cork), on the subject of making architecture a part of University education, with the power of conferring a University degree or diploma in architecture.

Sir Thomas Drew emphasised in his evidence the great difference in circumstances as between the present day and fifty years ago. The profession, he says, had no literature then (it had very little, would be more correct); there was little travelling, and no photography. "It is the growth of these things, and especially the growth of architectural literature, which has caused the demand for education to spring up." And he proposes that the University should undertake "the literary education of the perfect architect"—not the technique, which he would leave to the present system of apprenticeship to provide. In fact Sir Thomas Drew's idea seems to be that architects as a rule are not as well educated as they should be; that they come as pupils to an architect's office with a very deficient general education, and that a University should be able to give them a diploma of proficiency in the study of the artistic and historical side of architecture, by way of promoting a higher standard of education among architects. So far we are quite in agreement with the evidence in thinking that such a recognition of architecture in a University curriculum would be an excellent move. It would certainly tend to the raising of the intellectual status of the architectural profession. But when Sir T. Drew says that the certificate which a man brought from the University "would be accepted by the public as a guarantee that he was an educated man, outside the technical part of his craft," we should reply that that is not what the public want to be assured of. What they want is the assurance that a man has a sufficiency of technical knowledge to be trusted with the handling of important structures. The desire for that is at the bottom of all the talk about compulsory registration of architects; the argument is that there is nothing to show whether an architect is or is not a competent technical man. The University degree in art and history would be a benefit to the profession in raising the standard of education among architects, but the public would not trouble themselves much about it if it only gave an imprimatur for the subjects which are outside of technical work.

Mr. Arthur Hill, in his evidence, seems to take a wider and more practical view. He wishes that there should be University teaching in architecture, and a University degree, for the study of the whole subject, artistic and scientific. The following is his general summary of what the University course in architecture should include (question 4,606):—

"It should include, in the first instance, a certain amount of general culture, the elements of an Arts course. It should then include drawing, pure and simple, painting, modelling, and everything of that kind. It should include a special study of the history of architecture, because it is only by a review of the finest works that man has produced that the taste of the student can be formed and elevated. The subject of the history of architecture should not be approached from a purely archaeological point of view, but should also be treated so as to show how architecture developed. I believe that in that way what we are all seeking for at the present day, a new style, is more likely to arise than by mere copying. The science should be treated from the constructional point of view, and should be taught, of course, by a specialist."

Further on we observe that Mr. Hill said (question 4,633) that he would make every Bachelor of Engineering study architecture, and every architect acquaint himself with the principles of engineering; "the two

professions should be worked together, and taught together, up to a certain point." Beyond that point, of course, their ways would part; the engineer would go into higher studies in mathematics which the architect hardly requires; the architect would go into artistic study to an extent which the engineer is supposed not to require. The degree given to the architect would be one which amounted to a certificate of proficiency both on the technical and the artistic side—so far as the latter is capable of being certified at all. This seems to us a far more wholesome, sound, and practical view than that conveyed in some of the answers given by Sir Thomas Drew, which in truth rather surprise us. He says that he would not think it necessary to include any technical education in the University course; that "if he has any use of it in his profession, he will be able to master it"; and that "the two professions" (Architecture and Engineering) "have such different aims that to combine them would only be mischievous." Surely the fact that they have "such different aims" is just what is to be regretted. Engineers should know more of architecture, and architects more of engineering, than they do at present; and Mr. Hill's recommendations are calculated to bring about that desirable end.

Both witnesses, we observe, expressed themselves strongly against the idea of the registration of architects, on the same ground that has been often urged before—that you must start from the present moment, and register all who are actually in practice, good, bad, or indifferent. Sir T. Drew thinks that the Institute of Architects will go on with its final examination and diploma, "and probably get it legalised"; and that would really be the best way out of the difficulty. We do not quite understand why Sir Thomas Drew said that the Institute of Architects "give a diploma"; the acceptance of a candidate as Associate hardly amounts to what is generally understood by that term; though the legal recognition of their examination, if brought about, would amount to a diploma.

NOTES.

Education Bill. AN important amendment in the Education Bill in regard to secondary and technical education was accepted by the Government this week. By this amendment what are called county boroughs, which include the most important towns in the country, are to be allowed to levy whatever rate they like, and are, therefore, exempted from the limit of 2d. This will allow the larger towns, such as Manchester and Liverpool, to carry out really efficient schemes of technical education, but the fact that these authorities are, it is admitted, practically obliged to spend more than a 2d. rate shows that a higher rate is necessary in many other towns in the country which are not rural. However, it is something that this important amendment is introduced into the Bill.

Restoration of the Erechtheion. IN last week's issue of the *Athenæum* Mr. R. Weir Schultz makes a protest, or rather raises a question, which we think very much called for, as to the wisdom of the

proposed attempt to restore certain portions of the Erechtheion*. Mr. Schultz observes that "as regards the north portico, the whole question hinges on a proposal to complete (?) the portico by replacing in position the fallen portions of the entablature and cofferings. To enable this to be done the columns require to be strengthened and the broken lintel of the doorway bridged over with iron;" and he says—and we quite concur with him—that it is difficult to see what advantage is to be gained by this proceeding, as the building will be no less a ruin than before, "and it is a great question whether the portico will gain in appearance or whether even its stability will be increased." We look with jealousy on all propositions of this kind, as we fear they will be the prelude to further and even less excusable attempts at restoration. In regard to the two priceless remains on the Acropolis, the Parthenon and the Erechtheion, the safest principle is—"let well alone."

Milan Cathedral. ALL our readers will remember the circumstances attending the great competition for building a new façade to Milan Cathedral with funds left for that purpose by a wealthy inhabitant of Milan, and the lamented death, shortly after the competition, of the architect whose design was selected. Since then, the popular sentiment of conservatism, which has been developing in Italy of late years, has been manifested in energetic protests against any disturbance of the singular façade as it stands. This protest was carried to such an extent as to involve the substitution of a public committee in the room of the ancient corporation of the "Veneranda Fabbrica," and the whole project of rebuilding the façade would appear to be now quashed, the money being diverted to charitable purposes. The abandonment of the project for rebuilding the Cathedral façade does not, however, affect the question of providing the bronze doors in conformity with an older bequest. Sig. Pogliaghi, the successful competitor in this case, prepared his design and models a long time back, but their execution has been deferred in consequence of the disputes over the façade, and now it would appear they are to be proceeded with as originally designed. But a considerable difficulty has arisen in the mode of carrying out the design. Sig. Pogliaghi anticipated that the whole character of the front would be altered in conformity with the bequest of Sig. Togni in 1884, and so he has designed these doors in a Gothic style corresponding with the general character of the building. Now that they are to be inserted in the old doorway of the Napoleonic style they will add another discordant note to the curious jumble of detail which constitutes the west front. Considered as an individual work of art—the new pair of bronze doors is above the average. Founded on a close study of late mediæval forms, the peculiar character of blended German and Italian Flamboyant is well preserved. The general design consists of square cross-barred panelling filled with small figure groups of the Passion, &c., under cusped canopies. In the centre of each door is a large quatrefoil breaking into

the middle of the square panels, and filled with figures on a larger scale. The whole effect is good without being archaic, and the treatment as metal in high relief is in good taste and founded on the best models. These doors are over 22 ft. high. Sig. Pogliaghi, the designer, and Sig. Barigozzi, the bronze-founder, are to be complimented on an imposing work, although the setting of it is not altogether what they contemplated.

Coronation Seats. IN view of the recent meeting of Coronation stand-holders and the uncertainty as to the mutual legal rights of the lessors of seats and the holders of tickets for the same, it may be interesting shortly to consider the legal aspect of the question. The difficulty in part arises from the absence in most cases of any specific contract, the only document being generally a licence to use a particular seat to view the Coronation procession. The law on the subject, however, would seem to be expressed by the principle laid down in the old case of *Taylor v. Caldwell* (1863), that where from the nature of the contract it appears that the parties must have known from the beginning that it could not be fulfilled unless, when the time for the fulfilment of the contract came, some particular specified thing continued to exist, so that when entering into the contract they must have contemplated such continuing existence as the foundation of what was to be done, then, in the absence of express or implied warranty that the thing shall exist, the contract is not to be construed as a positive contract, but as subject to an implied condition that the parties shall be excused in case before breach performance becomes impossible from the finishing of the thing without default on the part of the contracting parties. That was a case where the parties had agreed to hire a music-hall which was destroyed by fire, and this decision was followed in *Appleby v. Meyers*, where contractors under a contract were erecting machinery on premises which were destroyed by fire, and Lord Blackburn held it a misfortune which equally affected both parties, excusing both from further performance of the contract, but giving a cause of action to neither. In *Robinson v. Davison*, *Taylor v. Caldwell* was approved, and a singer was held not liable for breach of contract when incapacitated by illness, personal service prevented by the Act of God being held a sufficient excuse in the absence of express warranty. The above cases were not on all fours with the circumstances attending the postponed Coronation procession, but the principles then enunciated seem applicable, and in the absence of some express contract or warranty that the event should take place, the loss will lie where it falls.

Conway Castle. UNDER the heading "Conway Castle in Danger," Mr. C. H. Bothamley wrote from Weston-super-Mare in the *Times* of Saturday last, giving warning as to a contemplated interference with Conway Castle which may have disastrous results if not stopped in time. It appears that the Town Council of Conway have decided to celebrate the Coronation year by restoring what is called the "Queen's" or "Eleanor's" tower of the castle. An appeal has been made for subscriptions to raise a sum of 500*l.*, with which

* He, like most English writers, calls it "Erechtheum"; but as we have always had "Parthenon" in English, it is more consistent to write "Erechtheion"; otherwise we are using a Greek form for the one building, and a Latin form for the other.

obviously, as Mr. Bothamley puts it, "a great amount of mischief may be done." The primary pretence for this was that the tower was not in a safe state; but obviously, nothing ought to be done beyond ensuring its stability in its present state. The great value of Conway Castle lies in the fact that it is a fairly well preserved and hitherto untouched relic of mediæval castellated architecture; and when once "restoring" begins, its value in this respect will be destroyed.

L.C.C. Central School of Arts and Crafts: Exhibition of Students' Work. THE annual exhibition of students' work of the Central School of Arts and Crafts in Regent-street has been open this week to the public. The Technical Education Board of the London County Council established the school in 1896 to provide instruction in the more artistic trades, not with the intention of supplanting apprenticeship, but to supplement it with lessons in design and other branches of apprentice work which it is not now possible to learn in the workshop owing to the subdivision of processes in production. We take it that the great idea is that the instruction actually meets the needs of the trades touched upon, the only principle, that is, on which artistic excellence can ever be founded. William Morris's hopefulness in the future of art was based upon its again becoming a natural factor in production. This exhibition of work is one of the outcomes of that truth, the actual exhibits of which in no wise represent the real value of the six years' work done. Instruction is given in book-binding, stained glass, enamelling, silversmith's, goldsmith's, and jeweller's work, chasing, engraving, moulding, and casting in metal, wood-carving and gilding, writing and illuminating, embroidery, lithography, woodcuts in colour, architectural design, furniture design, cabinet work and wood inlaying, ornamental leadwork, &c. Some of the designs on the book covers are good and well executed, the work in this section, perhaps, being above the average of the others. The enamelling, silversmith's and jeweller's work leave much to be desired in both quality and quantity. The exhibits in wood-carving and gilding show successful application in picture and mirror frames, which are more suitable than most furniture for such treatment. Architectural design is scantily represented, but what there is seems to be on sound lines, and taught evidently in a way to interest the student. The furniture designs are very poor, the best work in this section being in applied inlay, a very good example being that of an unfinished mirror frame of mahogany inlaid with ebony and mother-of-pearl, designed by F. Lansdown, executed by P. A. Wells; a small box, by Walter Donovan, is also worthy of praise. We are sorry that the ornamental lead work is so scantily represented, the excellent work done in this section under Mr. Troup, assisted by Mr. Dods, being generally one of the most interesting features of the school.

and is to be congratulated on his successful handling of the problem of fitting a bazaar into the main avenue, using the conservatory as a butt to his design. The plan consists of a central open nave terminating in the Royal Pavilion, with covered aisles on either side, in which are placed the stalls, &c. The feature of the plan is the central rotunda surrounding the bandstand, which Mr. Speaight boldly inserts into the middle of the nave. The stalls are all alike: a simple arch made up of plain square lattice-work on which the variety of creeper will be the distinguishing mark of the stall. The administrative section is a simple and effective bit of wood design, with dainty windows and shutters. The usual bazaar decoration of indiscriminate festoons, bannerets, flags, art muslin, drop scenes, and the like are happily absent, and in their place is a simple treatment of festooned evergreens and Chinese lanterns hung from white poles, decorated in black line and capped with balls and clustered streamers. Over the open nave are hung at intervals burnished copper coronas and drop balls. The only flag used is one Royal Standard. The general effect is that of quiet dignity, without the sacrifice of joyousness, which is so essential in such design.

Flatford Mill, East Bergholt, Suffolk. IN pursuance of an order made by the High Court of Justice, Chancery Division, this property is to be sold at the Auction Mart on Wednesday next. The mill stands on the river Stour, in East Bergholt parish, lying in the midst of a country depicted in many of John Constable's most famous landscape paintings. It was, moreover, his home during some years of his youth, when, locally known as "the handsome miller," he worked for a year or two at his father's trade, having been inherited by his father, Golding Constable, a man of considerable substance, who owned other water-mills in East Bergholt and at Dedham, in Essex, in the immediate neighbourhood. Some say that Flatford Mill was John Constable's birthplace. But the picture entitled "View of the House in which the Artist was Born": in 1776, and presented by his last surviving child, Miss Isabel Constable, to our National Collection in 1887, delineates a red brick house—perhaps the house which Golding Constable built for himself at East Bergholt—quite different from that shown in the picture, "Boat-building near Flatford Mill," and in the landscape, "Flatford Mill, on the Stour," with a horse and a barge in the foreground and the lock in the middle distance, which Miss Isabel Constable bequeathed in 1888 to the National Gallery as the gift of herself, her sister Maria, and her brother Lionel. Golding Constable inhabited also during some period Willy Lott's house on the Stour, near Flatford Mill—a favourite subject of his son's pencil, and the original of the painting, "The Valley Farm," which Constable exhibited at the Royal Academy in 1835, and which, having belonged to the Vernon Bequest, is now in the National Collection, where also, too, is his painting (given by his daughter) of the porch of the parish church, East Bergholt.

Central Heating Plant. THE rapid development of huge buildings in all parts of the Metropolis, where thousands of persons dwell within limited areas,

is sufficient justification for the establishment of central stations from which hot water might be distributed for heating and for other domestic purposes. For example, the blocks of buildings now lining one side of Battersea Park could very easily be heated from a single point, and if the supply of hot water for domestic use and electric current for light and heat were also undertaken, it is quite possible that the venture would be profitable all the year round. Heating stations of the kind are already in operation in the United States, and from them hot water is supplied at fixed rates for warming radiators. Circulation is usually aided by the employment of pumps, and the arrangement is so efficient that water returned to the heaters does not lose more than 15 deg. F. As the flat system is essentially of a co-operative nature it is strictly logical to argue that auxiliary comforts and conveniences should be afforded in a similar manner.

Triangular Bridges. In a recent issue of the *Scientific American*, we notice a description of a curious bridge lately completed in Ohio, U.S.A. The structure takes the place of a wooden-covered bridge of similar design, and has three arms joining at the confluence of the Muskingum and Licking Rivers. The east arm consists of three spans 122 ft. in length, the west arm has two spans, one 120 ft. and the other 92 ft. in length, and the north arm possesses three spans, each 81 ft. long. Our contemporary remarks that this "is probably the only structure of a similar shape in the United States, if not in the world." As a matter of fact, it is not the only one in the world, for the well-known triangular bridge at Croyland, in Lincolnshire, built some 600 years ago, still remains as an interesting example of this singular form of construction. From records bearing the date of A.D. 943 it appears that the present structure at Croyland is the successor of a still earlier triangular bridge on the same site.

LETTER FROM PARIS.

THE Parisian public, for whom the underground railway will afford the most economical means of transport, are impatiently waiting for the time when the lines in course of construction will be finished. The line from Vincennes to the Porte Dauphine has been in work for two years, with a regularity which can leave no doubt of the ultimate success of the whole system, if completed. According to the statement of M. Bienvu, the engineer, the second line, from the Place de la Nation to the Place de l'Etoile by way of the boulevards, ought to be completed this year. The works for the line between the Place de la Nation and the Boulevard de l'Hôpital have been commenced, and it is supposed that this will be completed in the spring of 1904. The No. 3 line, Boulevard de Courcelles to Place Gambetta, has also been commenced, and it is promised that it will be finished in the early part of 1905. Then there are the other proposed lines of the system—Porte de Clignancourt to Porte d'Orléans; Boulevard de Strasbourg to Place d'Italie; Palais Royal to Place du Danube; and Place de l'Opéra to Auteuil, by Grenelle. It will take about seven years to finish all these; so that, if work continues regularly, Paris may hope to have its complete underground railway system by 1910, but hardly earlier. The work has already necessitated a loan of 165 millions francs. A second loan of 175 millions has been decided on; so that the total cost will amount to 340 million francs.

The Union Centrale des Arts Décoratifs has at last decided to open to the public the new rooms in its museum in the Pavillon Marsan.

Imperial Coronation Bazaar. THE designs for the Imperial Coronation Bazaar, to be held at the Royal Botanical Gardens, were on view at the Hospital for Sick Children in Great Ormond-street on July 1. Mr. F. W. Speaight is the designer,

The opening, which attracted a crowd of visitors, took place on the 5th ult., and the exhibition will continue open till August 31. The galleries are reached by a modest staircase of purely utilitarian character. As to the grand monumental staircase projected by Lefnel, and hitherto left in abeyance, it is understood that the Direction des Bâtimens Civils has at length given way before the arguments of the Arts Décoratifs and their President, M. Berger, and intends to construct the staircase as soon as funds can be set apart for the purpose.

At the Ecole des Beaux-Arts, during the last few days, 244 designs have been exhibited which were sent in competition for the prizes offered to pupils of provincial schools by the "Société d'Encouragement à l'Art et à l'Industrie," for the best design for decorative door furniture. It might have been as well if the instructions had been a little more definite, and had stated, for instance, whether it was to be door of a boudoir, or of a study, or of a dining-room. The designs are all in a very modern style, but the majority are characterised by good taste and show a good deal of cleverness in design. Nine prizes have been awarded, and on the whole the competition seems to have fulfilled its object. The first prize went to M. Bourgoin, a modeller.

At the Luxembourg an ingenious method of rotation set on foot by M. Bénédite, the curator, in Salle des Etrangers, has allowed of the works of the Belgian and Dutch schools being replaced for a time by the English and American schools. Among the works now on view are Mr. Whistler's well-known portrait of his mother, Mr. Harrison's "Solitude" and "En Arcadie," Mr. Sargent's "Carmencita," Mr. Brangwyn's "Marché de la Plage," the "Benedicite" of Mr. Lorimer, and several works by Mr. Humphreys Johnston. This selection will remain on view till January, when the works of some other foreign school will take its place.

M. Alfred Boucher, the eminent sculptor, has undertaken a scheme to assist artists, whether painters, sculptors, or engravers, who are starting in life with small means and are often hardly able to rent a studio. He has started a kind of students' colony at Vangirard, in a building containing more than fifty studios, with lodgings in connexion with them, and a common room for meals. M. Boucher has himself furnished the plans of the building. Everything about it, though plain, is cheerful and attractive. It has been given the name of "La Ruche"—"The Hive."

The Municipal Council of Paris is proposing to pay a special homage to the seventeenth-century architects who built the Invalides. It is proposed to erect on the green in the new square of the Avenue de Breteuil, the statues of Mansard and of Libéral Bruand. It is probable that the execution of the statues will be entrusted to M. Lenoir, the author of the statue of Berlioz which was illustrated in the *Builder* some time ago.

The "Chef du Service des Beaux-Arts" of the Paris Municipality has been commissioned to communicate with a certain number of silversmiths and medal-engravers with a view to the production of a personal ornament in gold and silver, heightened with enamel, as a distinctive badge to be worn by municipal councillors at public fêtes and ceremonies. The existing badge, designed in 1873 by Viollet-le-Duc, is regarded as too heavy and massive.

The jury appointed to make the awards in the competition called "Concours de Façades" will begin its visits in a few days to the sixty houses erected in Paris in 1901, which have been entered for the competition. The jury is composed of five municipal councillors, M. Bouvard (Chief of the Service of Architecture), M. Sauger (Chief Architecte-voyer), and two architects selected by the competitors.

The Prefect of the Seine has now officially submitted to the Government the scheme for the prolongation of the Avenue de la Grande Armée as far as Nanterre. This fine proposed avenue, when completed, will extend as far as the middle of the forest of St. Germain. The estimated cost of the portion now proposed is 40,000*l*.

The Committee of the Société des Amis des Monuments Parisiens, after carefully studying the question of the new boulevards to be formed on the ground to be left vacant by the demolishing of the fortifications from Auteuil to the Porte Maillot, has decided to submit the following proposals to the Prefect of the

Seine:—The height of the houses to be built along the new boulevards shall be limited to three stories; their façades shall be placed at a certain fixed distance behind the line of frontage of the boulevard, with gardens before and around each house; the front gardens shall be separated from the boulevard by railings and not by walls.

The Prefect of the Seine has submitted to a Government Committee a scheme for installing works at Paris for the destruction of domestic and town refuse. It is a question of either putting down at once in four quarters of Paris complete installations, sufficient to deal with the whole of the town refuse, at an estimated cost of 408,000*l*, or of making two small trial installations at a cost of about 4,000*l*. The special committee will have to decide this point.

From the Report just published by the Committee for the supervision of the disposal of sewage from Paris, it appears that out of the quantity of 45,000 million gallons coming from the sewers of Paris and its suburbs, 41,000 million gallons have been distributed over the sewage farms, the surplus still being allowed to flow into the Seine. Further ground will shortly be devoted to the treatment of this portion, but it will still be some time before the vexed question of the sanitation of the Seine will become an accomplished fact.

The first premium in the competition for plans and designs for the new Mairie at Corbeil has been awarded to MM. Tavernier & Allange, architects, and their designs have been adopted for execution.

In the newly-created section of "decorative art" at both Salons, it was decided that the exhibitors would be allowed to compete for medals and awards on the same footing as their confrères of painting, sculpture, and architecture, &c. There has, however, been some disappointment and no little dissatisfaction caused by the fact that the awards have been attributed to the manufacturers and those who "edited" the various art objects, and not to the artists who designed them, the names of the designers not even appearing in the catalogue. The artists have, however, now managed to obtain their assumed rights as regards the awards made by the Société Nationale des Beaux Arts, but the Salon des Artistes Français has refused to recognise these rights.

The crematorium at the cemetery of Père Lachaise having become insufficient to meet the demands, it has been decided to construct a second installation in the cemetery of Montparnasse.

The recent proposal to establish underground conveniences at Paris in the manner of those in London has met with little success up to the present. Of the two positions selected for the first two installations, the Place de la Madeleine and the Place du Théâtre Français, the former has been abandoned owing to the objections made by the owners and tenants of houses and premises surrounding the square. Another position is being sought for.

A competition has been opened between architects, painters, sculptors, and art workers for designs and models of artistic street signs and shop fronts and business signs. The designs and models have to be sent in by November 15. The Paris Municipal Council has voted a credit of 400*l*. towards the expenses of the competition, and prizes amounting to 320*l*. will be awarded. The jury will be composed of members of the Town Council, of the Chamber of Commerce, the Académie des Beaux-Arts, members selected by the competitors, M. Edouard Dédalle, the chiefs of the services of Architecture, Prefecture, &c.

The Commission du Vieux Paris has submitted the following proposal to the Municipal various streets in Paris by adding to the summary indication of the acts or the work of the person whose name is given to the street, a medallion portrait, to be designed and executed at the Sévres manufactory.

On Saturday last (June 27) the new pavilions of the Hospital of the Maternité at Paris were inaugurated by M. Mourier, Director of the Assistance Publique. The architect is M. Rochet, architect of the Académie de Médecine, and the new pavilions contain 110 beds.

The seat left vacant at the Académie des Beaux-Arts by the demise of M. Coquart has been filled by M. Girault, architect of the Petit Palais at the Champs Elysées, who was elected by a majority of twenty-two votes in

competition with MM. Gaudet, Scellier de Gisors, Laloux, Formigé, Paulin, and Thomas. M. de Nolhac, curator of the Versailles Museum, is preparing on the upper floors of the northern portion of the chateau, four new rooms to be specially devoted to pictures and art objects of the period of Louis XIII.

M. Paul Escudier is preparing a scheme for an artistic theatre at popular prices, to be subsidised by the municipality and the Government. It is proposed to utilise the picturesque arena of Lutèce, and arrange the theatre in such a manner as to afford open-air representations in the manner of those given at Beziers and Orange.

MM. Paul Guadet (son of the architect of the Théâtre Français) and Henri Prudent, who received the medal awarded this year by the Société Centrale des Architectes for their measured drawings of the theatre built by Louis at the Palais Royal in 1790, on the position of the present theatre, have decided to complete their drawings of the various interesting remains discovered in the ruins of the Théâtre Français after the recent fire, and to present their finished work to the State.

The viaduct now being constructed along the Boulevard de la Villette, to continue as an elevated line the new metropolitan railway from the Place de l'Etoile to the Place de la Nation, is nearly completed. This viaduct, of a length of about 13 miles, has cost 320,000*l*.

The new Salle de Travail at the Archives Nationales is now opened to the public. This reading-room, one of the most elegant now existing at Paris, was arranged, decorated, and furnished by M. Thomas, one of the architects of the Grand Palais des Champs Elysées. The decoration has been kept to the style of that existing in the old Hôtel de Soubise; the number of seats is fifty-eight, and each seat is supplied with writing materials and a decorative inkstand of white Sévres porcelain.

A credit is being asked for the purpose of restoring the interior of the old Hôtel de Lauzun, on the Quai d'Anjou at Paris. The walls are covered with sculpture and frescoes, and it is proposed to make a careful examination of the various paintings, which will probably reveal signatures of well-known old artists.

It is proposed to build a new central railway station at Paris, on or below a portion of the ground now occupied by the Halles Centrales. This station is specially required for the purpose of forming a junction between the lines of the Nord railway and the Paris-Lyons-Marseilles; if the scheme is put into execution the present central markets will be transferred to a position on the quays of the Seine, with a special port for the river service.

SOCIETY FOR THE PROMOTION OF HELLENIC STUDIES.

THE annual meeting of this Society was held on Tuesday at Burlington House, Sir Richard Jebb, M.P. (President), in the chair.

The Report of the Council for the session 1901-02 stated that the work of the Society had been carried forward in its several departments with energy and effect. Three general meetings had been held and had been well attended. The Council had again made a grant of 100*l*. to the Cretan Exploration Fund. By the aid of that Fund Mr. Evans last year carried further his remarkable excavations on the site of the Knossos, while Mr. Hogarth made some interesting discoveries at Kato Zakro. The two explorers described their results at some length in the recent issue of the "Annual" of the British School at Athens. The response to the appeal issued by the managers of that fund last autumn was unfortunately so inadequate that it was found necessary to confine its operations during the present season to the work at Knossos upon which Mr. Evans had again been successfully engaged, though it was doubtful whether the funds now available would suffice for the completion of the excavations. Considering the unique importance of those Knossian discoveries to the history of ancient art and civilisation, as recognised by archaeologists in all parts of the world, it would indeed be a matter of profound regret if Mr. Evans were to be prevented by lack of means from carrying them to a satisfactory conclusion. Meanwhile another very promising Mycenaean site, at Palaekastro, near Sitia in Eastern Crete, which Mr. Hogarth had hoped to excavate under the auspices of the Cretan Exploration Fund, had been under-

taken by the British School at Athens. Some members would probably be aware that a British school had now been established at Rome on much the same lines as the school at Athens. Although the financial position of the new school was far from secure, a competent director had been found in Mr. G. McNeil Rushforth. Several good students had availed themselves of his guidance, and the nucleus of a library had been formed in excellent rooms secured for the school in the Palazzo Odescalchi.

Satisfactory progress had been made with the facsimile of the Codex Venetus of Aristophanes, and it was hoped that it would be ready for issue in the course of the autumn. Another special publication, which was announced last year, that of the Report on the very important excavations undertaken by the British School at Athens on the site of the Phylakopi, in the island of Melos, had also made good progress, and it was hoped that the volume might appear before the end of the year. The Society had been invited to send a representative to the celebration of the tercentenary of the Bodleian Library at Oxford next October, and as Sir Richard Jebb had already agreed to attend the celebration in another capacity, Mr. Macmillan, the hon. secretary, had been deputed to represent the Society. The work done in the library during the year again showed considerable progress, and the catalogue was now being printed. The year, too, had been a period of steady extension and increased use of the photographic collection. The balance-sheet showed that the ordinary receipts during the year had amounted to 1,022*l.*, against 1,037*l.* during the previous year. The ordinary expenditure had amounted to 665*l.*, against 716*l.* Forty-nine new members had been elected during the year, while thirty-seven had been lost by death or resignation. The present number of subscribing members was 759, and of honorary members twenty-five, the names of Professors Frederico Halbherr and Adolf Wilhelm having been added last year.

The Committee briefly proposed the adoption of the report, which was seconded by Mr. G. N. Bikelas, and carried.

Mr. Arthur Evans then gave a short account of his continued exploration of the "Palace of Minos." He said that the season's work in the Palace of Knossos, which began on February 12 last and had been continued to this month, had been fertile in results beyond all anticipation. It seemed destined to be rather a campaign of finishing up and of rounding off a fairly ascertained area. But besides the chambers that remained to be explored immediately contiguous to the Hall of the Double Axes and that of the Colonnades, excavated last year, the whole building was found to have a considerably larger extension on the eastern side than had been expected. The building was thus seen to have climbed down the slope in descending terraces to a point some 90 metres east of the northern entrance. Considerable remains were uncovered of the eastern boundary wall, or, rather, of four separate walls in immediate contiguity to each other. The new rooms adjoining the principal halls of the central part of the eastern quarter proved of great interest. South of the Hall of the Double Axes was a chamber flanked on two sides by colonnades and light areas and provided with a small bathroom and a private staircase leading to the upper rooms. Throughout all this region it had been possible to support a large part of the upper story, and a most elaborate system of drainage had been found, including latrines and drain pipes of advanced construction. Further fine remains of fresco had come to light—naturalistic foliage and lilies, an aquarium of fish, and a lady in a jacket and diaphanous chemise. It had also been possible to reconstitute an important panel of wall painting from a room excavated last year, giving a complete and highly sensational scene from the bull ring, in which girl toreadors took part. Large fresh deposits of inscribed tablets had come to light, the general purport of which was shown by the appearance of certain idiographic signs, such as swords and granaries, and those indicative of persons of both sexes. The largest deposit referred to percentages—some with the throne and sceptre sign before the amount—apparently recording the king's portion. A piece of a Mycenaean painted vase, with linear characters, and two cups with inscriptions written within them in a kind of ink, supplied wholly new classes of written documents. Great numbers of clay seal impressions were brought

out, including a fragment of one stamped by a late Babylonian cylinder. In magazines below the later palace level, and belonging, therefore, to an earlier building, occurred seal impressions with pictographic signs, together with an abundance of painted pottery of the "Kamaies" or "Early Minoan" class—including specimens, which for egg-shell-like fineness of fabric and beauty of form and hue, had never certainly been surpassed. Among the finds of smaller objects, two stood out respectively as of first-rate importance in the history of architecture and sculpture. One of these was the discovery of parts of a large mosaic consisting of porcelain plaques, a series of which represented the fronts of houses of two or three stories. Fragmentary as most of these were, it was possible to reconstitute a fair number with absolute certainty, and thus to recover an almost perfect picture of a street of Minoan Knossos in the middle of the second millennium before our era. The different parts of the construction—masonry, woodwork, and plaster—were clearly reproduced, and the houses, some of them semi-detached, with windows of four and six panes, oiled parchment being possibly used for glass—were astonishingly modern in their appearance. Other plaques found with them show warriors, and various animals—a tree, a vine, and flowing water—so that the whole seemed to have been part of a large design analogous to that of Achilles' shield. The other find—made towards the close of the excavation—which threw a new light on the art of Daedalus, was the discovery of remains of ivory figurines. Those were carved in the round, the limbs being jointed together, and, to judge by the most perfectly preserved, they seemed to have represented youths in the act of springing, like the cowboys of the frescoes. The life and balance of the whole, the modelling of the limbs, and the exquisite rendering of details, such as the muscles, and even the veins, raised those ivory statuettes beyond the level of any known sculpture of the kind of the period to which they belonged. The hair was curiously indicated by means of spiral bronze wires, and the amount of gold foil found with them suggested that they had been originally—in part at least—coated with gold; in which case they would have been early examples of the Chryselephantine process. The new materials bearing on the local religion were extraordinarily rich. Remains of a miniature temple of painted terra-cotta, with doves perched above the capitals of columns, occurred in a stratum belonging to the pre-Mycenaean building. In the palace itself a series of finds illustrated the cult of the double axe and its associated divinities. A gem showed a female figure—apparently a goddess—bearing this sacred emblem. But more important still was the discovery of an actual shrine belonging to the latest Mycenaean period of the Palace, with the tripod and other vessels of offering still in position before a base upon which rested the actual cult objects, including a small double axe of steatite, sacred horns of stucco, with sockets between them for the wooden shafts of other axes, terra-cotta figures of a goddess—cylindrical below—and in one case with a dove perched on her head, and of a male votary offering a dove. Of great interest was also the discovery in an eastern corridor of the Palace of a decorative wall-painting, consisting of a series of labyrinths, more elaborate than those of the later coins of Knossos. Owing to the constant need of supporting the upper story, much of the work had been of a difficult and at times dangerous nature, entailing the constant employment of large numbers of carpenters and masons. Vast masses of earth had also to be removed from parts of the site, and nearly 250 workmen were constantly employed. Throughout the whole work he had the devoted assistance of Dr. Mackenzie in superintending the excavation, and of Mr. Fyfe on the architectural side. There still remained a certain amount of delimitation and further exploration of the strata below the later Palace to be carried out next season.

Mr. R. Carr Bosanquet, the director of the British School at Athens, then gave a short address, pointing out the nature of the work which he had carried out in the eastern parts of Crete. He said that the excavations made had placed it beyond doubt that the Mycenaean capital of East Crete lay at Palaeokastro. The remains there were scattered four miles long and two miles wide, and not only was the whole plain dotted with homesteads, but close

to the sea there was a very large straggling settlement which one might dignify by the name of a town. Near the sea there were a number of well-to-do upper-class houses, and there were also poorer houses which might possibly have been the habitations of fisher-folks. One of the poorer houses was interesting as showing that the place had been suddenly abandoned more than once; and interesting finds were made at both levels. The richer houses yielded very important results. Hitherto they had been uncertain how far the luxury and refinement to which the remains of the Palace of Knossos testified had been widespread. They ascertained that there were quite a large number of houses at Palaeokastro in which wall frescoes had been used, and a typical house which they excavated, though not described as a palace, was distinctly the house of a wealthy and refined proprietor. It had upwards of forty rooms on the ground floor, and it had an upper floor in which many more important living rooms were placed. There were remains of two well-constructed staircases leading to the upper floor, one of them 7 ft. wide. On the ground floor there were living rooms constructed much on the same plans as the living rooms in the Palace of Knossos. Mr. Bosanquet also described the results of the excavations in some of the cemeteries, and said there could be no doubt that future excavations of the tombs would yield very important results. His colleague, Mr. Cumming, the young architect who accompanied him in the work and rendered him very valuable assistance throughout, was still at Athens.

A hearty vote of thanks was accorded to Mr. Evans and Mr. Bosanquet for their interesting addresses, and a similar compliment was paid to the Chairman for presiding.

INTERNATIONAL TRAMWAYS EXHIBITION, AGRICULTURAL HALL, LONDON.

SINCE the first International Tramway and Light Railway Exhibition was held in 1900, a remarkable development has taken place in connexion with tramway enterprise throughout the whole country, and particularly in the metropolitan district. No doubt the exhibition has contributed in some measure to this desirable end, but, on the whole, we think an institution of the kind should be regarded more as an index of industrial progress than as an educational medium. From this point of view it is clear that great advances have been made, for while two years ago the number of exhibitors was less than one hundred, to-day nearly two hundred exhibits are to be seen at the Agricultural Hall. The visitor who makes an examination of the machinery and appliances on view cannot fail to be struck by the evidences of progress which are almost universally displayed.

Two years ago British makers were certainly not in a position to cope with the demands of the country for tramway plant, but since then new works have been built and equipped with modern machinery, new methods of work have been adopted, and to day many important firms engaged in the industry are fully prepared for the further extensions of tramway and light railway systems.

Most of the cars exhibited at Islington serve to demonstrate the enterprise of provincial corporations and traction companies. Messrs. Milne & Co., of Hadley, Salop, show several admirable vehicles, amongst which are a car to carry eighty-three passengers, made for the Tyneside Tramways and Tramroads Co.; a sample of 100 cars now being built for the Bradford Corporation; and a most luxurious—perhaps too luxurious—"state occasion" car built for the Bourne-mouth Corporation. Messrs. Hurst, Nelson & Co., of Glasgow and Chesterfield, exhibit a car of recent type arranged with extended canopies, wide staircases giving access to the roof, outside "dry" seats, and patent life guards at each end. In the stand of Messrs. Dick Kerr & Co., of Preston, a useful single-deck combination car is exhibited, which provides accommodation for inside and outside passengers on one floor. The safety and comfort of outside passengers are considered by the adoption of panelling, folding gates, wind screens, and storm blinds. A welcome demonstration of metropolitan improvement is afforded by the London County Council car on the same stand, built for the South London

lines now in course of construction. The seating accommodation is for sixty-three passengers, and the car constitutes a decided advance upon the vehicles hitherto provided by the older tramway companies of London. A well-designed car is exhibited by the British Electric Car Co., of Manchester, its special features being the special arrangement of the stairway causing passengers to move continually in one direction when descending, and the placing of the doorway at such an angle that passengers naturally tend to step off the car at a point where they do not interfere with those descending from above.

Two types of car are shown by the British Electrical Engineering Co., of Loughborough, one of these being a sample of the vehicles now in course of construction for the Manchester Corporation. Amongst the few foreign exhibits we may mention a section of a semi-convertible car made by the J. G. Brill Co., of Philadelphia, U.S.A., and designed specially for summer service in such manner that it can be changed from a closed to an open car in five minutes by swinging the side windows against the roof. The European McGuire Manufacturing Co., of Bury, exhibit a solid steel freight truck, a snow sweeper and plough built for the Bolton Corporation in conformity with the Board of Trade regulations, and a life-saving guard which has been very successfully used in the United States. One of the most interesting features of the Exhibition is furnished by the British Westinghouse Co., of Manchester, who exhibit an electric tramway in actual operation upon a track 310 ft. long in the centre of the hall. Visitors can ride on the car, which is one of the Milne type, and every facility is offered for inspecting the details of the electrical equipment. The car is fitted with the Westinghouse magnetic brake, a combined track, wheel, and axle brake in which the forces are so proportioned as to render wheel-skidding practically impossible. The action of this powerful brake is entirely independent of the main current supply, and the required energy is furnished by the momentum of the car itself. Application and control of the brake are effected by means of the main handle of the controller, and the brake cannot be applied while the motors are receiving current. This brake certainly deserves careful examination by tramway engineers and officials. Numerous auxiliaries in connexion with tramway cars meet the eye of the visitor on every hand, and conspicuous among such are various forms of folding and other seats for wet weather. Contrivances of the kind have not hitherto been universally approved. Some which have been adopted do not appear to be popular with the public, and others to which there seems to be no objection from a passenger's point of view have not been approved by the companies. Up to the present, the most acceptable form appears to be that made by the Never-wet Seat Co., of Bolton, a wire-coil seating which can be fixed over an ordinary wooden seat. The coils are of non-corroding wire, formed in such a way that water instantly runs away from the surface. A tank containing a seat top is included in the exhibit, arranged so that the efficiency of the appliance can be practically demonstrated.

Messrs. Askham Bros. & Wilson, of Sheffield, have a very comprehensive display of points and crossings as supplied to many large cities and towns in the provinces. A somewhat similar collection is shown by the Hadfield's Steel Foundry Co., of Sheffield, who, in addition to the manufacture of points, crossings, car-wheels, and other details, undertake the construction of tramway tracks complete for both the overhead and conduit systems, ready for laying direct in the road. Another interesting exhibit is that of the Lorain Steel Co., of Lorain, Ohio, comprising one-half of a cross-over designed by Messrs. J. G. White & Co. for the London County Council electrical tramways now being constructed in the South of London. The arrangement, in many respects similar to that adopted on the leading American lines, is practically novel in this country, and the switching arrangements present a new departure in slot switch construction. The British Schuckert Co. exhibit a switchboard and contact apparatus for the purpose of exemplifying the advantages of the surface contact system of traction, and there are several stands where appliances relating to the trolley system are shown. Car wheels, axles, motor trucks, motors, controllers, and electrical apparatus for tramway use are to be found in considerable variety, most of

the leading firms being well represented. Engines and dynamos of large size are nowhere to be seen, although many of the suitable for small lighting installations. The British Westinghouse generating set of about 125 h.p., providing current for the car in operation, is well worth inspection; and so also are the Thorneycroft enclosed engine driving a Crompton dynamo, and the stands of Messrs. Crossley & Co., Bruce Peebles & Co., the International Electrical Engineering Co., and others. Cables, conduits, instruments, and accessories are shown in some profusion, whilst several firms represent their special types of steam boilers by models and sections, and makers of auxiliary appliances, such as mechanical stokers, fuel economisers, water softeners, steam traps, valves, and fittings make a fairly representative show. While we notice the absence of several leading firms whose names are intimately associated with the progress of electrical engineering in this country, it must be admitted that the exhibition satisfactorily covers every department of work connected with electrical tramways, and we feel sure that visitors will find ample material for profitable consideration in the collection of apparatus now brought together. Further advantage should follow the concurrent congress, in the adjoining Bernal Hall, of the International Tramways and Light Railways Association and the Union Internationale Permanente de Tramways.

PROPOSALS FOR RURAL DISTRICTS' BY-LAWS.*

THE local administration of public health in England is placed by law in the hands of Councils, of which there are the following several kinds:—County Councils, whose jurisdiction extends over counties or divisions of counties, in the old familiar sense of the word, as when we used to say there are fifty-two counties in England and Wales; County Borough Councils, for boroughs containing more than 50,000 inhabitants; Borough Councils, for incorporated towns containing less than 50,000 inhabitants; Urban District Councils, for towns not incorporated and for parishes of a suburban character outside the boundaries of cities, but hardly to be called separate towns; and Rural District Councils, for all the country districts lying outside the previously mentioned localities.

The immense progress made by the great majority of the Municipalities and Urban Districts during the twenty-seven years which have elapsed since the Public Health Act of 1875 was passed is one of the most striking features in the history of the nineteenth century as it relates to the national life of England. It is perfectly well known by those who are interested in the problems of sanitation, whether national or local, that one of the wisest steps ever adopted by our statesmanship was the bestowing of large general powers upon Local Authorities for the purposes of self-government and self-development. But nearly all that has been done in this direction belongs to the thickly populated districts, and in the sparsely populated neighbourhoods there are not the requisite resources, intellectual and moral and material, for dealing with many important questions of public health and welfare which are rapidly becoming or are already become urgent. The Rural District Councils are frequently composed of persons drawn from the very classes against whom the Sanitary Authority ought to proceed for the protection of the public, and this fact often results in the appointment of unsuitable officials, or else the obstruction and persecution of capable and honest officers, who endeavour to do their duty without fear or favour. Of course, it is not suggested that this unfortunate state of things is unknown in Urban Districts, or that it characterises the working of all Rural Councils; but I merely allude briefly to a fact which is widely known and deeply deplored among non-official sanitarians.

The absence of a strong and intelligent public spirit, to stimulate and direct the activity of Rural Councils, has such lamentable results as regards the public welfare and security because so much of the legislation directed to those ends is permissive and not compulsory.

* A paper read at the Congress of the Institute of Sanitary Engineers, at Buxton, on Tuesday, the 17th ult., by Mr. E. Durant Cecil.

By-laws, as the word implies, are local in their application, and Rural Councils are not obliged to have any sanitary by-laws in force at all. They may obtain power to make and enforce by-laws for the purposes of public health, either by applying direct to the Local Government Board or by adopting Part III. of the Public Health Acts Amendment Act of 1890; but they only "may" do so, and, as a matter of fact, the vast majority have not adopted or made any sanitary by-laws, but are simply under whatever sanitary regulations apply to the nation at large. For many years no attempt was made to discriminate between the requirements of town and country districts in the matter of the regulation of roads, buildings, drainage, &c., so that either a district had no regulations of the kind, or else it became an Urban District, with the full code of the Model By-laws issued by the Local Government Board; but last year that body published a set of "Model By-laws for Rural Districts," applicable to "new buildings and certain matters in connexion with buildings." It is generally admitted that these are only tentative and experimental, and it is understood that the Local Government Board will welcome rather than resent intelligent criticism, such as I trust, will be offered in the consideration of the subject by our Institute. But in connexion with the proposals which I am about to lay before you, it is strongly my opinion that whenever a satisfactory code of Model By-laws shall have been drawn up, and shall have been approved by the Local Government Board, such by-laws ought to be put in force throughout all the Rural Districts, without waiting for the Local Councils to take the initiative.

Before proceeding to criticise *seriatim* the Model By-laws already alluded to, which were published last year by the Local Government Board, I wish to offer one remark as to the wording of all these and similar by-laws. Why should every clause begin with a formula repeated in full with dreary monotony, "Every person who shall erect a new domestic building," or "Every person who shall lay out a new street"? As in some sections, which are distinguished by letters instead of numbers, the pronoun "he" is often used, and as in other cases it is quite possible to describe the proper construction of a building or street without referring to "every person," why should not the shorter and simpler method of expression be used in drawing up by-laws? It will be necessary for me to refer to the copies of the by-laws by pages or sections, because it would overload this paper to quote in full what will be discussed.

By-law 3, on p. 16, deals with the covering of the whole site with 6 in. of concrete, but, instead of being absolutely required, the dangerous qualification is inserted, "wherever the dampness of the site or the nature of the soil renders such a precaution necessary." There ought to be no exceptions to the application of this law, which need not press heavily as regards cost, because a much more suitable, sanitary, and durable floor than the usual kind of boards on joists would be formed with wood blocks bedded in tar or asphalt over the concrete foundation. This would modify the following by-law slightly, because the "damp course" (which in an official document surely ought to be called damp-proof course) would have to be placed at the level instead of "beneath the level" of the lowest floor, if constructed as suggested.

No. 5 is very indefinite as to the manner in which the top of a wall, when forming a parapet, should be protected from rain. It would be better either to distinctly prescribe that an angular coping wider than the wall itself, shall be used, or that the last five courses shall be laid and flushed in Portland cement, or omit the by-law altogether.

By-law 6, which regulates the distance between the faces or front walls of new buildings, is admirable in principle, but I would suggest "36 ft." wherever the words "24 ft." occur, for there can be no sufficient reason in country districts, at any rate in ninety-nine cases out of a hundred, for building houses with less than 36 ft. between their opposite fronts. In the same way, I suggest that the dimensions of open space in By-law 7 are utterly inadequate. Of course, it might be argued that a cottage in the country, with 150 sq. ft. of space belonging exclusively to it, is more healthfully situated than a cottage with four times as much space in the middle of a town, because there is so much open country all round; but this is a very fallacious argument, for it is impossible to

know how thickly a district may be built upon in future times, and, in fact, some of the worst slums, which are to-day the despair of Sanitary Authorities, came into existence originally as rural cottages. I propose, therefore, 500 sq. ft. instead of "150," leaving to each Authority the opportunity of modifying the requirements under special and exceptional circumstances.

In the Model By-laws for rural districts there is no provision regulating either the thickness or the materials of the walls of houses, and in regard to this department of the subject it is exceedingly difficult to strike the happy medium between an injurious laxity which might allow unsafe and unhealthy buildings to be erected, and an elaborate interference with every detail of construction, such as, for instance, is enacted in the draft by-laws for the rural district of Maldon, in Essex, concerning which our esteemed President remarked that "they wanted reducing to about one-fourth of their bulk." It is perfectly certain that in very many districts where new cottages are urgently needed, the enforcement of detailed by-laws applicable to important towns must prohibit the erection of such dwellings as are suited to the means of the rural labourers. It is highly desirable to discover a method of constructing cottages for country districts in a sound and sanitary manner, which, let at a rent of from 2s. to 3s. per week, will return about 4 per cent. upon the outlay. In other words, healthy homes, containing not less than four habitable rooms each, and each of those rooms containing not less than 800 cubic feet, must be erected and completed at an average cost of 150l., including the site. There are some favourably situated localities where this might be done, even under such detailed regulations as those for urban districts, in proof of which I learned a short time ago from a respectable firm of builders that they had put up a number of cottages for themselves at a cost of 3d. per cubic foot, calculated in the usual way from the underside of the footings to half the height of the roof.

Although in this case there was a brickfield adjoining the site, and there was no builder's profit included in the cost, it seems to me strikingly small. Personally I am strongly in favour of allowing cottages to be built with walls of Portland cement concrete 6 in. thick, or brick walls 4½ in. thick, with a thin but perfectly smooth rendering of cement mortar, mixed half-and-half with sharp sand on the outside. There are also two or three kinds of patent concrete slabs which, I think, might be quite safely employed for one-story dwellings, having the additional advantage that they are all turned out from moulds cut perfectly true, and are, therefore, likely to present a more uniform surface to the weather than either brickwork or concrete mixed *in situ*.

We must not forget the possibility of constructing very comfortable and satisfactory dwellings in timber, and, of course, wherever the Urban By-laws have not been adopted, there is nothing to prevent this material being used. But it seems very desirable that a middle course should be chosen between the total absence of regulations as to the materials of construction on the one hand, and the hard-and-fast requirement of "brick walls not less than 9 in. thick" on the other. The danger from fire, although a very obvious one, and the one most readily brought forward when wooden cottages are proposed, cannot be expected to impress very strongly any one who is acquainted with the conditions of Colonial life, in which the vast majority of the dwellings are wholly constructed of timber, with the exception of the chimney-flues. But this allusion suggests one side of the question, which ought to be dealt with if any restriction whatever is placed upon the employment of building materials in rural districts. Timber construction may reasonably be allowed, but all kinds of timber are not suitable for the purpose; and there are enormous quantities of cheap timber imported into Britain which are too soft and porous and green to be safely used in this way, as the same qualities which render wood the easiest prey of fire are those which make it insatiable and quickly perishable. On the other hand, Colonial woods are nearly all exceedingly hard, dense, durable, and not easily inflammable.

Some months ago a hot discussion occurred about the construction of a number of cottages in a district either near to or within the New Forest. As far as could be made out by an unbiassed reader, the owner of an estate was

honestly endeavouring to meet the very urgent demand for additional dwellings by the erection of timber cottages, at such a cost as would allow him to let them at a very low rent, suited to the needs of the peasantry. But some enthusiastic sanitarians discovered that these cottages were being put up without any reference to sanitary by-laws, and without official inspection. Had by-laws of the usual type been in force there, and had an inspector of the average intelligence been empowered to interfere, it is practically certain that those dwellings would not have been erected, nor any others in their place, and another instance would be added to the hundreds that exist of the compulsory migration of rural inhabitants into towns on the other.

By-laws 8, 9, 10, and 11 deal with the important questions of lighting and ventilation, and the provision that the area of the window or windows of a room shall be not less than one tenth of the floor area certainly ought to be retained, even if not made more stringent. At the end of By-law 9 I suggest that the sentence should read, "Shall construct every such window so that at least one half may be opened, and so that the opening may extend in every case to the top of the window, which shall not be in any case more than 6 in. below the ceiling." In By-law 11, I suggest that when a room is constructed with a fireplace and proper fire, there should be an opening into the flue just below the ceiling, as well as the usual stove, because there are innumerable bedroom fireplaces which are never used, and, therefore, are useless for the purpose of ventilation.

The following group of by-laws, which are placed under the heading, "With Respect to the Drainage of Buildings," are of the familiar type as regards glazed pipes, not less than 4 in. in diameter, with proper falls, water-tight joints, traps, Y-junctions, and not T-junctions, and ventilating pipes or shafts, and waste pipes discharging over gulleys instead of into the drain direct. All these, which include Nos. 13 to 19, on pp. 20 to 24, I think should stand as they are, with one addition to the effect that, wherever the main drain which leads to the sewer or cesspool is joined by a branch drain, there shall be an inspection chamber, and the junction shall be made in open channel pipes.

A very difficult group of by-laws deals with "water-closets, earth-closets and privies." Of course, water-closets are, in country districts, the exception rather than the rule, and even where circumstances permit them to be used, I regard the advantages of the system to lie, not in the closets themselves, but in the water-carriage of the sewage. There are many people who think that a water-closet furnished with an automatic flushing cistern is the best possible form of closet. But it is perfectly certain that the carelessness, dirtiness, and indolence of large numbers of human beings are just as effectual in misusing water-closets as they are in rendering earth-closets and privies objectionable. Wherever a system of sewers exists, which we know is seldom the case in the country, by all means insist upon water-closets and flushing cisterns, but it is an arguable point whether it is not more mischievous to drain houses into cesspools, than to dispose of the excreta upon or within the soil or the garden. There are by-laws which provide that every cesspool shall be watertight, and shall not allow either leakage from it or absorption by it, and also that there shall be adequate means of access for removing the contents, and it would not be difficult to enforce these regulations when cesspools are first built, but it is exceedingly difficult and expensive to keep all existing cesspools under efficient inspection, and to empty them at sufficiently short intervals. If we bear in mind that whatever system is adopted it will be open to some objections, I think that an earth-closet built quite separate from the house, at a distance of at least 25 ft., instead of the "10 ft." of By-law 25, and provided with a movable receptacle arranged so that it can be withdrawn through the back wall of the closet, instead of a large fixed receptacle, which would require much more labour to empty, and with "suitable means or apparatus for the frequent and effectual application of dry earth or other deodorising substance, or of ashes, dust, or dry refuse," will be, upon the whole, the simplest and most sanitary arrangement.

One cannot but be surprised that in the model by-laws which we are considering, which number only fifty, including several of a formal or routine character, there are six

dealing with ashpits, Nos. 33 to 38. As a matter of practical common sense, country cottages with decent gardens do not require ashpits at all, particularly so if they have earth closets such as I have just suggested; but it is to be remarked that the detailed regulations, which actually include the building of the ashpit with "brick walls 9 in. thick," and a solid floor and a roof and a ventilator, do not say that every house shall be provided with an ashpit, but that "every person that shall construct an ashpit in connexion with a building shall" construct it in such and such a way. I suggest, therefore, that when the by-laws need to be shortened and lightened this portion should be omitted.

As to the By-laws 39 to 42, "with respect to cesspools in connexion with buildings," the blank distance between any cesspool and the nearest dwelling-house or building used in business should be filled in at 30 ft., at least. The varying circumstances of different districts would require the blank distance between the cesspool and "any well, spring, or stream of water," to be filled up by the Council making the by-laws. The wording of this By-law No. 40 seems to me to need strengthening, because although the expression "domestic purposes" might be held to include supplying drink for cattle, sheep, and horses, it is hardly definite enough, in view of the terrible fact that epidemics of typhoid fever have been caused by cows feeding on rank grass, the moisture of which was derived from the overflow of a cesspool. It is also a disquieting thought that water used for washing out milk cans, such as are sent by rail, might not be regarded as used for "domestic purposes." As it was with ashpits so it is with cesspools, no regulation is provided as to whether dwellings shall or shall not be drained into cesspools, the particulars referring to "every person who shall construct a cesspool in connexion with a building." In No. 42 there is a very good provision as to the construction of cesspools, that they shall be built of "good brickwork in cement, properly rendered inside the cement, and with a backing of 9 in. of well-puddled clay, or of at least 6 in. of cement concrete around and beneath such brickwork"; but the last words of this sentence are a very weak alternative, and should certainly be omitted.

The by-law as to the closing of buildings or parts of buildings which are unfit for human habitation, calls for no special remark beyond cordial approval. But it suggests the unfortunate circumstance that in many cases the owners of insanitary property are either members of the District Council, which should take action, or else have such influence with its members as to nullify a by-law of this kind; and, therefore, I strongly hold that when information has been given either by a public official or private individual as to any building being grossly insanitary or otherwise unfit for habitation, upon the failure of the Council to take action within a reasonable time—say, four to six weeks—the informant should have the right of applying to the County Council, and that the latter, after inquiry, should have powers for compulsory and summary proceedings without further negotiation with the Local Authority.

In By-law 44, which provides for the giving of notices and the deposit of plans and sections of proposed new buildings, the required plans and sections should always be in duplicate, and I would, therefore, insert the words "in duplicate" after the word "sections" on p. 35, after the word "writing" at the top of p. 36, and after the words "block plan" a few lines lower down. There are other particulars which ought to be inserted among those which the by-law requires to be shown on the plans and sections and notices; after the words "water-closet, earth-closet, privy, ashpit, cesspool, well, and all other appurtenances, the damp course, the level of the lowest floor of such building, and of any yard or ground belonging thereto," I propose to insert the words:—"The position and size of all windows, doors, fireplaces, flues, and ventilators, the scantlings of all timbers, the purposes for which the several rooms are intended to be used."

I suggest that the last sentence of this by-law should be altered to read as follows:—"Such person shall sign both sets of plans and sections and block plans, or cause the same to be signed by his duly-authorised agent, and one complete set shall be signed by the Chairman of the Council, or other member of the Council appointed for the purpose, with a certificate that

the said plans have been approved, or have not been approved, by the Council, and shall be returned to the applicant, and the other complete set of plans shall be retained by, and shall be the property of, the Council."

By-law 48 provides for the delivery of a notice, of the completion of buildings, in order that the surveyor may have free access to every part of the building for the purpose of inspection during a period of seven days after the notice shall have been delivered. But it seems to me that this regulation is very incomplete, unless supplemented by a by-law, which I propose to call 48A, and for which I suggest the following draft:—"No dwelling-house or building used, or intended to be used, for the purposes of trade, business, or manufacture, shall be inhabited or used for the said purposes until it shall have been certified by the Surveyor of the Council or Clerk of the Council that such building is complete, in accordance with the deposited plans and the by-laws, and is fit for habitation or use as aforesaid."

It is strange that no such by-law as this is included in the model set, for I have myself known of cottages being inhabited while they were unfinished, and had no closets, no water supply, and no dustbins, through the urgent need for additional dwellings in that particular situation.

I commend the foregoing proposals to the members of our Institute generally, and to the members of the By-laws Committee specially. I have not prepared a full draft of a model set of by-laws, including those of the Local Government Board which I leave unaltered, together with the new ones or alterations which I have suggested, because I think this should be done by the Committee, after full and careful discussion of this paper and of all other suggestions which they may receive from other members upon this important subject. It is only after collecting and considering the opinions of a large number of practical men that any authority can belong to a draft put forward by the Institute. No such authority is for a moment claimed for this paper, the object of which is to afford a basis for discussion.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir J. M'Dougall, Chairman, presiding.

The London Water Bill.—The Parliamentary Committee reported at length on the London Water Bill, and remarked that while they did not propose to repeat the very grave objection to the scheme which they had already laid before the Council, yet the principle involved in this scheme amounted to an absolute reversal of the existing system of London government, and they protested emphatically against such a principle being established on a side issue, and after having actually been condemned by the Committee to which it was referred.

Mr. Radford, Chairman of the Committee, said the Council had now to consider how the mischief threatened to London by the Bill in its present shape was to be averted.

Mr. Dickinson declared that the forcing through of the Bill would be a discredit to Parliamentary procedure. The London County Council was in the end the only authority which could properly deal with the London water question.

Mr. Beachcroft regretted that the Joint Committee was not constituted on different lines. After some further discussion the Report was received.

Appointment of Manager of Works.—The General Purposes Committee reported as follows, the recommendation being agreed to:—"In accordance with the resolution of the Council of February 18 last, an advertisement has been issued inviting applications for the appointment of Manager of Works at a salary of £5,000 a year. The applications (105 in number) were in the first instance considered by the Works Committee, who have submitted to us the names of five candidates whom they consider the most suitable for the position, and we have ourselves had a personal interview with these five gentlemen, with the result that we have decided to submit the names of the following candidates:—Mr. George Hay, Mr. G. W. Humphreys, Mr. A. Robertson. The Standing Order which requires that we should submit to the Council the names of three can-

didates authorises us at the same time to indicate the candidate whom we think most fitted for the appointment, and the Works Committee, in submitting to us the names of the five candidates above referred to, have informed us that, in their opinion, Mr. G. W. Humphreys, who is agent and manager to a large firm of contractors, is most qualified to fill the position. We have decided, in accordance with the Standing Order before mentioned, to recommend the Council to act in accordance with the opinion of the Works Committee, and to appoint Mr. Humphreys. The Works Committee inform us that, in their opinion, the salary attached to the appointment should at present be £7,000, instead of £5,000, as previously decided by the Council, and in this we concur. We therefore ask that the resolution of the Council of February 18 last may be varied accordingly. . . ."

It was also agreed to promote Mr. A. Robertson to be Assistant Manager of Works.

Escape from Fire.—Replying to a question by Mr. Sharp, Dr. Longstaff (Chairman of the Building Act Committee) said that with regard to the Avenue Exchange of the National Telephone Co. in Lime-street, the company occupied part of the third floor of the shop, the fourth and fifth floors. On the fifth floor, used as a trunk-line exchange, nine males were employed; on the fourth floor, used as a central telephone exchange, eighty females were employed; and on the third floor is a mess-room and motor for supplying electricity. As to the means of escape, there is a 4-ft. brick-enclosed stone staircase in the east angle of the premises, connected with the basement, ground, third, and fourth floors only. The doors to the staircase were ordinary deal doors. From the fourth floor there was a spiral iron staircase up to the fifth floor, and a similar staircase down to the lighting area to the third floor. A serious matter was that the windows on the third and fourth floors were fixed iron sashes, and would not be available for escape. The premises did not appear to come within the scope of Section 14 of the Factory and Workshops Act, 1901, and could not, therefore, be dealt with by the Council. The Council's Inspector was not allowed to take any measurements or make any drawings.

Answering further questions, Dr. Longstaff said the Committee would consider what could be done in the matter of communicating with the Telephone Co.

Proposed Erection of a Parcel Office at Union-street, Southwark.—The Building Act Committee reported as follows:—

"We reported to the Council on April 30, 1901, that we had been in communication with H.M. Office of Works with reference to the frontage of a proposed parcel office for the General Post Office on the south side of Union-street, Gravel-lane, Southwark, between Orange-street Board School and Pepper-street, and extending back to Orange-street, and that notwithstanding the exemption in favour of the Crown contained in Section 202 of the London Building Act, 1894, that H.M. Office of Works had made a proposal whereby the frontage next Union-street, which is at present irregular, would be straightened, Faviot's-court, a narrow footway between Union-street and Orange-street closed, and Pepper-street and Orange-street widened from 20 ft. to 25 ft. It was also proposed to cant off the corner of the building next Union-street, and (subject to the consent of the Treasury and of the Post Office authorities being obtained by H.M. Office of Works) to throw into the public way and dedicate to the use of the public the whole of the land outside the building where it abutted upon the public way. The proposal was, in our opinion, a satisfactory one, and we so informed H.M. Office of Works. We also communicated particulars of our action to the Metropolitan Borough Council of Southwark. We were subsequently informed by the Surveyor to H.M. Office of Works that the Borough Council refused to bear the cost of the paving entailed by the widening of the streets in connexion with the erection of the parcel office, and that unless the Council could induce the Borough Council to alter its decision, the matter would have to be reconsidered altogether. We therefore wrote to the Clerk to the Borough Council stating that, in the opinion of the Council, a most desirable improvement would be effected by the widening of the streets as proposed, and that it was hoped the Borough Council would be able to come to an arrangement with H.M. Office of Works so that the proposals which had been made at the instigation of the Council might be carried out. We pointed out that this was the more desirable in view of the fact that owing to the exemption in favour of the Crown contained in Section 202 of the London Building Act, 1894, it was sometimes difficult to obtain the setting back of buildings belonging to a Government Department to effect desirable street improvements, and that every obstacle raised in any particular case increased the

difficulty. We have, however, been informed in reply that the Borough Council is unable to depart from its previous decision in the matter. We very much regret the decision came to by the Borough Council, and we have communicated with the Improvements Committee with a view to their considering whether the matter is of sufficient importance for the Council to undertake the cost of the paving entailed by the proposals of H.M. Office of Works."

Tube Railways.—It was agreed:—"That, in view of the probability of proposals for tube railways and other schemes for London locomotion being submitted to Parliament next Session, the Highways Committee be authorised to seek an interview with the President of the Board of Trade with the view of urging upon him the desirability of the establishment of some statutory authority to deal with all proposals relative to locomotion in London." The Council adjourned shortly after seven o'clock.

VENTILATION OF SEWERS.

We have received from Mr. H. Gilbert Whyatt, Assoc. M. Inst. C.E., Borough Engineer and Surveyor of Grimsby, the following communication:—

At the Local Government Board inquiry on the above subject, conducted by Mr. W. A. Ducat, M. Inst. C.E., on May 22, 1902, the question arose as to whether the Board had ever consented to a scheme of ventilation by tall shafts only and the closing of surface ventilators at street level. I accordingly sent out to forty boroughs and eleven other Authorities, where I understood they had abandoned surface ventilation, the following three questions:—

Have you abandoned surface ventilation of sewers?

If so, was alternate method of ventilation provided by loan obtained under sanction of Local Government Board, or out of rates?

If the former, did the Local Government Board consent to the surface ventilators being closed, or have you closed them without consent?

No reply was received from seven towns. From seven towns the reply was that they had never abandoned surface ventilation, and the surveyor of another town desires that his reply be kept private. There remain, therefore, thirty-six replies to be analysed and tabulated.

In the following four towns surface ventilation was never adopted:—

Name.	Acres.	Population.
Aberystwith	847	8,014
Canterbury	3,935	25,000
Ilkeston	907	6,130
Wigan	2,178	62,000

In the following twenty-eight towns and urban districts surface ventilation has been entirely, or is being gradually, abandoned, out of the rates, and, therefore, without consulting the Local Government Board:—

Name.	Acres.	Population.	Remarks.
Basingstoke	4,194	10,000	Yes, to a great extent.
Blackpool	4,444	47,346	Partially, all new man-holes have closed covers in part.
Boole	1,590	58,556	Yes, many years ago.
Bournemouth	5,850	60,000	Yes, in one portion of the town.
Chesterfield	1,338	—	Yes.
Deal	1,111	11,000	Yes.
Eastbourne	5,410	43,000	In some parts of the town.
Folkestone	3,481	30,694	No surface ventilation.
Harwich	1,870	10,740	In the narrow streets.
Hastings	4,857	68,000	Yes.
Henley-on-Thames	348	6,500	Yes, in all cases.
Leicester	5,586	220,000	Yes, on all new sewers, and on old sewers wherever a complaint is received and sanction to erect a shaft obtained.
Lewes (Sussex)	1,024	11,245	Yes.
Lincoln	1,891	45,500	Offending covers closed on complaint, where ever sanction to erect a shaft is obtained.
Maidenhead	9,123	12,000	Yes, in all streets.
Norwich	7,582	111,788	Yes.
Penzance	472	15,000	Manholes provided with flap inlets to allow entrance of air only.
Ramsgate	2,343	27,586	Practically only a few open covers left.
Reading	5,628	73,595	Not entirely.
Seaford	4,246	45,000	Yes.
Tenby	735	4,500	Not entirely.
Torquay	3,879	33,000	Yes.
Widnes	3,029	29,000	Yes.
Slough (Bucks)	—	12,000	Yes.
Surbiton	2,958	15,000	Yes, some years ago.
Sutton (Surrey)	1,835	17,100	Yes, with the exception of manholes where decorsing plant is fixed.
Tipton	9,700	32,000	Not entirely.
Uxbridge (Bucks)	18,500	18,500	Yes, all surface grids are now closed.

(NOTE.—In some of the foregoing towns works have been carried out with the sanction of the Local Government Board, and they appear again later.)

In the following nine towns surface ventilation has been entirely or is being gradually abandoned, the cost being defrayed out of loans sanctioned by the Local Government Board. In some cases the Board do not appear to have considered the point; in other cases their consent was given.

The following are the replies to the queries:—

	Whether abandoned.	Whether under loan.	Whether with consent.
Brighton ..	Partly.	By loan	Ventilating shafts would be useless, unless the surface ventilators in neighbourhood were removed. We did not ask the consent of the Local Government Board.
Canterbury...	Never been adopted.	System of ventilating by tall upright shafts was approved of by the Local Government Board some forty years ago.	The Local Government Board have sanctioned a scheme for new tributary sewers in which all the ventilation is effected by tall shafts.
Leicester....	Yes. On all new sewers.	Yes.	On old sewers this work has been charged to revenue. On new sewers I provide... nothing but standard ventshafts, costs of which have been included in estimates for loans and approved.
Norwich....	Yes. It constitutes a nuisance dangerous to health in most cases.	By loan.	No record. They were probably not asked.
Scarborough	Yes.	By loan.	By consent of the Local Government Board.
Southend-on-Sea	Yes.	By loan.	Some have been closed without consent.
Tenby	Not entirely.	By loan.	Yes. I have relaid about half the town sewerage, and put in about five miles of other new sewers ventilated by shafts which have been sanctioned by Local Government Board out of loan.
Tonbridge ..	Yes, entirely.	By loan.	Yes. I have relaid about half the town sewerage, and put in about five miles of other new sewers ventilated by shafts which have been sanctioned by Local Government Board out of loan.
Weston-super-Mare ...	Not entirely.	By loan for the construction of ventilating pipes up the sides of buildings.	

The general opinion as voiced in these thirty-six replies is to the effect that emanations of sewer gas at street level are objectionable; that in four cases surface ventilation was never adopted; that in twenty-eight towns and urban districts they have closed them or are closing them at the expense of the rates; and that in certain other towns the Local Government Board have definitely approved of such closing.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Strand.—(a) That the resolution of the Council of January 21 sanctioning the erection of certain projections to a block of buildings to be erected on the site of No. 36, Bury-street, and Nos. 19 and 21, Ryder-street, St. James's, be rescinded. (b) Four two-story oriel windows and three balconies on the eastern front, and two balconies on the northern front of a block of buildings to be erected on the site of No. 36, Bury-street, and Nos. 19 and 21, Ryder-street, St. James's (Mr. R. J. Worley for Mr. J. Beale).—Consent.

Clapham.—(a) That the resolution of the Council of March 11 sanctioning the erection of twenty-seven houses with bay windows on the south side of Deauville-road, Clapham, be rescinded. (b) Twenty-seven houses with bay windows on the south side of Deauville-road, Elms-road, Clapham, westward of Rodenhurst-road (Mr. Kerven and Mr. H. Bignold).—Consent.

Lines of Frontage and Projections.

Wandsworth.—Four houses, with shops on the

ground floor, on the east side of Streatham High-road, Wandsworth (Mr. C. M. Quilter for Mr. W. Mason).—Consent.

St. George, Hanover-square.—Four brick pilasters in front of a building on the site of Nos. 199 to 203, Buckingham Palace-road (Mr. W. A. Large for Messrs. Humphreys, Limited).—Consent.

Wandsworth.—An addition to St. Mary's Church, Balham High-road (Mr. W. N. Dunn for the Vicar and Churchwardens).—Consent.

Chelsea.—A church and school building on the south-eastern side of King's-road, Chelsea (Rev. A. Rees for the Trustees of the church).—Consent.

Willesden.—Buildings on the north-west side of Conon-street and south-west side of Edith Villas, Fulham (Mr. W. Cave).—Consent.

Brixton.—One story shops in front of Nos. 1 to 19 (odd numbers only inclusive), Brixton-road, Brixton, the erection of four-story buildings on the east side of that street northward of No. 1, and also the erection of one-story shops in front of Nos. 2 to 48 (even numbers only inclusive), Camberwell New-road (Mr. J. T. Woodard for the trustees of the late Harry Hammond Spencer's estate).—Refused.

Fulham.—A mission hall on the western side of Wandsworth Bridge-road, to abut upon the southern side of Hugon-road, Fulham (Messrs. Z. King & Son for Messrs. S. and R. W. Black).—Refused.

Maylebone, East.—A bath-room addition over a portico in front of No. 26, St. John's Wood-park, St. Marylebone (Messrs. Batt and Hart for Mr. J. Davis).—Refused.

Strand.—A steel and glass shelter at the entrance to the buffet and grill-room at the Grand Hotel, Charing Cross, to overhang the footway of the Strand (Mr. W. Woodward for Gordon Hotels, Ltd.).—Refused.

Width of Way.

Hampstead.—Re-erection of the City Arms beer-house, No. 24, New-end, Hampstead, with the external walls of the new building at less than the prescribed distance from the centre of the roadway of Sreatley-place (Mr. W. Stewart for Messrs. Mann, Crossman, & Paulin, Ltd.).—Consent.

Southwark, West.—A warehouse building on the east side of Great Guildford-street, Southwark, with the external walls of such building at less than the prescribed distance from the centre of the roadway of the street (Mr. F. D. Smith for Mr. G. Newton).—Consent.

Poplar.—An extension of the period within which the erection of three blocks of dwellings on the east and west sides of Ann-street and the west side of Brunswick-road, Poplar, respectively, with the forecourt fences at less than the prescribed distance from the centres of the roadways of those streets, was required to be completed (Mr. R. Robertson for the Housing of the Working Classes Committee of the Council).—Consent.

Hoxton.—A warehouse at the rear of No. 97, Curtain-road, Hoxton (Mr. R. Peters for Mr. W. C. Wigg).—Refused.

Poplar.—A two-story building on the north-west side of Bowley-street, Poplar (Mr. C. Dunch for Mr. J. Barner).—Refused.

Width of Way, Lines of Frontage, and Projections.

City.—A projecting bay at the Cripplegate Institute, Golden-lane, City, to abut upon Brackley-street (Mr. F. S. Hammond for the Governors of the Cripplegate Foundation).—Consent.

Hampstead.—An addition to Emmanuel Church, West End-green, Hampstead (Messrs. Whitfield & Thomas for the Rev. E. N. Sharpe).—Consent.

Notting-ham.—An addition to a mission-room on the north-west side of Lowden-road, Herne-hill, to abut upon Heron-road (Messrs. Tucker & Huntley for the vicar and churchwardens of St. Paul's Church).—Consent.

St. Pancras, West.—A lift enclosure at the Euston Hotel, Euston-street, St. Pancras (Mr. A. Whitelaw for the London and North-Western Railway Co.).—Consent.

Hackney, South.—A warehouse building on the site of Nos. 9 and 11, London-lane, Mare-street, Hackney (Mr. W. A. Lewis for Mr. N. Fortescue).—Refused.

Southwark, West.—A porch and two bay windows in front of St. Peter's Church Vicarage House, Summer-street, Southwark (Mr. A. H. Ryan-Tenison for the Rev. W. A. Corbet and the Wardens and Building Committee of the church).—Refused.

Width of Way and Construction of Shed.

Southwark, West.—An open shed on the east side of Great Guildford-street, Southwark (Mr. F. D. Smith for Mr. G. Newton).—Consent.

Separation of Buildings.

Southwark, West.—The retention of an opening at the first-floor level in the party wall between Nos. 76 and 78, Southwark-street (Mr. B. H. Jenkinson for the Celvic Co., Ltd.).—Consent.

Dwelling-houses for Persons of the Working Class.

Deptford.—Dwelling-houses, to be inhabited by persons of the working class, on a site on the west

side of Sandford-street, Trundle's-road, Deptford (Messrs. Humphreys, Davies, & Co. for the Surrey Commercial Dock Co.).—Refused.

* * * The recommendations marked † are contrary to the views of the Local Authorities.

Illustrations.

SCULPTURE AT THE ROYAL ACADEMY.

THE illustrations show some of the best though not the largest of this year's work in sculpture at the Royal Academy. Mr. Colton's "Crown of Love," which we regard as the most important work of the year, has been already illustrated in our pages when it was exhibited in plaster.

The following are titles and artists' names of the works as numbered on the plate:—

1. "Fairy Tales": statuette—Mr. F. M. Taubman.
2. "A Sunflower": bust—Mr. Andrea C. Lucchesi.
3. "A Little Spirit of Dreams": Miss Esther M. Moore.
4. "Baptismal Font": Mr. Albert H. Hodge.
5. "Askos and Kylikes": Mr. Oliver Wheatley.
6. "Design for Bronze Sundial": Miss Florence H. Steele.
7. "Boy and Bear-cubs": Mr. J. M. Swan, A.R.A.

We also give a separate illustration of the ideal bust by Mr. A. C. White, under the title "Isabella," for which there was not space in the lithograph plate.

The works illustrated were all commented on in the article on "Sculpture at the Royal Academy" in our issue of May 31; so we need not add further remarks here. We have to thank all the sculptors named for their kindness in sending us photographs of their works.

PROPOSED TOWN HALL, HARROGATE.

The buildings have been disposed on the site in the simplest and most economical manner, the whole of the accommodation specified to be on the ground floor being so placed, as also are the principal rooms of the Free Library. The latter portion of the scheme has been treated as entirely separate, with its own main entrance from Victoria-avenue.

The principal entrance to the Town Hall is from Station Parade, subsidiary entrances being provided from Raglan-street. The plans are sufficiently explicit to render a detailed description superfluous, but it may be noted that the main consideration has been the concentration of departments, and the avoidance of unnecessary corridors. Thus the whole of the public offices of the business departments are entered either from the lower or upper hall, and are accessible without passing any other rooms.

The Council Chamber, Mayor's Parlour, and committee-rooms are approached by a corridor, or gallery, lighted from above and designed on lines which would lend themselves well to public purposes. The whole of this department is entirely self-contained, and has been placed in convenient relation to the offices of the Town Clerk. Subsidiary offices, heating chamber, &c., are placed in the basement, with separate and direct entrances, and are well lighted by windows above the ground level, thus obviating the necessity for areas.

It is suggested that a subway be constructed under the roadway in Raglan-street, connecting the police-station with the court. This does not appear to present any difficulties, and would be a most desirable arrangement for the passage of prisoners from the police-station to the dock.

The free library has been arranged so as to insure ease in working and perfect supervision with a minimum staff. The accommodation provided is as follows:—

Lending Library.—About 17,000 volumes, which number might be very materially increased by the addition of galleries if desired.

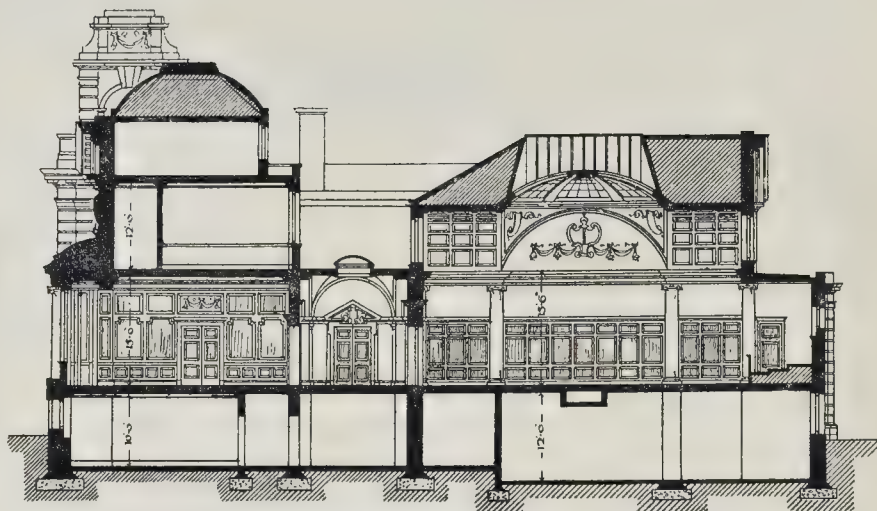
Reading Room.—Sixty-six readers at magazine tables; eighty readers at newspaper stands; total, 146.

Reference Library.—Twenty-four readers, about 8,000 volumes. Additional book stores might be erected if desired over the reading-room.

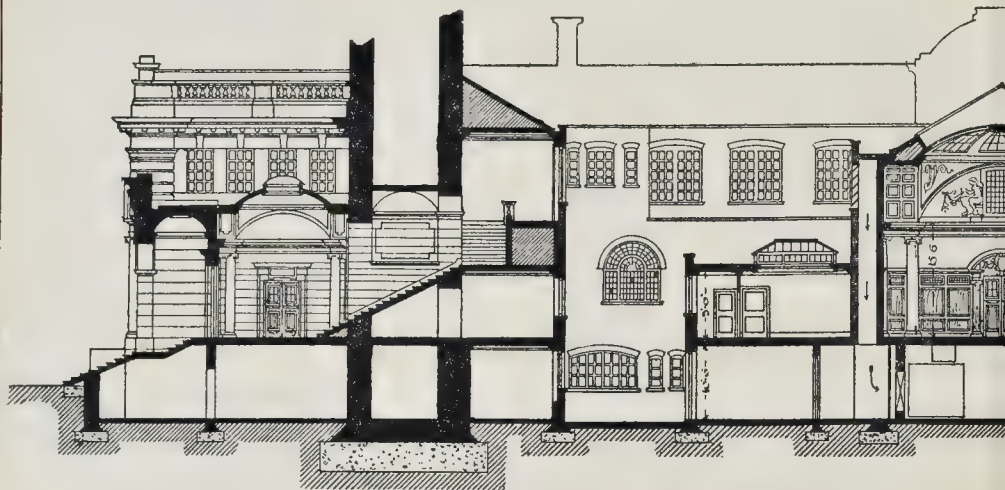
The materials proposed to be used are as follows:—The elevations to be faced with stone to be selected from one of the many

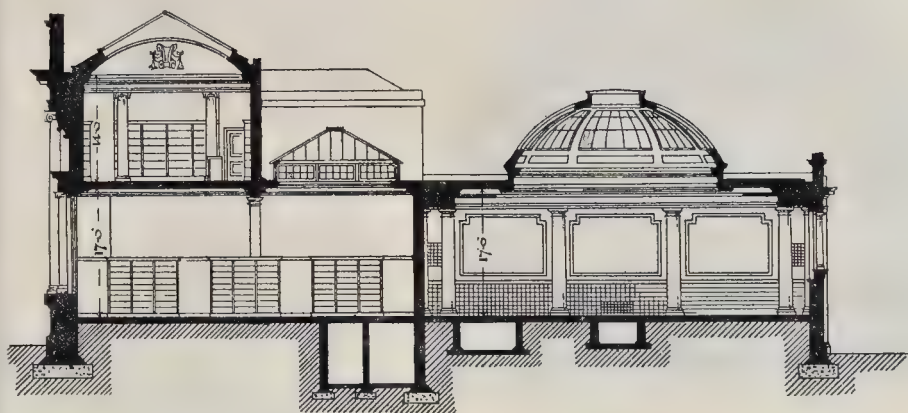
BOROUGH OF HARROGATE: PROPOSED TOWN HALL:

Scale 10 3 0 10 20 30 40 50 Feet

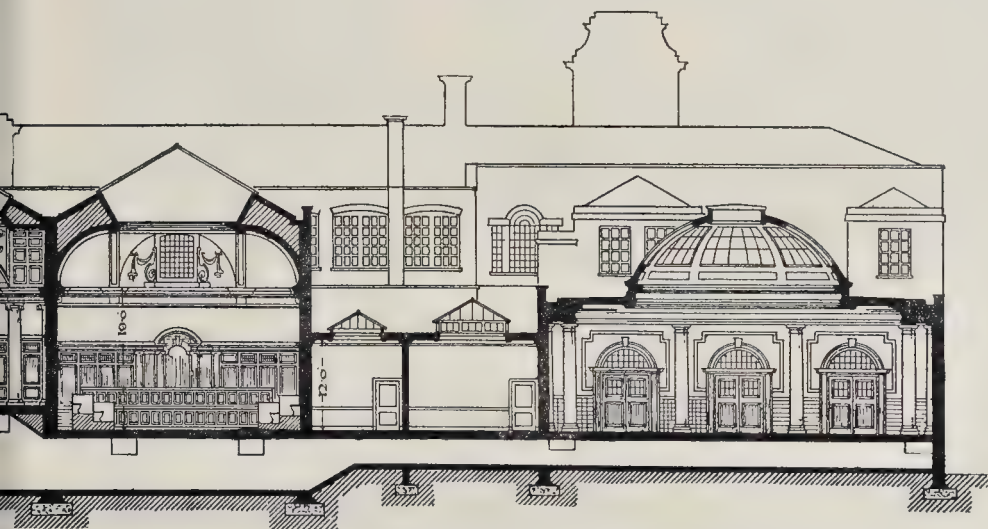


SECTION AA.





SECTION B-B.



SECTION C-C.

Design.—By Mr. H. T. Hare, F.R.I.B.A.



"Isabella": Bust. Mr. A. C. White, Sculptor.

[See p. 11.]

excellent quarries in the neighbourhood. The sloping roofs to be covered with green slates, and the flat roofs constructed of concrete and covered with asphalt. The whole of the floors to be of fireproof construction. The finished floors in the offices, Free Library, &c., would be of wood blocks, and in the committee-rooms, Mayor's Parlour, Council Chamber, &c., of oak. The entrance hall, Council gallery, &c., would be paved with marble slabs. The walls in the Mayor's Parlour and the Council Chamber to be panelled in wainscot; in which material the whole of the fittings of the court would be made. The columns and pilasters in the entrance hall, Council gallery, and Council Chamber to be of Devonshire marble. Modelled plaster would be used in the ceilings of the principal rooms and corridors.

The Council Chamber, police-court, and reading-room are proposed to be treated on the "Plenum" principle. The inlets are placed about 8 ft. above the floors, and the outlets at the floor level. This method has been found to produce most satisfactory results in rooms which become crowded at times.

The remaining portions of the building would be heated by ventilating radiators, extraction being by flues carried up in the chimney stacks. Low-pressure hot water is proposed as the heating medium. All the principal rooms are provided with open fireplaces in addition.

The sanitary arrangements have received due attention, and all conveniences are placed on outside walls with direct light and ventilation. So far as possible they have been grouped round the internal areas, thus greatly simplifying the drainage system. The architectural treatment has been kept extremely simple, dignity and breadth having been aimed at rather than elaboration of detail.

The following is a calculation of the cubic contents of the design: 903,000 cubic feet at 10d. = 37,625*l.* Upper part of tower, 17,000 cubic feet at 2s. 6d. = 2,125*l.* Total 39,750*l.*

This amount should be adequate to carry out the building in a satisfactory manner,

being calculated on the same basis as work of a similar character executed by the author.
H. T. HARE.

COMPETITIONS.

THE LIVERPOOL CATHEDRAL.—The 30th ult. was the last day for the reception of designs for the cathedral to be erected on St. James's Mount, Liverpool, but the dislocation of railway and postal arrangements consequent on the Coronation holidays caused the Liverpool Cathedral Building Committee to extend the time until July 2. Designs have been received from nearly all parts of the Empire, as well as from the United States and some cities of Europe.

Books.

The Principles of Planning: An Analytical Treatise for the Use of Architects and Others. By PERCY L. MARKS. London: B. T. Batsford. 1901.

IN the art and science of planning is comprehended much of the best part of architecture, and Mr. Marks has chosen a highly interesting topic. The subject has been often dealt with before, but usually under special aspects; this is a book which treats of it as a whole, comprehensively and yet minutely. Fulness of detail is not, however, throughout the work commensurate with fulness of scope. Mr. Marks aspires to teach "the whole duty of man," as concerns planning, in 100 pages. So it is no great blame to him to say that it is easy to note many omissions, or that he lays himself open at many points to the just criticism of specialists.

Practical architecture has become so complex that a fully satisfactory guide to the detailed planning of all classes of buildings could only be composed by a committee of experts. But for a single-handed attempt to

grapple with such a widely-extending subject, the author of "Principles of Planning" has really done very well. His range of interests is wide; his choice of matter judicious. Labour he has clearly not stinted, and his success in arranging the large amount of material which he has collected is worthy of much praise. The most prominent feature of the book is a series of examples of various modern types of buildings, gathered from the work of many living or recently deceased architects, and arranged alphabetically according to their respective purposes. Under the same headings the author discusses the special requirements of each particular class of building, regularly dividing his remarks into advice on "essential features" and on "requisite accommodation." The distinction here drawn is, as Mr. Marks himself confesses, a difficult, if not impossible one to follow out consistently; it results in confusion caused by the overlapping of what one person might call "requisite accommodation," with what another might equally well describe as "essential features." Probably the author's own intention would be better served if he were to alter his method slightly, directing the attention of students, firstly, to the qualities desirable in each building according to its special object; and, secondly, to the accommodation which it should afford, together, of course, with the distribution of that accommodation. A few items taken at random from this chapter will give an idea of the variety of subjects treated:—Abattoir, art galleries, artisans' dwellings, assize courts; market, musical buildings, museum, music-hall, Palace (Royal), Parliament houses, police-court and station, Polytechnic Institute. Some of the plans which illustrate this section are of the author's own design, and show very close attention to detail as well as great ingenuity in contrivance. What faults they have may be traced to a certain over-ingeniousness which purposely avoids the obvious and revels in forced "quaintness" of arrangement. This certainly has the merit of catching the eye, but at the same time suggests the reflection that there is after all a good deal to be said for the symmetry and simplicity which Mr. Marks appears—though he does not exactly say so—rather to despise.

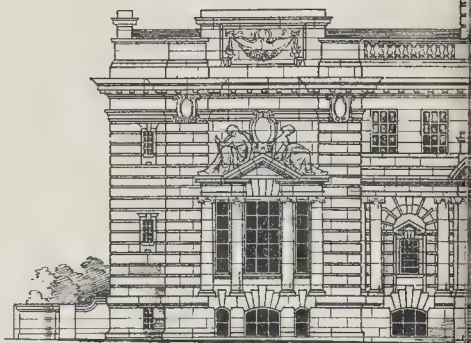
The question of "aspect" is next considered. Mr. Marks appears to be bound upon the vital importance of securing an appropriate aspect for every sort of room and building; but as demands for "prospect" so often have to be closely weighed against considerations of "aspect" alone, with the result that actual planning is usually, except in ideal situations, a compromise between their rival claims, he would have done better to treat of "prospect" in the same chapter, and in intimate relation to "aspect," instead of, as he has done, relegating it to the end of a later miscellaneous chapter, entitled "Roominess, Furniture Requirements, Prospect."

The remaining chapters are, in the order of the book, devoted to "Privacy and Seclusion," which the author rightly explains must not be taken as convertible terms—"Grouping," "Staircases and Miscellaneous Features"—wherein is described, of course, as a warning, a truly remarkable staircase, "with 10½ in. risers, 7 in. or 8 in. treads, and a width of not more than 18 in. (memory suggests that this was 14 in. . . .) which consisted largely of winding steps," and where also the author strongly denounces the modern fashion of constructing "ingle-nooks" in ordinary houses; and "Economy," concluding with "Design in Relation to Plan."

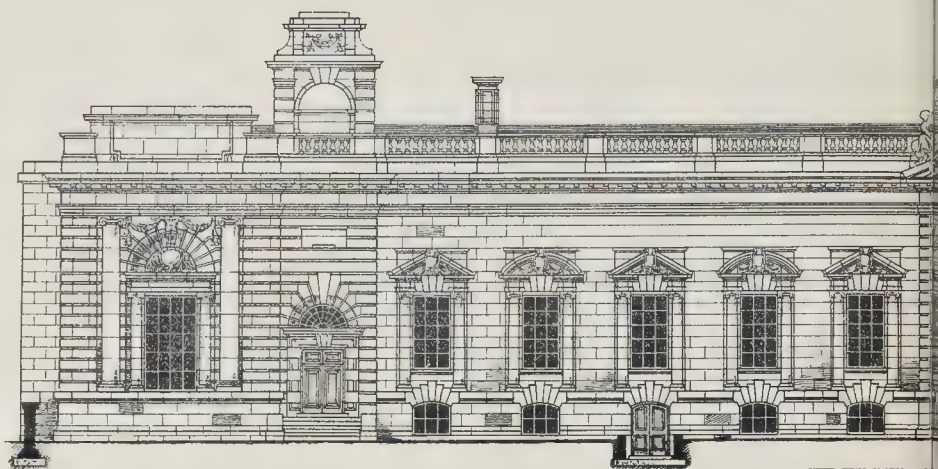
The advice given on all these matters cannot be said to be distinguished by any special originality, but it is at least generally unimpeachable, and should be very useful to beginners. Indeed, there is not much in these subjects which calls for discussion, except in the case of the last one, and to this a good deal more space might well have been devoted. As it is, there are only four and a half pages and a couple of small diagrams of rather trivial character, to make up what should be the most interesting chapter of the book. Possibly the author has been restrained by fear of yielding to the temptation of becoming garrulous on such an attractive subject; but in a book of the pretensions of this one, such reticence is not only misplaced, it is positively disappointing. The reader naturally expects to find, when he comes to this chapter, a full and serious consideration of the important questions so lightly alluded to by Mr. Marks, and the crown of the work seems wanting. It is also matter for

BOROUGH OF HARROGATE: PROPOSED TOWN HALL:

SCALE 1" = 10' 0"



ELEVATION



ELEVATION

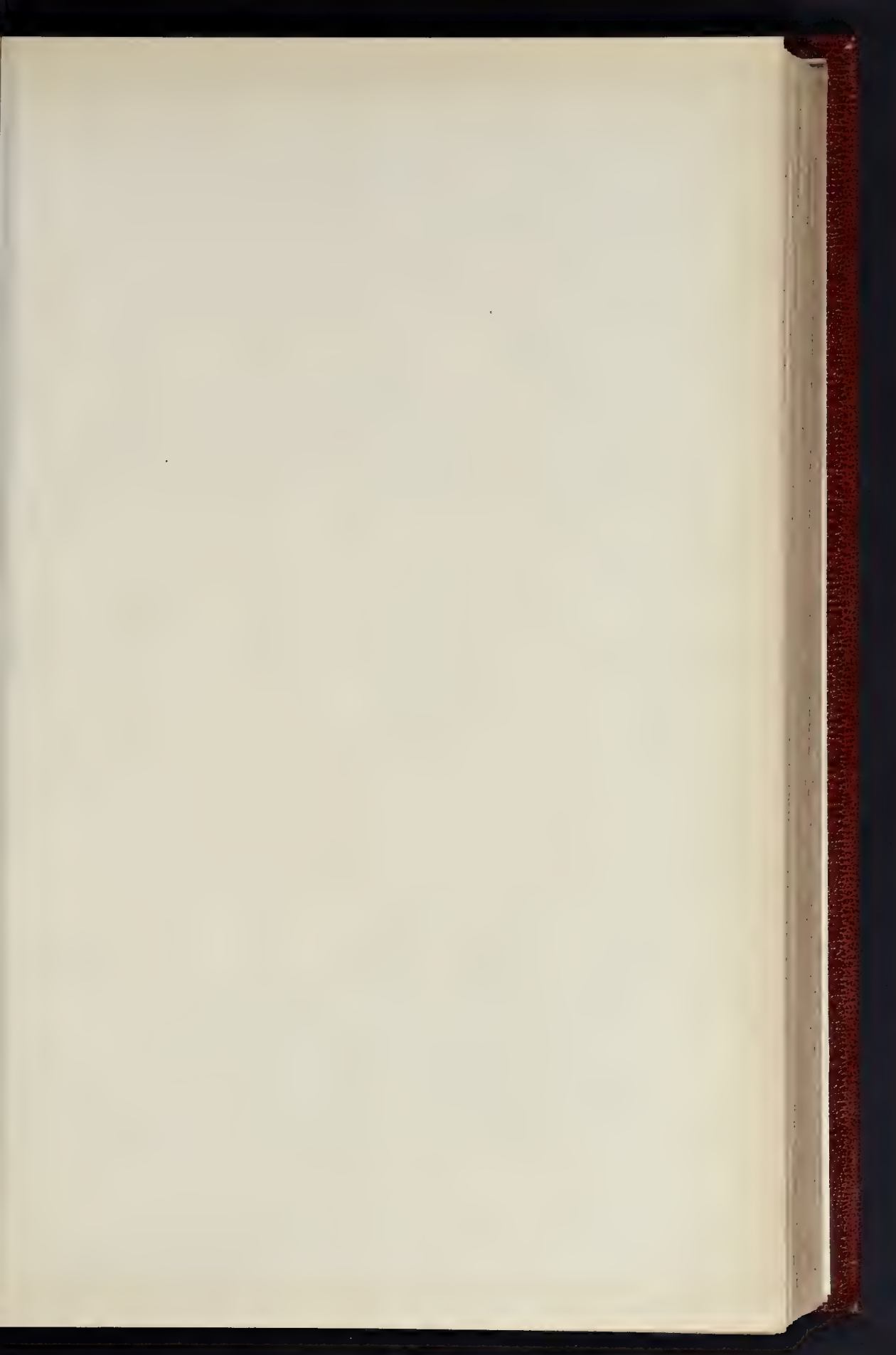


STATION PARADE



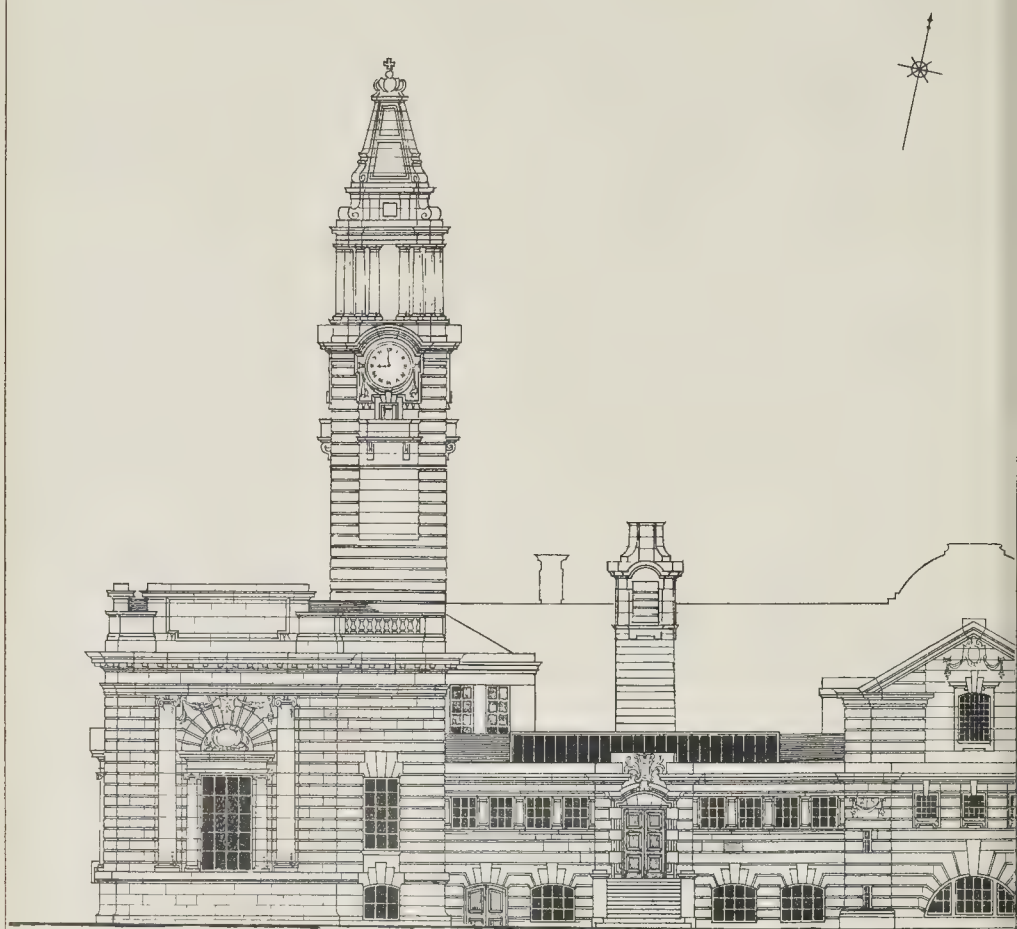
VICTORIA AVENUE:

PHOTO LITHO SPRAGUE & CO. LTD. 4 & 5 EAST HARDING STREET FETTER LANE E.C.

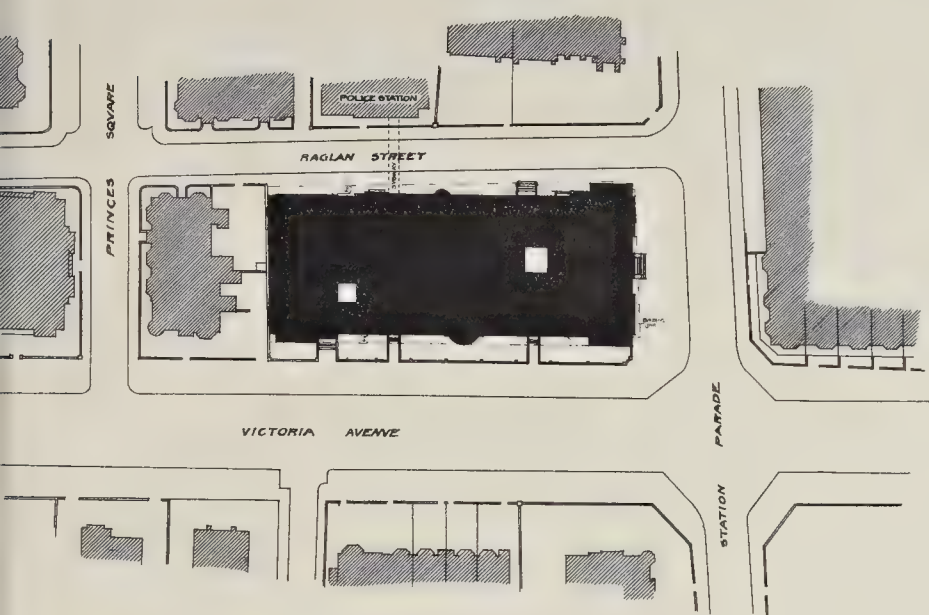


BOROUGH OF HARROGATE: PROPOSED TOWN HALL:

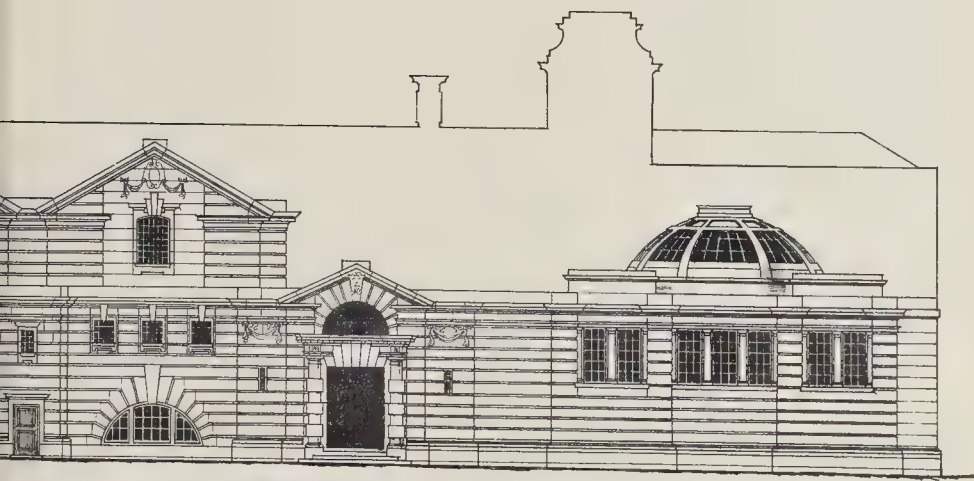
Scale 1" = 3' 0" 6" 12" 18" 24" 30" of Feet



ELEVATION



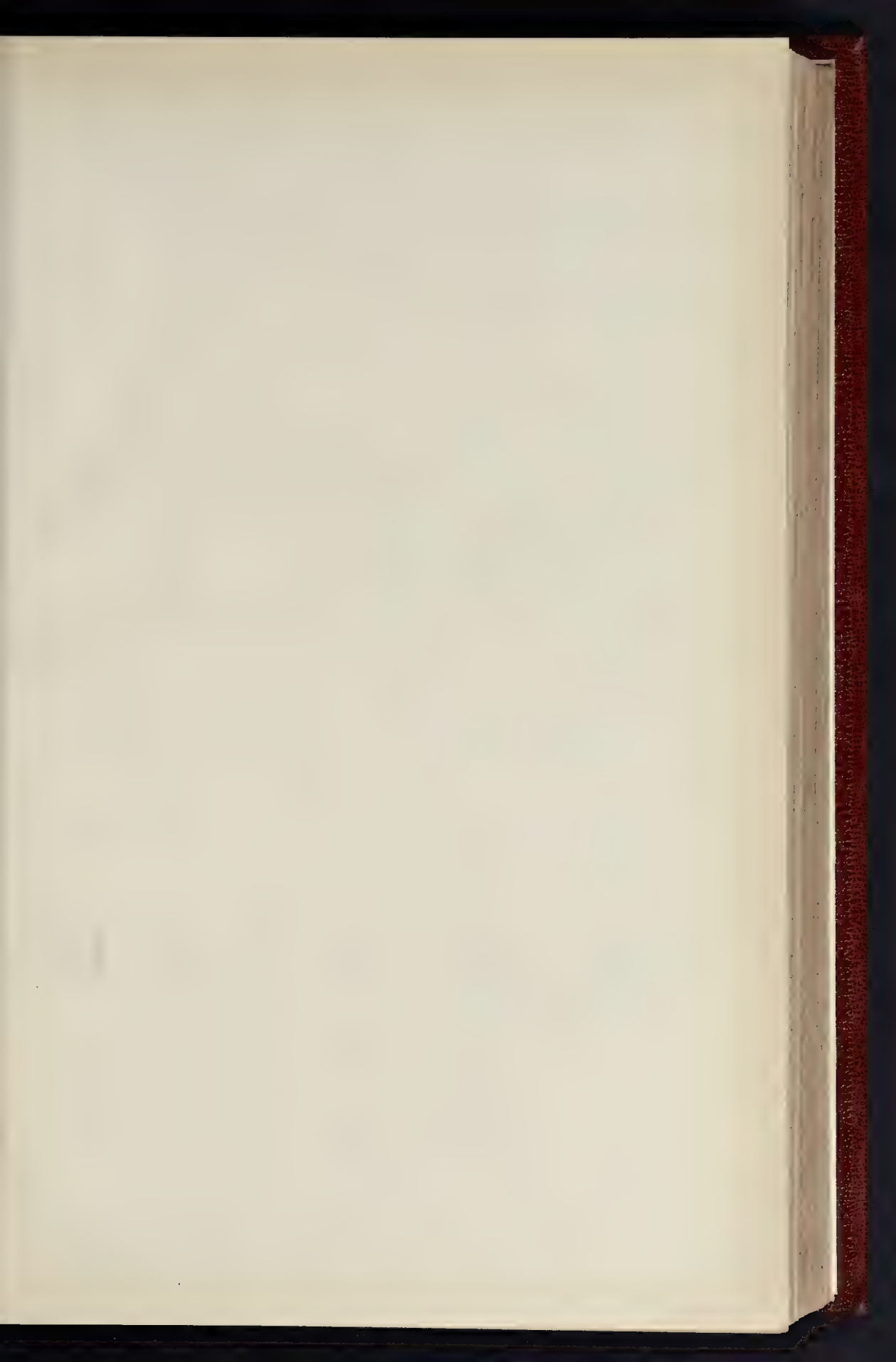
BLOCK PLAN:



RAGLAN STREET:



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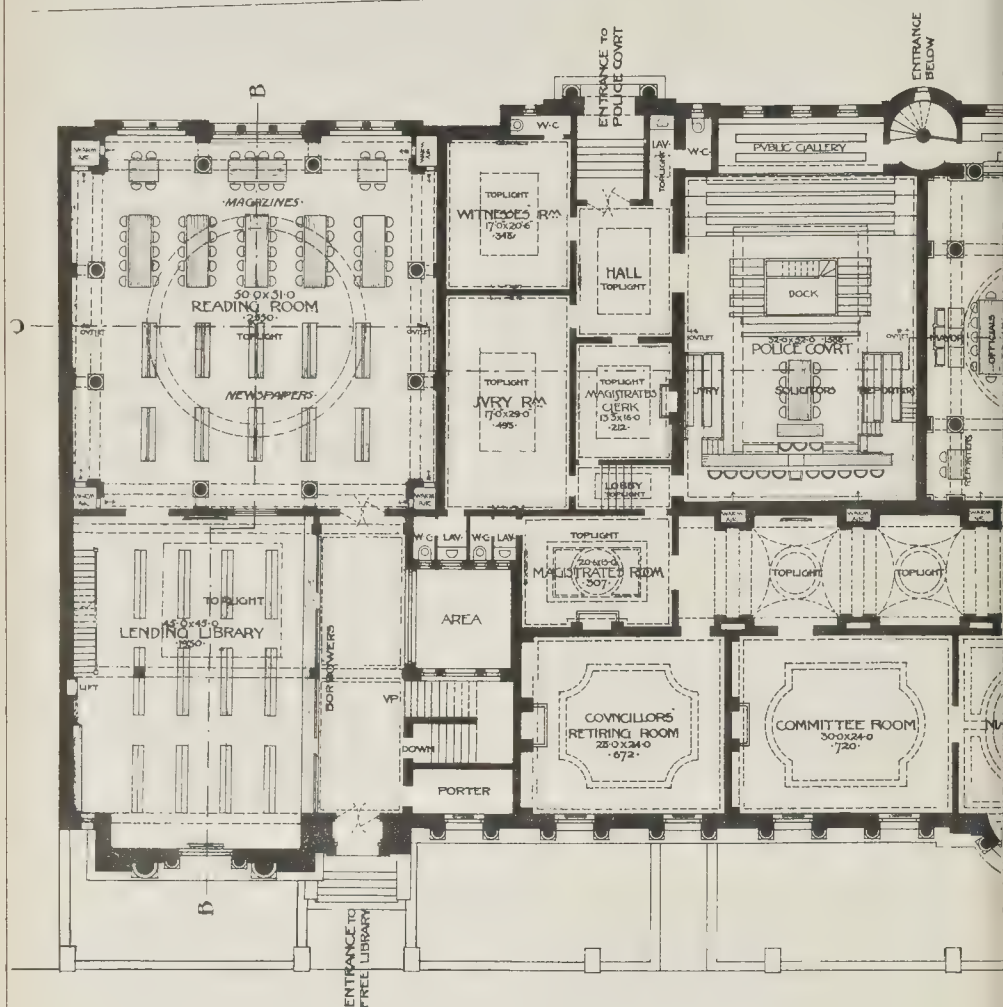


BOROUGH of HARROGATE: PROPOSED TOWN HALL:

GROUND PLAN:

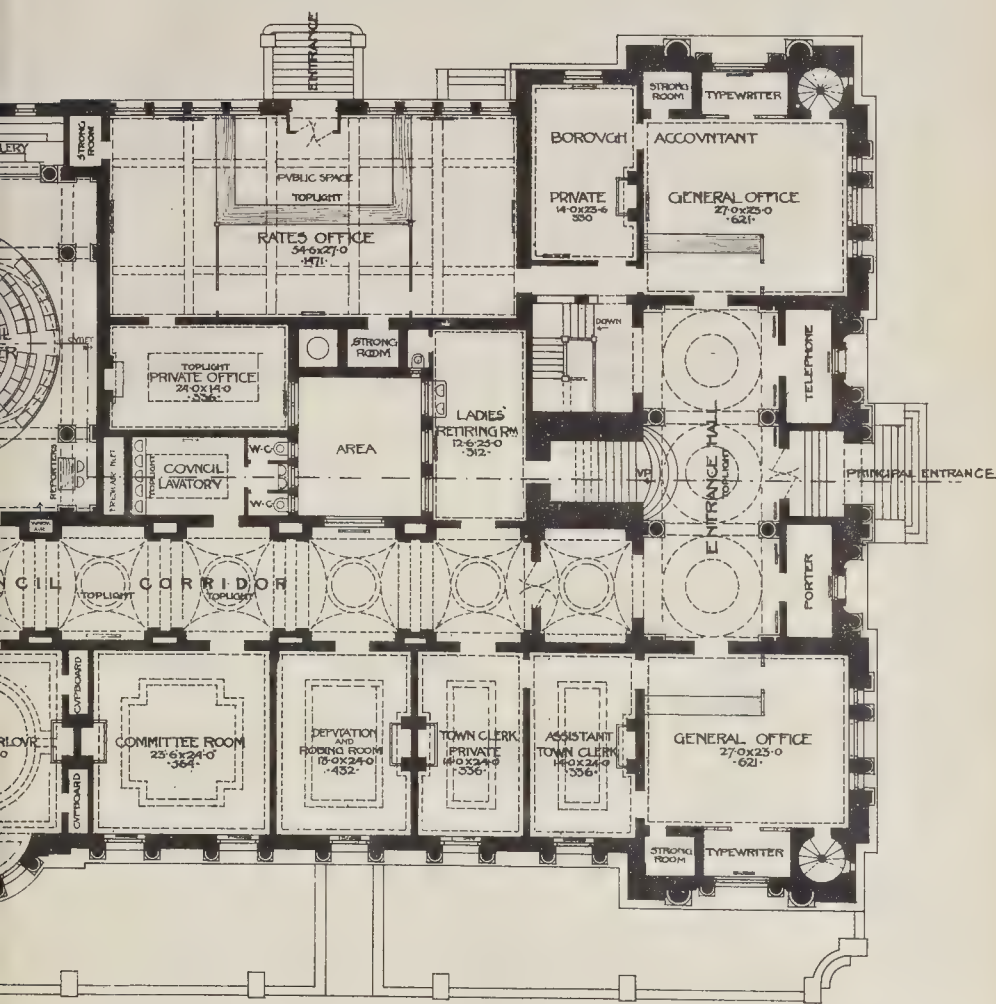
Scale 10 5 0 10 20 30 40 50 of feet

RAGLA



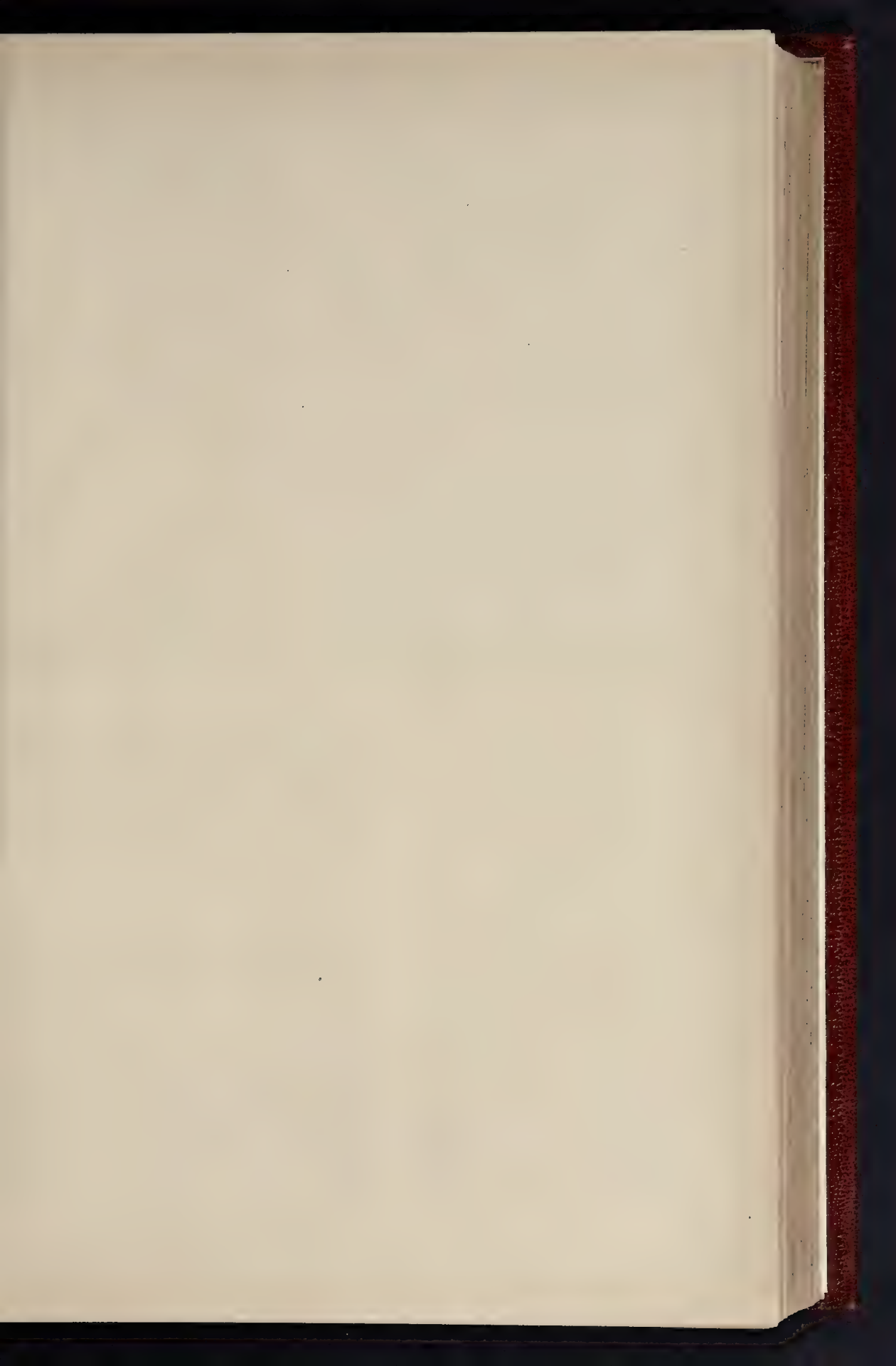
VICTOR

STREET



AVENUE

INK PHOTO SPRAGUE & CO. LTD. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.





1.



2.



4.



5.



3.



7.



6.

INK PHOTO SPRAGUE & CO. LTD 4 & 5, EAST HARDING STREET, FETTER LANE E.C.

regret that careless writing—a defect from which (in spite of many attempts at “fine” and “smart” writing) the book, as a whole, suffers greatly—should in this chapter be so prominent. “It must not be regarded as a question merely of symmetry or amenity [sic?] it is possibly the most culpable instance, but objection must be taken even to the opening sentence. “The word ‘design’ is used in the limited significance of the art qualities displayed in the elevations.” Here, apart from all question as to whether an architect ought to think of “design” exclusively in this sense, the use of “art” as an adjective is ugly and unjustifiable slang, which one would not expect to meet outside the range of drapers’ advertisements and the like.

The most valuable quality of this book is its suggestiveness. It makes the reader think; and even if the author’s style is less characterised by lucidity than might be wished, the occasional obscurity of his wording compels all the closer attention. Mr. Marks has not produced an exhaustive treatise, but certainly a stimulating one; by arranging and criticising so many examples, both real and imaginary, of good, bad, and indifferent planning, he has done good service in bringing many important considerations to the notice of students which might otherwise have been overlooked; and he has provided every architect with material for reflection.

School Architecture: A General Treatise for the Use of Architects and Others. By EDMUND MARCH WHEELWRIGHT. Boston (U.S.A.): Rogers & Mansion. 1901.

It is so long since the publication of our only text-book on this subject, Mr. E. R. Robson’s “School Architecture” (which dates from 1874), that the dearth of more recent information has often been noticed with surprise. Some amount of interest, therefore, cannot fail to be aroused by the appearance of an entirely new work, which bears the same title as Mr. Robson’s classic treatise. This fresh addition to the scanty literature of school-building is, however, so exclusively American in conception, and American views of education are, to judge from this book, so very different from our own, that it has little value for the generality of English architects. At first sight Mr. Wheelwright’s imposing-looking volume might easily be taken for what a good many people have been wanting—a comprehensive guide to all that belongs to the special design and construction of schools. But closer examination reveals the disappointing fact that the author is unable to rise to the idea of any other kind of school being necessary or desirable beyond the particular type which we know as “Board schools.” Himself the official architect of a large American city, no system of education seems to be worthy in his eyes of serious consideration—seems, indeed, worthy not at the most casual and slighting mention—except that of day schools “operated” (as he elegantly phrases it) by municipal bodies. Schools of this character have, of course, their proper place in the educational system of every nation, but are with us usually considered in the light of a mere makeshift provided by charity—or policy—for the children of those who cannot, or will not, pay for a better sort of training.

There is also another fundamental difference between Mr. Wheelwright’s way of looking at a school and that of most English, and even of some American, architects. We, and also several of the author’s fellow-countrymen (as may be seen from their works illustrated in this book), are accustomed to a well-understood type of design as appropriate to schools of every rank. In whatever style or fashion an English architect works there is a particular feeling with which he approaches the designing of school buildings, and it is very seldom that one cannot easily recognise a school wherever one may find it. But the schools built by Mr. Wheelwright (a good many of which are illustrated here), and by several other American architects whose work he appears specially to admire, are in outside appearance quite indistinguishable from ordinary office, light manufactory, or warehouse buildings. Many of these designs irresistibly recall the average block of mercantile buildings in Queen Victoria-street or Cannon-street, and are much inferior in architectural quality to many a warehouse in the streets of Manchester. Huge “teaching mills” is all that they seem to suggest. The

type of building which is thoroughly “scholastic,” and yet not remote from “domestic,” in character is not indeed unknown in the United States—as some very pleasing instances even in this collection witness—but is apparently a rare exception. A large portion, too, of the book is devoted to the schools of various European countries, and here again those of the factory type form the majority of those selected for illustration.

Apart from these limitations, this book is ably put together and is very well produced. It contains an ample model specification for an American school, and has a good index. Its encyclopedic title even may, quite possibly, appear to Americans to be justified by its contents, though to Englishmen a book styled a “general treatise on school architecture” which ignores every kind of boarding school, small or great, all private schools, and all “public schools” in the English acceptance of the term, seems, to say the least, inadequate, if not paradoxical. There is an immeasurable distance between the mere “instruction” which is all that the institutions described here are capable of giving, and the real “education” which we generally associate with the word “school.” It would be a bad pity for this country when all the educational traditions which have had so large a part in the making of our national character were, in senseless imitation of Continental and American methods, levelled down to a uniform, mechanical system of “teaching mills,” however expensively erected and equipped. But that time has not come, and, meanwhile, the way is still open for an author who will deal fully and thoroughly with school building, giving to “school” the whole meaning so long attached to the word in England.

The City of St. Alban: Its Abbey and its Surroundings. By CHAS. H. ASHDOWN. The Homeland Association, Ltd. 1902.

This forms No. 21 of the series of handbooks published by the Homeland Association, uniform in style and size with others already noticed in these pages. It is divided into two sections, the first dealing with the Abbey church and town, and the second with some of the interesting places in the neighbourhood. St. Alban is within such easy reach of London that it would be rash to suggest in these days of easy and rapid transit that it was not well known, or that the picturesque country that surrounds it was not often visited. A useful list, however, is given for the benefit of the cyclist, and a capital map is inserted in the pocket at the end of the book, reproduced from the Ordnance Survey. The guide is very fully illustrated with reproductions of photographs and pen-and-ink drawings. The latter vary considerably in merit; perhaps among the best are the street views in St. Alban and one of a house at Water End, near Wheathampstead. The photographs include a picturesque one of the market place and lower part of the clock-tower; a quaint bracket from French Row is also given. The author on p. 12 refers to the “Five Sisters” of St. Alban, and it is only on p. 21 that in another paragraph given to the same subject the reader learns that they are modern, and that “black felt” has been introduced, so that the “tallest lancet in England” shall appear to be of the same “stature” as the others. In spite of the terrible havoc that has been wrought there is still a mine of wealth in architectural detail in the building, and the handbook under notice will for the most part be found a useful guide to its points of interest, and to those of the neighbourhood within a radius of about six miles.

History of Sepulchral Cross Slabs. By K. E. STYAN. London: Bemrose & Sons, Ltd. 1902.

THE author of this octavo volume quotes a number of authorities on the subject in his preface, and in the general arrangement of his book he appears to have followed somewhat on the lines of the Rev. E. L. Cutts, who, in 1849, published a well-known book. A good deal of time has undoubtedly been spent on the production of this work—the author tells us in his preface that it has been “the work of a considerable number of years, and over each slab the greatest accuracy in drawing has been carried out, due proportions and minuteness of detail being specially desired”—but it seems a pity that all this time and trouble should not have been expended more largely on

examples that have not already been published. There are a large number of these memorials in various parts of the country that are not well known, and, although in some instances beautiful examples are here illustrated, the majority are somewhat lacking in interest, and in almost every case the drawings suffer from a superabundance of cross hatching and shading. There is also no scale on the drawings. The examples have not been placed in chronological order, and for a curious reason—“for the simple purpose of destroying any chance of monotony that might arise were all the examples of one treatment to be placed side by side.” To the reader and student anxious to learn by the comparison of examples the various characteristics of each period, and the gradual development of the form and elaboration of the crosses on these memorials, this system, if system it can be called, is most irritating, being somewhat increased by the absence of the name of place under each slab, necessitating constant reference to the list of illustrations at the beginning. Notes are given on the history of these memorials in general, their treatment, symbols, &c., and some examples are illustrated at the end of the book, drawn from Mr. Cutts’ book already referred to. In the list of authorities quoted in the preface occurs *Collins’ History of Somerset*: this should, of course, be *Collinson’s*.

Paint and Colour Mixing: A Practical Handbook for Painters, Decorators, and all who have to mix Colours. By ARTHUR SEYMOUR JENNINGS. London: E. & F. N. Spon, Ltd. 1902.

THIS is a useful book of ninety-four pages dealing with the practical part of the art of colour mixing and painting. It contains little information regarding colour theory or the chemical composition of the different pigments, but instructions are given for the production of almost every conceivable shade of colour by mixing together certain of the simpler pigments. The book also contains useful hints on painting, and on the selection and preservation of brushes.

In a few instances the information given with regard to a colour might with advantage be considerably amplified. All that the author considers necessary to state about “scarlet red,” for example, is that “This is bought ready made. It is the name given to the brightest of the oxide paints.” Even the practical painter might be taught something more than this.

The book contains several plates showing specimens of the different colours. Mr. Jennings has recognised the impossibility of selecting names for his colours which will give universal satisfaction, owing to the fact that no agreement exists even among colour makers as to the name to be given to any particular shade of colour. He obtained colour cards from all the leading paint manufacturers in this country, as well as some from abroad, and then compared them. It was found that identical shades of colour were sold under a great variety of names, and an interesting portion of Mr. Jennings’ book is a list of the different names given to each colour. Thus a certain shade of green is sold by different manufacturers as Venetian green, Imperial French green, light green, shamrock green, bright green, mountain green, middle green, and engine green; while a certain shade of brown is known by the following names:—Acorn brown, amber, dark oak, dark brown, light brown, dark Indian brown, chestnut brown, middle chocolate, and Portland brown.

Those who are interested in paints and painting, and have not the inclination or sufficient leisure to study the science of the subject well, no doubt, be glad to secure a copy of Mr. Jennings’ little book.

Notes on the Construction and Working of Pumps. By EDWARD C. R. MARKS, A.M.Inst.C.E., M.I.Mech.E. Manchester: The Technical Publishing Co., Ltd. 1902.

AT first sight, this book appears to be little more than a collation of descriptive matter and illustrations from the catalogues of various pump-makers, with three or four introductory chapters stating some simple facts affecting the construction and use of pumps generally. More careful perusal will show that although the author relies very largely upon commercial prospectuses for his facts and data, there is a

fair amount of original matter serving to connect the quotations and to make clear many points connected with the construction and working of the pumps described. Representative examples of nearly all the leading types are mentioned, and those who may have occasion to select pumps in the course of business or of professional practice will find the volume a convenient and useful book of reference.

Modern Gas and Oil Engines. By FREDERICK GROVER, A.M. Inst. C.E., M.I. Mech. E. Third Edition. Manchester: The Technical Publishing Co., Ltd. 1902.

THE present edition of Mr. Grover's practical treatise on internal combustion engines includes additions of a kind to which considerable attention is now devoted by designing and experimental engineers. There are new chapters relating to gas-engine efficiency, and to the application of temperature-entropy (θ) diagrams thereto. The results of experiments conducted by the author on the explosion pressures of acetylene and air are recorded, and also the results of various tests carried out by him at various times. This fresh matter comes as a welcome addition to a work whose value is already appreciated by practical engineers.

Correspondence.

PERMEABLE WALLS.

SIR,—Your Note in last issue, p. 632, under this heading, concludes thus: "The employment of reasonably porous building materials is clearly calculated to exercise a beneficial influence upon the atmospheric condition of a dwelling house or other building." This suggests permeable brick walls as air filters. But what is to be done of the filtering materials when in a few years they are fouled and poisoned? Your water filter you can cleanse and otherwise deal with, but when your porous walls are dirty nothing short of rebuilding will avail. True it is that a good deal is to be said for and against impermeable linings to walls, whether of cement or otherwise, but that is not for this letter.

ARTHUR HARSTON.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

I.—INTRODUCTION.

THE progress effected by the civilised world during the nineteenth century in the acquirement of knowledge, and in the application of that knowledge to practical purposes, resulted in the creation and rapid development of many new industries directly connected with the art of construction, and led to some noteworthy changes in building practices. It appears most probable, moreover, that the discoveries of the present century and the altered conditions of life will be the cause of changes even more remarkable.

The manufacture of comparatively cheap wrought iron, steel, plate glass, and Portland cement in unlimited quantities, which produced so great a change in the majority of buildings erected at the close of the nineteenth century, was rendered possible only by material advances in chemical knowledge, and the co-operation of the chemist with the constructive engineer.

Many branches of science are concerned with the operations of the modern builder, but it is the work of the chemist which is most strongly in evidence. The tendency of the industrial chemist is to produce artificial building stones cheaper, stronger, and more uniform in structure and composition than those of natural formation; to supply artificial roofing materials more useful than slate; to transform inflammable timber into fireproof materials; to provide metal cores for piers which would otherwise collapse; and, in brief, to revolutionise constructive practices and create new standards of strength.

The new architecture resulting from the unstinted application of the most recent products of the manufacturing chemist is best seen in the "sky-scraper" of the United States. We may regret its advent, and fail to admire its impressive ugliness, but it is useless to ignore its utility.

The multiplicity of the materials used in modern construction and the great reliance placed upon them render it more and more imperative that the architect and builder should be familiar with the character and behaviour of each when placed under those conditions to which it is liable to be subjected in practice. Such knowledge cannot be properly acquired without at least an elementary acquaintance with chemistry, such as is now acquired by youths at all technical schools during the first year's course of study. In the present series of papers the chemistry of building materials will be discussed as simply as possible, but only those having some practical knowledge of chemical science can expect to find the papers of much service or interest.

It is not only in the manufacture of materials that chemistry is concerned with the work of the builder. The decay of stone, the setting of mortar and cements, the drying of paints, and the corrosion of metals are all the results of chemical action; and some knowledge of analytical chemistry is necessary to enable the builder to estimate correctly the commercial value of his materials, or to detect the presence of adulterants or deleterious impurities upon the absence of which his reputation for good work is dependent.

Few architects or builders have sufficient leisure to enable them to become proficient chemists, and all important analytical work must, as a rule, be placed in the hands of a professional analyst. But every student of building construction should acquire sufficient chemical knowledge to render comprehensible the behaviour, under various natural conditions, of all the materials commonly used by builders, and to enable him to apply those simple chemical tests which can in many cases be employed to detect the presence of common adulterants.

The Constructive and Destructive Action of Air and Water.—Air and water are universally utilised by the builder for the purposes of construction; yet these same agents are ceaselessly engaged in ruthlessly destroying the work he has accomplished.

Air is utilised, for example, for hardening mortar, seasoning timber, drying painted surfaces, and in the manufacture of bricks; while water is also employed in the manufacture of bricks, for the production of mortar, and in the utilisation of cement. Before, however, a building is completed the atmosphere, in its condition of perpetual motion, has begun its work of destruction. Perpetually buffeting the walls, it gradually pulverises and carries away the solid material in fine grains. But the destructive action of the air would be slight in all countries not subject to violent hurricanes if it were not aided by the action of water in the form of rain. No material yet discovered or manufactured can resist the action of water allowed to fall upon it from a distance. Iron, granite, and slate are all worn away in the course of time by the impact of drops of water.

The mechanical force of falling water is *per se* irresistible, but it is not merely by mechanical action that rain-water destroys buildings. The atmosphere always contains gaseous carbon dioxide, which is readily dissolved by rain-water. The rain-water solution of carbon dioxide has acid properties, and is capable of dissolving carbonate of lime, whether it be in the form of compact limestone or forms a constituent of hardened mortar or cement. The insoluble carbonate of lime is converted into bicarbonate of lime, which is soluble. Each shower of rain, therefore, converts a portion of the carbonate of lime into bicarbonate, and carries it down to the earth in solution. If all the rain-water which trickles down the brick walls of a building could be collected and evaporated to dryness, a residue would be obtained which would consist of carbonate of lime (the bicarbonate is reconverted into carbonate when the solution evaporates to dryness) dissolved from the joints by the rain, together with a certain proportion of sand and brickdust which had been carried down by the mechanical action of the water.

Nearly all of the other materials used for building are also prejudicially affected by the joint attack of air and water, the action being usually chemical as well as mechanical.

Where the annual rainfall is small, as in the neighbourhood of the pyramids of Egypt, the atmosphere is much less destructive than in more humid climates. The pyramids, which

have stood for so many centuries in the dry atmosphere of the desert, would disintegrate rapidly if transported and exposed to the atmosphere of London or New York. The obelisk on the Thames Embankment known as Cleopatra's Needle remained in excellent preservation for countless ages in the arid climate of Alexandria, but when re-erected in London it soon exhibited signs of disintegration, and has only been preserved by careful treatment with protective solutions of gum resin in petroleum spirit.

The atmosphere of modern British towns has an abnormally destructive action upon most building materials, for, in addition to the work accomplished by frequent rains and high winds, the prejudicial influence of the products of the incomplete combustion of coal is also exerted. Even when coal is so consumed that the products of combustion consist solely of completely oxidised gases, those products in the presence of rain must to a certain extent act injuriously upon all neighbouring buildings; but when, as is the universal custom at the present time, every smoke-stack is permitted to vomit forth a continuous stream of solid carbon particles, coated with tar oils, and floating in an atmosphere, more or less condensable, of water vapour mixed with soluble compounds of ammonia and sulphur, the destruction due to the use of coal is infinitely greater.

House soot always contains sulphate of ammonia, and as long ago as the year 1864 it was shown by the late Dr. Voelcker, in a paper communicated to the Society of Arts, that when this substance comes in contact with any of the building limestones in the presence of moisture the stone is converted into sulphate of lime. Sulphate of lime readily combines with water to form hydrated sulphate of lime, and is apt to cause exfoliation of the stone owing to the expansion which occurs when the sulphate of lime changes from the anhydrous to the hydrated condition. Sulphate of lime is also more soluble in water than carbonate of lime.

A noteworthy corroboration of Dr. Voelcker's statement is to be found in the analysis of the incrustation on the Stone Gallery of St. Paul's Cathedral, London, communicated last year by Mr. E. G. Clayton to the Chemical Society. The Stone Gallery is situated at the base of the dome, and is constructed of Portland stone (carbonate of lime). The balustrade on which the incrustation has formed is surmounted by coping stone of the same material. There is therefore no sulphate of lime in the neighbourhood of the gallery; yet the analysis showed the incrustation to consist mainly of hydrated sulphate of lime.

Frost is another active agent of destruction in this country which does not affect buildings in Egypt. When water freezes it expands, and the force of its expansion is irresistible. All stone is more or less porous, and the pores of the stone become filled with water in wet or misty weather. When the atmospheric temperature becomes so low that the water in the stone solidifies, the expansion of the water causes disintegration of the stone. Perfectly dry stone would not be affected by subjection to a freezing temperature.

On the sea-coast the builder has to contend with yet another powerful agent of destruction. The wind blowing from the sea carries salt water in the form of very fine spray. The salt water contains salts which are deliquescent, *i.e.*, salts which have the power of abstracting moisture from a humid atmosphere, and which never become perfectly dry under ordinary atmospheric conditions.

The saline spray is driven by the wind against the face of the brick or stone work. In hot, dry weather the brick or stone will not retain sufficient water to maintain the salts in solution, and these will then become solid and appear as an efflorescence on the face of the work. As soon as the atmosphere again becomes humid, the salts again absorb atmospheric water, pass again into solution, and maintain the wall in a damp condition. In course of time the salts in brick or stone work which cause the dampness in humid weather and the efflorescence in dry weather might be washed away into the earth by the action of repeated rains, but in the close vicinity of the sea the winds are apt to blow fresh supplies of deliquescent salts against the walls as repeatedly as the rains wash away former deposits, so that the face of buildings exposed to the sea often exhibit either efflorescence or damp patches, according to the

condition of the atmosphere and the porosity of the stone or brick.

It is evident, therefore, that chemical reactions play an important part in both the construction and the destruction of buildings, and in subsequent papers it is proposed to discuss the science of chemistry in its most practical relationship to building and building materials.

GENERAL BUILDING NEWS.

BAPTIST CHURCH, ST. BUDEAUX, CORNWALL.—The foundation-stones of a new Baptist Church were laid at Budeaux on the 19th ult. The total cost is over 1,800l. The architect is Mr. Frank Clark, and the contractors Messrs. Allan & Fozer.

CHURCH, BLAIRGOWRIE, N.B.—A new church at Blairgowrie has been erected at a cost of 6,000l. It has transepts, aisles, and apse, and a small back gallery, and is seated for rather more than 750. The architects are Messrs. D. & J. R. M'Mullan, of Aberdeen. The roof is circular, lined with wood, and the principal couples rest on stone pillars and corbels, with intermediate moulded ribs. The seats and furnishings inside are of pitch-pine. The vestry is in close proximity to the pulpit, with a direct door for the minister. There is, in addition to the church, a hall, 41 ft. by 40 ft., with two classrooms adjoining, each 20 ft. by 20 ft. These classrooms are provided with patent folding doors, so that the three departments can be thrown into one, giving sitting accommodation for about 550 people. Cloakrooms are attached. The session-hall is placed in the centre hall or vestibule. All the accommodation is arranged round this, including a stair to heating-chamber, store for books, library, &c. The central hall is lighted by a large cupola. The kitchen accommodation in connexion with the hall, with copper boiler.

ST. BARTHOLOMEW'S CHURCH, NOTTINGHAM.—The Church of St. Bartholomew, Blue Bell Hill, Nottingham, was consecrated recently by the Lord Bishop of Southwell. The plans for the church were designed by the late Mr. J. L. Pearson, and the work has been carried out under the supervision of Mr. E. L. Pearson, the contractor being Mr. J. Hutchinson, of Nottingham. The church is built of Coram stone, faced with Bulwell stone and with Box Ground stone dressings. The nave consists of four bays, with north and south aisles, the westernmost bay of the north aisle being used temporarily as a chamber for the organ, which has been transferred, after rebuilding, from the iron tower. The church has an open timbered roof. Notwithstanding the great height of the building, there is no clearstory, the nave being lighted by lancet windows. In the western gable there is a triple-lighted lancet window, and the aisles have windows of double lights. The eastern arches of the nave and aisles are at present bricked up, so as to allow of the addition of a chancel and vestry, similar provision having been made on the south side of the church for a porch.

LITTLE OAKLEY CHURCH, ESSEX.—The reopening of Little Oakley parish church and the consecration of the new burial ground was performed recently by the Bishop of St. Albans. The building committee desired to execute the work of rebuilding the church in sections, commencing with the lower part of the tower, the nave, and the chancel roof. The west end has been entirely rebuilt, with the exception of some of the steeple walls, and the chancel roof has been reconstructed. The interior is refitted throughout in oak. Four new windows have been fixed in the nave, with cathedral glass. As regards the exterior of the church, new buttresses have been erected, and the roof has been refitted. The next section of the restoration scheme comprises the rebuilding of the steeple, the hanging of two more bells (two have already been placed in position), and the erection of a new vestry on the north side of the church. The work has been carried out by Mr. E. Sanders, of Dovercourt, the architects being Messrs. J. E. K. and J. P. Cutts.

CHURCH, ST. ANDREW, GREENWICH.—The Bishop of Rochester consecrated recently the new Church of St. Andrew with St. Michael, which has been erected on a site in Greenwich Marshes, near the opening of the Blackwall Tunnel. The church has been built at a cost of 15,000l. from the designs of Mr. Basil Champneys, and in style is late Gothic. The cost was provided by the sale of the site and property of the Church of St. Michael and All Angels, Wood-street, E.C., the font of which has been removed to the new church. At the east end is a stained-glass window in the shape of St. Michael's cross, subscribed for by the people of the parish, and outside the west door are two statues in stone of St. Andrew and St. Michael.

CHURCH, SEVEN KINGS, ESSEX.—The foundation-stone of a new church at Seven Kings, Ilford, was laid recently. The new church, which is dedicated to St. John, is to be of brick and Bath stone. There will be a cross, and a bell tower, but the portion now being built will provide for 480. The portion which will be completed first will consist of the chancel, side chapel, organ chamber, and two bays of the nave and aisles. The cost of this portion will be 2,320l., and the total cost of the church

will be about 7,000l. Mr. John Bentley is the builder, and the architects are Messrs. J. E. K. and J. P. Cutts.

CHURCH, SALFORD.—The Church of St. Ignatius, now being erected by Earl Egerton of Tatton, is situated in the parish of St. Bartholomew, Salford. The site fronts Oxford-street, which leads into Regent-road, and will be bounded on the east and south by new streets, now in course of construction. The new church is to seat 500 persons. The church is being erected from the designs and under the superintendence of the architects, Messrs. Darbyshire & Smith, and the foundations are being executed by Messrs. William Brown & Son, contractors, of Salford.

PRESBYTERIAN CHURCH, FROGNAL, HAMPTSTEAD.—The memorial stone of the new Presbyterian Church of England at Frognal (corner of Finchley-road and Frognal-lane) was laid recently. The new church is to be built by Messrs. Dove Bros., of Islington, and the architects are Messrs. Pite & Balfour. It is to seat 750 persons.

POLICE-COURT, CAERPHILLY, WALES.—The new Petty Sessions Court at Caerphilly was opened recently. Externally, the building is finished with cement with grey and red Forest stone windows. The interior is finished with light-colored wood, and at the roof of the magisterial bench is double moulded with circular head, and measures 10 ft. square. The whole of the buildings, including cells, are fitted with hot water heating apparatus. Semi-detached from the courthouse there is a charge-room, a day-room for the constables, sleeping quarters and the cells. The work has been carried out by Messrs. Price Brothers, of Cardiff, at a cost of about 2,000l. the architect being Mr. T. Lloyd Edwards, County Surveyor, Bridgend.

BOARD SCHOOL, BIRCHFIELD-ROAD, LIVERPOOL.—The new school in Birchfield-road, Edge-lane, was opened on the 23rd ult. Messrs. Willink & Thicknesse, of Liverpool, were the architects, and Mr. William Hall was the contractor, Mr. Wm. Riding being clerk of works. The main principle of the plan is that of a large hall from which all the teaching-rooms on the ground and first floors are approached. At the extreme end of the hall, and facing the main entrance, are two staircases, one for the boys and the other for the girls, and which communicate with a balcony which runs round the hall, from which access is gained to the upper classrooms. Descending a staircase situate between the two staircases mentioned, access is obtained to the basement, where there is a swimming-bath, some 60 ft. in length, lighted from the top. It is lined with white enamel bricks, and the bath is warmed at all times. There is a gymnasium, and on the top floor over a portion of the area are placed on one side a chemical laboratory, a physics laboratory, and a science lecture hall, whilst on the other side there are rooms for laundry and cookery work. The school is heated and ventilated on the Plenum system. The building is of brick. It gives accommodation for 550 infants and 140 mixed scholars—total, 1,690. The total cost, including site, is about 35,000l.

BANK, DUBLIN.—The new premises which have just been erected at 84 and 85, Thomas-street, for the Thomas-street branch of the Hibernian Bank, were opened on the 23rd ult. The new bank is a four-storied building, with a line of granite shafts, and a polished Aberdeen granite shafts to the entrance doorway and windows of the cash office. The basement comprises a heating chamber, also a book store and strong room, lined with white-glazed bricks and provided with fireproof doors. On the ground floor there is a public office, 47 ft. 6 in. by 20 ft., with a manager's office adjoining. There is accommodation for seven officers, exclusive of the managers. The upper portion of the building has been designed as a residence for the manager. The work has been executed by Mr. Kevin Toole, contractor, Dublin, from the design and specification and under the superintendence of Mr. William H. Byrne, architect, Dublin.

CHURCH INSTITUTE, STOKE-ON-TRENT.—On the 9th ult. the Bishop of Chester visited Stoke-on-Trent for the purpose of laying the foundation-stone of a building to be called the Queen Victoria Church Institute. The site of the institute is at the corner of Church-street and Boothern Old-road, and the building will be erected by Mr. T. R. Yoxall (Mayor) from the plans of Messrs. Lysons, Beal, & Lyman, at the contract price of 3,000l. On the ground floor there will be a lock-up shop, the principal entrance to the institute, and one side of the restaurant, with a frontage to Church-street; the main front of the restaurant, dining-room, and large church room fronting Boothern-road. On the first floor there will be billiard, dining, and tea rooms, and a gymnasium, and on the second floor the accommodation will consist of rooms for the Girls' Friendly Society, office, &c. The kitchens, cellars, and heating apparatus will be located in the basement.

SCHOOL EXTENSION, ABERDEEN.—The Aberdeen School Board have had under consideration for some time the necessity for remedying and improving the High School for Girls in Albyn-place, so as to provide facilities for the teaching of special subjects. The board resolved some time ago to erect a new building at the back portion of the ground, so as to provide for a large and properly-

equipped gymnasium and cookery-room, the present cookery-room to be added to the art department, while the existing gymnasium will be utilised as sewing-room, examination-room, and a room for hand and eye training or for other purposes as may be afterwards arranged. The scheme has been suspended for some time in consequence of a proposal to introduce a science course into the school, and the Board has now resolved to include in the new building two laboratories and a preparation-room for the teaching of chemistry and biological science, including physiology. Acting on the Board's instructions, their architect, Mr. J. A. O. Allan, prepared plans of the proposed additions, which have been adopted by the Board and recently approved of by the Department.

CHRIST CHURCH SCHOOLS AND INSTITUTE, BECKENHAM.—The block of buildings which have been presented to Christ Church parish were opened recently by the Bishop of Ripon. The accommodation consists of a school hall, 58 ft. long, with the platform at the south end and a gallery at the north end. On either side of the hall are five bays for classes, which can be separated by curtains. Immediately adjoining the west part is the superintendent's room, and at the back of the hall is a kitchen. At the south end towards the church are two classrooms for senior scholars, each having a porch, lavatory, and independent approach from the road. Storage space is provided below the platform and classrooms for furniture, &c., not in use. The site being upon a hill, the institute room for young ladies, which is between the new hall and the old buildings, is approached down a few steps, and is 37 ft. long, with a fireplace at one end. This room has an independent entrance from the road, and, in addition to lavatory accommodation, there is a cycle-shed for the use of members. This institute communicates by a lobby with the old building, which is newly fitted for use as a gymnasium, week-days and infant school on Sundays. The general contract has been carried out by Messrs. Higgs & Hill, of Lambeth; the stonework by Mr. Lovelock, of Beckenham; the electric lighting by Messrs. H. Farmer & Co., Wardour-street, S.W.; the heating by Messrs. Killick & Co., of Liverpool; and the glazing by Mr. E. Frost, of Haverton Hill, N.W. The architect entrusted with the scheme was Mr. Francis Hooper, of Norfolk-street, Strand, and Beckenham.

EXTENSIONS, BARNESLEY BECKETT HOSPITAL.—On the 27th ult. the Mayores of Barnsley opened the new children's ward, which has been erected at the Barnesley Beckett Hospital. Plans were prepared for the displacement of the Hard Ward and four other rooms used as bedrooms, and the alteration gives accommodation for nineteen beds, allowing 900 cubic feet of air space to each. Messrs. R. and W. Dixon were the architects, and the contractors were:—Brickwork, Messrs. J. K. Taylor & Sons; joiner, Mr. J. Smith; plumber, Mr. S. Rushforth; plasterer, Mr. T. Linder; painter, Mr. E. R. Fletcher; and electric light, Mr. James Taylor.

SANITARY AND ENGINEERING NEWS.

WATER AND DRAINAGE SCHEMES, ASHWELL.—The Ashwell Rural District Council has resolved to have water and drainage schemes prepared for the parish of Ashwell, Herts, and Mr. J. R. Elliott, A.M.I.C.E., of Nottingham, has been instructed to prepare the necessary plans.

SEWERAGE SCHEME, NORTH CLAINES, WORCESTER.—The Droitwich Rural District Council have instructed Mr. Harry W. Taylor, A.M.I.C.E., of Newcastle-on-Tyne and Birmingham, to prepare a scheme of sewerage for North Claines (suburb of Worcester).

SHIPLEY SEWAGE DISPOSAL.—The Shipley District Council have instructed their Engineer, Mr. Malcolm Paterson, M.I.C.E., of Bradford, to prepare the necessary plans and sections for the extension of their bacterial beds in accordance with the requirement of the Local Government Board. After receiving the sanction of the Local Government Board in 1896 for the tank precipitation and land filtration scheme, designed by Mr. Paterson, the Shipley Council decided to carry out a bacterial scheme without awaiting further sanction, and it now appears that the scheme carried out is not deemed sufficient by the Local Government Board. The additional works required will include 12 acres of bacterial beds and an extension of the land filtration area.

SEWERAGE, HANLEY, STAFFS.—At their meeting, held on the 24th ult., the Hanley Corporation had under consideration a scheme for the bacterial treatment of the sewage from the whole of the county borough. The scheme, which has been prepared by Messrs. Willcox & Raikes, of Birmingham, provides for utilising the existing works, and the construction of new tanks and bacteria beds at an estimated cost of 76,000l. It was resolved that application be made to the Local Government Board for sanction to a loan for this amount. Large experiments have already been carried out, and the engineers were instructed to proceed with the bacteria beds.

CARR BOTTOM RESERVOIR, BURLEY WATERWORKS.—At the last meeting of the Burley-in-Wharfedale Urban District Council the Engineer

for the new waterworks, Mr. M. Paterson, of Bradford, reported that the dam was within 9 ft. of top-water level, and that 40,000 cubic yards of earth-work had been completed, leaving less than 10,000 cubic yards to be done. Of this probably more than nine-tenths had come out of the reservoir site within the water line, in addition to most of the puddle, the rubble pitching, and the bleaching. The pitching is almost entirely obtained from surface drift boulders of millstone grit. These were split into massive blocks and keyed up with smaller material.

WATER SUPPLY, BEAMSTEIN.—The Rural District Council have instructed Messrs. Beesley, Son, & Nichols, engineers, of Westminster, to prepare schemes of water supply, sewerage, and sewage disposal for the town of Beamstein.

SEWERAGE WORKS, SAFFRON WALDEN.—The Town Council have received sanction from the Local Government Board to borrow the sum of 18,000l. for works of sewerage and sewage disposal. It is proposed to obtain an additional 2½ acres of land at the present outfall site, and treat the sewage on the bacterial principle, as advised by Messrs. Dibdin & Thudichum. Messrs. Beesley, Son, & Nichols, of Westminster, are the engineers to the scheme.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—The partnership heretofore subsisting between Messrs. John Stephenson and Frank Parkinson, carrying on business as concrete, asphalt, and wood-block flooring contractors, at Fereday-street, Walsden, in the County of Lancaster, under the style or firm of "Stephenson & Parkinson," was dissolved by mutual consent as from April 30 last. The business will be carried on under the management of Mr. Frank Parkinson.

COMPETITION, TOWN HALL, HARBOROUGH.—We are informed that the drawings mentioned in our review of this competition as having been sent in by Mr. W. N. McKinley were submitted by Mr. W. H. Wike, A.R.I.B.A., and Mr. W. M. McKinlay, Norbury.

FLORITE OPAL TILING.—The Permanent Decorative Glass Co. send us some samples of their "Florite Opal Tiling" for wall lining. These are tiles about 7½ in. thick, with a glassy surface, capable of treatment in colour, and of course readily washable. In the examples sent to us the smaller tiles for covering a considerable surface are treated with an imitation of marble surface of different markings; this is a form of imitative material which we do not much like, though apart from the imitation question it would have a good enough effect. The tiles would of course be susceptible of decorative treatment of another kind, either in geometrical diaper patterns or in squares of bands of different colours, which we should certainly prefer to the imitation marbling. The material seems a good one in itself for purposes of internal decoration, and is not costly. It has already, we understand, been made use of by some leading London architects.

THE LAND REGISTRY, LONDON.—The Registrar has issued a departmental report upon the work of establishing and maintaining a general register of titles to real property for the county of London. During the ten years 1890-1901 there have been entered upon the register in London freeholds 32,268 separate properties, having an aggregate computed value of 34,907,643l.; and in respect of those properties, since their entry upon the register, have been recorded 21,875 transactions relating to sale, mortgage, inheritance, and other incidental matters. The office has re-surveyed 72,374 acres of house property, and laid down the sites upon the large-scale ordnance survey maps; it has also made more than 800 enlarged and special surveys in the case of various particular registrations. The cost of that additional work has been defrayed out of the revenue derived from fees received, in terms of the Land Transfer Acts, upon the *ad valorem* scale adopted six years ago. Thus far, the income yielded by fees is found to be sufficient to meet all departmental expenses, and to leave as well a large margin in favour of an insurance fund set up under the Act of 1867, with a view to compensate persons who may suffer injury or loss from possible official mistakes.

THE LONDON PLAYING FIELDS SOCIETY.—The Society's twelfth annual report, for 1901, which has just been issued, sets forth that the grounds which they now hold afford space for upwards of 150 cricket pitches, with room for about 3,300 players, and that football can be played on fifteen grounds, and lawn tennis on twenty-five courts. The Society ask for donations in aid of the purchase and laying out of land, to include 7,000l. to defray the expense of adding nearly 20 acres to Prince George's playing field at Raynes Park, where, in 1888, they bought a freehold of 2½ acres, their first permanent ground, for 9,400l.; and 800l. for reimbursement of the cost of laying out the Magdalen playing field, near Earlshill Station, of which they have taken a long lease from 1901.

NEW UNIVERSITY BUILDINGS, CAMBRIDGE.—A grace has been carried by a majority of votes by the Senate for the purchase of rather more than 6 acres of land on the Downing-street site for the erection thereon of additional buildings for purposes

of the University. The price is to be determined upon the basis of an annual rent charge of 1200l. per acre, that charge to be redeemable by the University at any time, and in such instalments as may be mutually agreed upon, by the transfer to Downing College of certain trust securities that will yield an income equal to the amount of rent charge so redeemed. The securities will be chosen by the University subject to approval by that College and the Board of Agriculture in London.

ELECTRICAL RAILWAYS IN SWITZERLAND.—In describing the remarkable progress of railway traction in Switzerland, under conditions that do not prevail in less mountainous regions, the New York *Street Railway Journal* directs attention to the extensive employment of steam plant in the production of alternating and three-phase currents for long-distance transmission where local water-power is not available. Coal districts are remote, the freight-service is limited; but the tourist traffic whilst reduced to a minimum during the winter months, has rapidly developed, and exceeds that in any other country. Our contemporary gives statistics showing how matters stood at the end of 1899. The total length of twenty-three electrical railways in the tows amounted to 154.18 km., the physical situation and the comparatively small size of the urban districts precluding the construction of long street lines; of nine cable roads, worked with electrical power and having an aggregate length of 102.1 km., the shortest was the Zurich mountain road (17 km.), the longest (3.6 km.) was that on the Stanserhorn. At that same period the total length of the tramways was found to be 176 km., the several distances being worked with electricity to the extent of 88 km., their aggregate, double-tracks, however, are very intricate. Even in Geneva the single-tracks extend to more than one-half of a 20 km. system. The franchises of the street railways are considerably prolonged, as contrasted with those that obtain in other European States. In Germany, for instance, the longest period is fifty years. In many large cities is shorter, whereas some franchises will not expire until from fifty to seventy-five years hence in Switzerland.

THE SURVEY OF LAKES IN SCOTLAND.—The survey is taken in the Tay and Speyre valleys, to the number of twenty and more, has just been finished by Sir John Murray and his staff, who are now engaged in the survey of Lochs Morar and Stiel. We read in the *Scotsman* that only four of the lakes in question had been, so far as is known, systematically sounded before. During the recent operations careful observations were made for determining the height above sea-level of the surface waters of the several lakes as compared with the nearest O.S. bench-marks when the soundings were taken, for the purpose of ascertaining the true relation between the contour lines at the lake and the water levels. The soundings have been plotted in position upon the 6 in. O.S. maps, and contour lines of depth have been drawn at intervals accordingly, with the depth and extent of the lake; a planimeter was used to calculate the areas between the successive contour-lines, the cubical quantity of water was then obtained, and the mean depth estimated by dividing the mass by its superficial area. The depths were measured in each instance by running lines of soundings across the lake at, or nearly at, a right angle to its axis, and at distances governed by the extent and outline of the lake. At Loch Tay, for example, the separate soundings were made at intervals of 200 yds. upon lines of 440 yards apart from one another, and the superficial area of that loch being more than ten square miles having a fairly regular border line. But in the small and irregularly-shaped lakes the lines and the soundings along them were taken much more closely together. The soundings in Loch Tay were less than 1,000 in number, whereas in Loch Ba, in the Tay basin, which has a superficial area of less than one square mile, as many as 300 were taken. The work of the survey extended to investigations into the temperature of the waters from surface to bottom, their transparency, the formation of sand and mud lying upon the lake floors, microscopical organisms, and the phenomenon of "seiches" or water pulsations occasioned, it is conjectured, by variations of atmospheric pressure. A "limnograph," constructed at Geneva under Dr. E. Sarasin's superintendence, will shortly be set up on the margin of one of the lakes for obtaining a continuous record of the changes in its water-level.

ARCHITECTURAL MONUMENTS IN EDINBURGH.—Sir John H. A. Macdonald (the Lord Justice Clerk) opened on the 10th ult. an exhibition of selected works by the students attending the School of Applied Art, Edinburgh, of which Dr. Rowand Anderson is the hon. director. Sir John said the question now facing them was whether the school was going to continue or not, and the question, as usual, was one of money. They had spent upwards of 9,000l., and they had a collection of works for the purpose of obtaining a valuation of about 5,300l. For some years they had excellent assistance from the municipality, but lately the latter had not felt inclined to be so liberal, and he hoped that they would be roused again to take a good and important work. There was no place in the United Kingdom where they ought to have a better school of applied art than Edinburgh, and if

they had had such a school years ago they would not have at the present time such a number of monstrosities filling the place, which, although they had failed to make her absolutely ugly, had prevented her from being so beautiful as she might be. He only wished someone would put a few pounds of dynamite under what people called Nelson's Monument—but what he called Nelson's Telescope—and shake it down into a comfortable ruin.

LABOUR IN THE COLONIES.—The July circulars of the Emigrants' Information Office (Bathurst, Westminister) mention that mechanics and labourers in Canada are well employed at this time both in towns and in country districts, but the labour market is unsettled in many parts owing to numerous strikes for higher wages and shorter hours, and the increasing cost of living. In British Columbia there is exceptional activity in the logging, lumbering, and shingle industries. In New South Wales trade continues fairly busy both in building and construction work. The labouring classes generally are complaining of the increased cost of living owing to the new Federal tariff. In Victoria there is no general demand for more labour. In New Zealand the building trades have been busy throughout the Colony, except at Wellington and a few smaller places. Men in the engineering trades have been fairly well employed except at Wellington and Invercargill. In Cape Colony there is a good demand for mechanics, especially men in the building trades; but no one can limit oneself at first obtaining a permit from the Permit Office, 47, Victoria-street, London, S.W. The general manager of the railways reports that a limited number of engine fitters, boiler-makers, coach builders, coach painters, firemen, and wagon builders, and a few ironmoulders, iron turners, coppermiths, blacksmiths, and trimmers, would probably secure employment by applying at the Government workshops in Cape Colony; the contract would be for at least one year at 9s. to 12s. a day, and the applicants must pay their own passages. In Natal there is a good demand at the present time for skilled artisans, more especially for carpenters and those in the building trades, but they cannot land without permits. The carpenters' strike is now settled, the men agreeing to accept an increase of 1s. a day (bringing their wages up to 13s. a day) instead of 2s. 2½ at first demanded. No one can land in South Africa without a permit, and none but refugees, Government employees, and persons engaged in a service of a public nature will be permitted to move up into the Transvaal. There is a good demand for mechanics, especially those in the building trades; wages are high, carpenters receiving 20s. to 23s. 6d. a day, but the cost of rent and food is at least twice as much as in England.

CARRARA MARBLE INDUSTRY.—Mr. Towsey, British Vice-Consul at Spezia, in his annual report, just to hand, mentions that an association of marble exporters has been formed at Carrara under the name or title of "Unione fra gli esportatori di marmi," and its objects, as set forth in a circular issued by its President, are (1) to unite in one association the individual energies of the members for the purpose of regulating and developing the marble trade, and for the protection of exporters and purchasers of marble; (2) to draw up and adopt from time to time a tariff fixing minimum prices under which no member of the association will be allowed to sell; and (3) to fix conditions of sale. The association consists of about forty different firms and individuals, including several British firms. Its President is the Commendatore Bernardo Fabricotti, and the vice-presidents are Mr. Thomas Robson and Signor Salvini Gino. These, with a secretary, treasurer, and ten councillors, form the Committee. The statistics respecting the Carrara marble industry for 1901 have not yet been published, the latest available being those for 1900. In that year out of the 795 quarries in Carrara district only 368 were working, and from these were excavated 108,470 tons of marble of the value of 7,038,800 lire, or 299,577l. sterling. The total of marble sawn was 60,022 tons and worked 4,535 tons, the number of quarrymen and workmen employed being 6,521. In Massa district out of 239 quarries seventy were at work, yielding 30,860 tons, value 46,581l. sterling, of which 18,253 tons were sawn and 650 tons worked, the quarrymen and workmen numbering 1,100. In Versilia district 72 quarries out of 230 were working, and produced 46,599 tons, value 79,338l. sterling, of which 10,192 tons were sawn and 9,380 worked, the number of employees being 2,533. The exports to the United Kingdom were 6,802 tons block, 15,371 sawn, and 8,031 tons otherwise worked—a total of 30,204 tons. The only 230 tons that took more was the United States—1,860 tons. France coming next with 20,067 tons and Germany fourth with 21,160 tons. During the year there were twenty-nine serious accidents, resulting in nine deaths and twenty-three men injured. There were also 680 slight accidents, bringing up the total to 718. Attention is called to the increasing accumulation of debris at the quarries, which, it is feared, will in the future render the working of them difficult.

APPOINTMENT.—We are informed that University College Hospital Committee, London, have appointed Mr. George Hornblower, F.R.I.B.A., of 2, Devonshire-terrace, Whitechapel, W., architect to the hospital, in succession to the late

Mr. Henry D. Shepard, who received the appointment on the resignation of the late Sir A. W. Blomfield, A.R.A.

CAPITAL AND LABOUR.

BRISTOL BUILDING TRADE DISPUTE.—The Master Builders' Association of Bristol, having served notices upon various operative societies in the building trade for certain alterations in the rules to come into effect on the 30th ult., a conference was held between the various organisations concerned, but no amicable arrangement could be arrived at, and application was therefore made to the Board of Trade to appoint a conciliator under the Trade Disputes Act. Preliminaries having been arranged, Mr. A. A. Hudson, barrister-at-law, who had been appointed by the Board of Trade to officiate in that capacity, attended at the office of the Chamber of Commerce and submitted the various documents that had been received by the Board of Trade from the Master Builders' and Operative Societies. Mr. George Wilkins opened the case for the Masters' Society, and detailed the reasons for the notice given against the operatives, more especially with regard to wages. Mr. Cowlin supported Mr. Wilkins' statement, and mentioned that in 1899 a halfpenny per hour advance was granted without discussion, but at present the labour market was full, and the rate of wages very high, the consequence being that speculative building was practically at a standstill. Mr. Cowlin replied on behalf of the operatives generally, leaving points affecting particular trades to be dealt with by the representatives of those trades. In the course of the explanations that followed there was an opinion generally expressed that many jobs were hanging fire waiting until this dispute was settled, and that there were great prospects for a prosperous time in the near future. Messrs. H. Davis, G. H. Voisey, and E. Clothier all endorsed the contention of Mr. Jarvis. The Conciliator then intimated that he considered it would be very unwise to dislocate the rule as to wages, and after further discussion the Masters' Society representatives concurred with Mr. Hudson's statement. Mr. Hudson also explained that he considered the employers, when they gave notice in December last, were quite justified in doing so, considering the state trade was in at that time; then the war showed no prospect of early settlement, and things did not look very hopeful as far as the near future was concerned. But undoubtedly Mr. Hudson had intended to have been more hopeful than it was, and the outlook was more hopeful than it is. He considered the operatives had made out a case for no reduction of wages taking place, and he complimented Mr. Jarvis upon his statement of the operatives' case. Notices served by the Masters' Society and certain other notices of alteration of the rules were, after full discussion, withdrawn. One of the representatives of the Amalgamated Society of Carpenters agreed to submit a proposal for the withdrawal of that Society's counter notice to a meeting of his committee in order that the advice of the Conciliator might be accepted.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

4,345.—AN ANTI-FROST APPLIANCE FOR PIPES: C. Sharples.—In order that the supply-pipe may be emptied with the shutting of the stop-pipe a sleeve having an opening is put around the plug of a screw-down tap. When the tap is open the plug will close the opening, but when it is closed water will flow through the opening, and so through a passage in the casing. Similar openings are made for a plug-cock.

4,370.—PAVING FOR RACE-COURSES, TENNIS-COURTS, &c.: I. E. Erlich.—Thin coal-tar or petroleum residues are sprinkled over a foundation of some gritty or sandy material, and when it has been absorbed a layer of thicker tar or asphalt is applied in streaks. As each streak is tarred it is covered with roofing or other paper, cloth, or some such material, and then rendered smooth with an iron disc. A second layer of tar and paper is applied, and the surface is finally dusted with fine sand. The paving may be used for existing floors.

4,420.—AN APPLICATION FOR PLATE GLASS, GLASS PRISMS, LENSES, &c.: F. E. Reynolds and G. R. Grubb.—In order to facilitate the reflection and transmission of light rays the articles are immersed in a solution of this urea, with the addition of an alkaline solution, in caustic soda, of washed and freshly precipitated lead tartrate heated to 140 deg. Fahr.; more of the lead tartrate solution is then added, the temperature is lowered to 120 deg. Fahr., and, as it becomes cool, the compound will form a uniform amorphous film upon the glass or other transparent body.

4,457.—WATER SERVICE (DOMESTIC): J. T. Ward and W. Ward.—The supply-cock is opened with the depression of a ball-float by a pull upon the end of a pivoted lever, whereupon the overflow pipe will deliver the water, which may be drawn off directly through a branch-pipe at the bottom of the cistern. The ball float is set between the pull and the pivot of the lever.

4,475.—IMPROVEMENTS IN CRANES AND DERIVATIONS: D. F. Macdonald.—In order that the loaded jib may be more easily swung round, and that the effect of list may be counteracted, a movement sideways is provided for the heel of the jib or the attachment between the tie and the post. A block carries a collar on to which the jib is hinged, and, whilst it slides in guides upon the post, can be shifted with a screw. In the case of a movable tie-attachment, the guides are hinged on to the post, so that they will remain in the plane of the tie, independently from its inclination. For the screw and nut a rack and pinion may be substituted.

4,486.—SAFETY LOCKS: E. J. Hall.—The inventor seeks to prevent the successful use of a pick-lock or a wrong key. A spring forces an arm which is pivoted at one side of the notched locking-bolt against the bolt behind which is a locking-bar whose one end is pivoted on to the arm and the other end forms a beak, having a block for its guide, the bevelled part of the locking-bar is engaged by a wedge-piece carried by a support and guided with a pin inserted through a slot, the long bit of the key will engage with a recess in the bolt and its short bit with the curved portion of the wedge-piece. For withdrawal of the bolt one turns the key until it lifts the wedge-piece, and thereby moves the bar to clear the beak, and a projection on the arm from the notches of the bolt which can then be withdrawn by means of the long bit of the key, but one can not withdraw the bolt with a key of which the lesser bit is either too short or too long, as in that event the beak, or the projection on the arm, will engage with the notch.

4,490.—WATER SERVICE FOR BATHS: J. F. Wilkinson.—The inventor causes the hot and cold water pipes of spray and shower baths to discharge into a mixing receiver, to the outlet of which the roses are fitted. A pull works the plug valves together, and there are cocks for regulating the several amounts of supply. In one variant form the supply for the sprinkling pipes is derived from a tank in which the mixing is first effected.

4,502.—LIFT-VALVES AND THEIR REPAIR: J. R. Russell.—The water flows through an opening in the side of a tapered liner, which is fitted in the casing of the tap. Inside the liner is inserted a float of wood or of hollowed metal, which an extension or peg upon the plug will, under normal conditions, hold up from its seating at the narrow end of the liner. The float will ascend to arrest overflow as the plug is taken out for repair. A seating within the casing may be adopted instead of the liner.

4,537.—FLUSHING APPARATUS: W. Dunbar, J. E. Ford, and W. Ford.—The flush is promoted by means of a cistern that is arranged at the side of the closet, with which it communicates through a bent pipe which opens into the soil trap. The starting-valve within the cistern is joined to the lever of the discharge-valve of the closet; by that arrangement, which is described as being applicable for closets after different kinds, the trap will be flushed and the basin discharged at one and the same time.

4,625.—CONSTRUCTIONAL WORKS AND SINKING OF SHAFTS: J. Wilson.—A hollowed structure which in the first instance is based upon a frame so shaped as to cut into the stratum is put together and sunk at the same time. A suction pipe or other appliance takes away the displaced stratum, and masonry or concrete is built upon the ledge of the frame, the loosening of the material to be removed is accelerated with branch pipes from the service pipes that convey liquid or gas under pressure. A sudden fall of material, as for instance quicksand, is obviated by bridging over the interior of the column.

4,666.—PIT PROPS: G. Fowler.—These are fashioned by cutting off the ends of the webs of steel or iron bars having an I-section, and turning the flanges down over recessed saddles, which are laid on the cut-off ends between the flanges. The saddles are devised for preventing the bent flanges from becoming distorted, and the sinking of the props into the woodwork will be prevented by causing the ends of the flanges to overlap one another or to meet in the middle.

4,702.—LAQUES AND VARNISHES: E. Hecht and G. Poitenc.—The inventors use fatty acids of an oil which is derived from *Driandra cordata* and *Elaeocopa vernicia* trees. In one mode they mix heated copal with the fatty acids, and then add benzol or some such ingredient for thinning purposes; in another mode they make a varnish by heating an admixture of wood oil or other suitable oil with the fatty acids.

4,742.—A TOP FOR A VENTILATING SHAFT: T. E. Bladen.—Flaps of mica or of aluminium are disposed around the sides of the shaft top; the free sides of the frame are fitted with brackets for the hinge pins of the metallic flaps, whilst for mica flaps there are riveted eyes for hanging the plates from the pins.

4,756.—PROCESS OF MIXING CONCRETE: J. Giffith.—A tilted-box pivoted in an opening in a raised platform feeds the charge into the mixing trough; the opened end of the box is tapered and has a pivoted gate; the box is tilted when its contents have been spread in layers; the motion of the gate is stopped at a certain point, and the

material will then slide out through the uncovered end of the trough as soon as a suitable degree of inclination is effected. For the special form of mixing trough confer No. 23,966 of 1898.

4,760.—ELECTRICITY METERS: A. Campbell.—For measuring energy, current, quantity, and resistance. To compensate a pressure circuit for variations in temperature it is connected between two diagonally opposed corners in a quadrilateral disposition of resistances whereof the temperature-resistance co-efficients in respect of one or two are different from those of the rest. Electrical pressure is applied either directly or from a shunt, or an additional resistance to the other two angles of the quadrilateral. The inventor claims that his invention is available for various measuring instruments, such as ohm-meters, volt-meters, watt-meters, shunted ampere-meters, ampere-hour-meters, and others. In one adaptation he compensates a copper winding by two equivalent copper resistances and two manganin resistances, whereof each has one-third of the resistance of the winding.

4,772.—BRICK-MOULDING PROCESS: H. J. Lintolt.—The clay is to be tipped from a barrow into a pug-mill, which is sunk into the ground, and is then lifted with an endless screw or another kind of elevator to a box of which the delivery-openings are fitted with doors; the clay is moulded by hand as it is extruded through the openings on to different parts of the table.

4,785.—A SELF-CLOSING VALVE: H. S. Fletcher.—The middle stalk of the valve is fastened within a chamber at the lower end of the spindle, which provides for independent movement, a flanged ring secures the seating to the valve, which can be screwed off its seat by the turning of a hand-grip at the squared upper end of the spindle; a spring of which the ends are fastened on to a projection from the casing and on to the spindle closes the grip when it has been freed.

4,805.—IMPROVEMENTS IN CRANES: Chisholm and Moore Manufacturing Co.—Means of control for a travelling crane worked with compressed air comprise a crane carriage, on which is mounted a traversing motor, with two separated hoisting motors having drums that work with single and multiple pulley-blocks, respectively, for changing the speeds of lifting. A valve which regulates the motors is worked with a rod having two pistons, the valve being held in mid-position, normally, by springs. The full force of only one spring returns the pistons to their mid-position, as a washer and pin prevent the expansion of the spring at the side towards which the pistons have been moved. The motors are after the kind specified in No. 4,857 of 1901, and the sliding valve has inlet ports and an exhaust port working with passages joined to ports covered by the oscillating motor cylinders. The specification describes means for supplying compressed air to the outer ends of the pistons.

4,866.—An overhead travelling crane driven with compressed air, which will lift at varying rates of speed, and can be readily taken to pieces, has its bridge and truck beams joined by angle-pieces that are bolted to the truck-beams, and riveted to the bridge-beams, each truck consisting of two parallel channel-beams kept apart by distance-pieces, and inserted through holes in the webs of the two parallel I-beams that form the bridge. For supporting the truck wheels is designed a carriage of which cross channel pieces and the sides make the frame. Each of the two drums has its own motor, worked by reducing-gear. One drum works with a multiple pulley-block and some sheaves; the other winds up the load directly or through a single pulley-block. Roller-bearings should be fitted for the wheels of the carriage, which is traversed by gearing worked from a chain-wheel.

4,868.—TELEPHONE EXCHANGES: C. W. Scott.—A bar having a number of contacts enables the lines to be "earthed" in the event of a storm, and so on, by means of multiple switches. For each switch there are coiled insulated conductors that connect the lines to contact-strips upon an insulating-bar that will engage with one of two grooves which are fitted with springs likewise arranged. The latter springs are severally connected to the switch-board and to ground by means of a wire soldered on to them.

4,872.—BY-PASS COCKS FOR GAS SERVICE: J. West.—For a by-pass plug cock one portion of the by-pass groove is fashioned in the casing of the cock and the other portion in the plug. In one position of the plug a continuous by-pass is supplied by the overlapping of the two portions of the groove, whilst a screw regulates the amount of gas that flows through, but the gas will be quite cut off with the turning of the plug altogether in the opposed direction.

4,881.—IMPROVEMENTS IN BRAZING, SOLDERING, AND SIMILAR TOOLS: G. F. Dinsmore.—The novelty of the invention lies in the parts which include an oil reservoir, the connecting portion with its accessory fittings, a removable head, and a burner. Air, to a pressure of from 40 lbs. to 50 lbs., is pumped through a stopper and valve. When the reservoir is almost full, a hole, which is opposite an opening in a weighted ring, admits oil into a chamber inside the reservoir, and that opening will communicate with

the bottom of the reservoir without being affected by the position in which the tool is employed. A pipe conveys the oil from the interior chamber to the filamentary burner-coil, whence it issues, as vaporized, around and before the needle, which has a screw and nut that regulate the size of the escape orifice. Before the flame is discharged around the head air is drawn into the mixing-chamber. A bayonet-joint enables one to replace a soldering-head with a brazing-head. When the latter is heated, the removal of the stopper provides for the head being pushed backwards in order that the outlet holes of the shell may be thereby closed.

4,012.—A SAW-SET: *G. Mitchell*.—A setting-plate, which forces the tooth of the saw against a bevel-plate, is carried by a spring which is screwed on to the frame, and is itself forced against the tooth with a thumb-screw. A screw beneath holds the blade of the saw against the bevel-plate as the setting proceeds, and the bevel-plate is screwed on to the frame.

MEETINGS.

FRIDAY, JULY 4.

Surveyors' Institution.—Conversations at the Natural History Museum, Cromwell-road, S.W., from 9 to 12.

SATURDAY, JULY 5.

Northern Architectural Association.—Annual Excursion.

Edinburgh Architectural Association.—Annual Excursion: Carlisle, Lancaster Priory, and Naworth Castle.

WEDNESDAY, JULY 9.

Institute of Sanitary Engineers, Limited.—General Purposes and Finance Committee at 4 p.m.; Election Committee at 5.15 p.m.; Special Council Meeting at 7 p.m.

THURSDAY, JULY 10.

Incorporated Association of Municipal and County Engineers.—Annual general meeting, Bristol.

FRIDAY, JULY 11.

Incorporated Association of Municipal and County Engineers.—Annual general meeting, Bristol (continued).

SATURDAY, JULY 12.

Incorporated Association of Municipal and County Engineers.—Annual general meeting, Bristol (concluded).

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

June 14.—By STEPHENSON & ALEXANDER (at Cardiff).

Pontypridd, Glamorgan.—Treforest, a freehold building estate, area 60 a.; also f.g.r.'s 314, 125, 3d, reversion in 71 yrs. £8,550

June 17.—By STANFORD & BROOM (at Halesworth).

Wenaston, &c., Suffolk.—A freehold sporting estate, 150 a. or 27 p. 3,025

Chediston, Suffolk.—The Church Farm, 82 a. or 4 p. 1,500

Halesworth, Suffolk.—Freehold house and shop, y. r. 144. 700

Two freehold cottages, w. r. 151. 65 155

June 18.—NEWLAND, DAVIS, & HUNT; and

Moore Smith & Sons (at Newport).

Redwick, Mon.—Brick Farm House, 130 a. r. 6 p. 7,450

Magor, &c., Mon.—Magor Pill Farm, 71 a. 2 r. 4 p. 1,025

Various enclosures of land, 144 a. or 11 p. 7,370

Freehold cottage and o. a. 3 r. 28 p. 145

June 19.—By STEPHENSON & ALEXANDER (at Cardiff).

Ely, Glamorgan.—Bedlonia Villa, f. p. 400

By W. Brown & Co. (at Great Missenden).

Great Missenden, Bucks.—Springfield House and 40 a. f. 3,100

Lee Common, Bucks.—Four freehold cottages. 270

Balling, Bucks.—Four freehold cottages. 130

Chtridge, Bucks.—Three freehold cottages. 110

By P. M. PUCKRICK (at Devizes).

Littleton Panel, Wilts.—Conygre Field, 6 a. 2 r. 26 p. f. 570

Chilton Clay, Wilts.—Freehold land, 15 a. 3 r. 15 p. f. 350

June 20.—By T. E. AVRE & Co. (at Exeter).

Rockbeare, Devon.—March Farm Estate, 127 a. f. (in numerous lots). 6,339

By Messrs. COBE (at Sittingbourne).

Tunstall, Kent.—Four Acre Meadow, 4 a. 3 r. 1 p. f. 150

Borden, Kent.—Cow Field, 2 a. 2 r. 18 p. f. 105

Fon Grove enclosure, 8 a. 1 r. 4 p. f. 350

June 21.—By PRICE & THORPE (at Northampton).

West Haddon, Northants.—White House Farm, 140 a. 1 r. 3 p. f. 4,700

Cold Ashby, Northants.—The Reservoir Farm, 37 a. f. 750

June 23.—By DOWSETT, KNIGHT, & Co.

Marylebone, 12, Nottingham-pl., ut. 431 yrs. g. r. 341, y. r. 2004. 2,100

Kentish Town.—Burghey-rd., lock-up stabling premises, ut. 78 yrs. g. r. 14, y. r. 184. 210

By GARRETT, WHITE, & POLAND.

Peckham.—Gibbon-rd., The Railway Tavern, f.g. r. 201, reversion in 62 yrs. 4,710
50, 54 to 62 (even), Gibbon-rd. (S), f. y. r. 2161, 3,390
71 and 73, Evelina-rd. (S), f. and 307, Hollydale-rd. (shop and yard), ut. 79 yrs. g. r. 1,700
41, 135, 45, y. r. 1071. 2,080
75 to 84 (odd), Evelina-rd. (S), f. y. r. 1341.

By HOLCOMBE, BETTS, & WEST.

Marylebone.—51, Linhope-st., ut. 18 yrs. g. r. 141, 145, w. r. 461. 125

By A. H. TURNER & Co.

Essex, Surrey.—The Lammas, f. p. 3,400

By G. A. McDOWALL (at Stratford).

Plaistow.—26 and 28, Gordon-st. f. w. r. 301. 310
Canning Town.—33 and 34, Edwin-st., f. w. r. 340
50, Beckton-rd., f. w. r. 181. 45 155

June 24.—By J. H. BULMER.

Edmonton.—9, Gloucester-rd., f. w. r. 281. 125. 205

By C. W. DAVIES & SON.

Shoreditch.—11, 12, and 13, Harriet-st., ut. 45 yrs. g. r. 121, 125, w. r. 651. 45. 600
Holloway.—67, Holloway-rd. (S), with yard and workshop in rear, c. y. r. 674. 108. 1,250
Tottenham.—27, 37, 39 and 47, Carlingford-rd., ut. 88 yrs. g. r. 211. 108. 1,240
Leyton.—341, Capworth-rd., f. w. r. 331. 165. 325

By L. FARMER & SONS.

St. John's Wood.—7, Marlborough-rd., ut. 60 yrs. g. r. 301, p. 1,250
Kilburn.—51, Princes-rd., ut. 60 yrs. g. r. 81. 108. 300
Cricklewood.—237, Fordwych-rd., ut. 931 yrs. g. r. 61. 108. y. r. 481. 560
47, 49 and 51, Oak-grove, ut. 21 yrs. g. r. 211. 108. y. r. 1081. 1,140

St. John's Wood.—8, Accia-rd., ut. 171 yrs. g. r. 111. y. r. 131. 1,150

26, Abbey-gdns., ut. 37 yrs. g. r. 81, y. r. 551. 450

Friern Barnet.—Friern Park, two plots of freehold land. 150

Wood Green.—Pollard-grove, Stuart House, f. y. r. 341. 130

By FREDERICK WARMAN.

Highbury.—38, Highbury-grove, ut. 471 yrs. g. r. 101. 581. 1,775

Clerkenwell.—4, Holford-sq., ut. 161 yrs. g. r. 51, y. r. 561. 115

Highbury.—30, Drayton Park, f. y. r. 601. 1,010

Crouch End.—21, Caryfort-rd., ut. 931 yrs. g. r. 61. 108. y. r. 481. 470

Holloway.—13 and 15, Benwell-rd., ut. 51 yrs. g. r. 161, e. r. 901. 815

June 25.—By G. A. McDOWALL.

North Woolwich.—238, 240, 242, and 244, Albert-rd., f. w. r. 1041. 7,000

Contractions used in these lists.—F.g. r. for freehold ground-rent; l.g. r. for leasehold ground-rent; i. g. r. for improved ground-rent; g. r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. for estimated rental; w. r. for weekly rental; y. r. for yearly rental; u. r. for unexpired term; p. a. for per annum; y. r. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard.

PRICES CURRENT OF MATERIALS.

*. Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

Hard Stocks	1 10	0	per 1,000	alongside, in river
Rough Stocks and Grizzles	1 10	0	0	" "
Facing Stocks	2 12	0	0	" "
Shippers	2 5	0	0	" "
Flettons	1 8	0	0	at railway depot.
Red Wire Cuts	1 12	0	0	" "
Best Fareham Red	3 12	0	0	" "
Best Red Pressed	3 12	0	0	" "
Ruabon Facing	5 5	0	0	" "
Best Blue Pressed	4 6	0	0	" "
Staffordshire	4 6	0	0	" "
Do, Bullnose	4 11	0	0	" "
Best Stourbridge	4 6	0	0	" "
Fire Bricks	4 6	0	0	" "
GLAZED BRICKS				
Best White and Ivory Glazed				
Stretchers	13	0	0	" "
Headers	12	0	0	" "
Quoins, Bullnose, and Flats	17	0	0	" "
Double Stretchers	10	0	0	" "
Double Headers	16	0	0	" "
One Side and two Ends	19	0	0	" "
Two Sides and one End	20	0	0	" "
Splays, Chamfered, Squins	20	0	0	" "
Best Dipped Salt Glazed Stretchers and Headers	12	0	0	" "
Quoins, Bullnose, and Flats	14	0	0	" "
Double Stretchers	15	0	0	" "
Double Headers	14	0	0	" "
One Side and two Ends	15	0	0	" "
Two Sides and one End	16	0	0	" "
Splays, Chamfered, Squins	14	0	0	" "
Second Quality White and Dipped Salt Glazed	2 0	0	0	less than best.

PRICES CURRENT (Continued).

BRICKS, &c.	
Thames and Pit Sand	7 3 per yard, delivered
Thames Ballast	6 0 " "
Best Portland Cement	31 0 per ton, delivered.
Best Ground Blue Lias Lime	35 0 " "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime..... 108. 6d. per yard, delivered.

Stourbridge Fire-clay in sacks, 268. 6d. per ton at rly. opt.

STONE.

STONE.	
Ancaster in blocks	11 per ft. cube, deld. rly. depot
Bath	1 7 " "
Fareleigh Down Bath	1 8 " "
Beer	1 6 " "
Grinshill	1 10 " "
Brown Portland in blocks	2 4 " "
Darley Dale in blocks	2 4 " "
Red Corshill	2 5 " "
Clooseburn Red Freestone	2 3 " "
Red Mansfield	2 4 " "
Hard York in blocks	2 20 " "
Hard York 6 in. sawn both sides	2 8 per ft. super. at rly. depot.
(under 40 ft. sup.)	2 8 per ft. super. at rly. depot.
" 6 in. Rubbed Ditto	3 0 " "
" 3 in. sawn both sides	3 0 " "
" 2 in. self-faced Ditto	0 94 " "
Hopton Wood (Hard Bed) in blocks	2 3 per ft. cube, deld. rly. depot.
" 6 in. sawn both sides	2 7 per ft. super. deld. rly. depot.
" 3 in. do.	1 24 " "

SLATES.

SLATES.	
in. in.	£ s. d.
20x10 best blue Bangor	12 0 per 1000 of 1200 at rly. dep.
" best seconds	11 10 0 " "
16x8 best blue	6 17 6 " "
20x10 best blue Portland	11 7 6 " "
16x8 best blue Portland	6 5 0 " "
20x10 best blue Europa	11 7 6 " "
fading green	13 10 0 " "
16x8 best blue	7 10 0 " "
20x10 permanent green	12 10 0 " "
16x8	6 0 0 " "

TILES.

TILES.	
Best plain red roofing tiles	44 6 per 1,000, at rly. depot.
Hip and valley tiles	3 7 per doz. " "
Best Broseley tiles	48 6 per 1,000 " "
Hip and valley tiles	4 0 per doz. " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6 per 1,000 " "
Do. ornamental Do.	60 0 " "
Hip tiles	5 0 per doz. " "
Valley tiles	3 8 " "
Best Red or Mottled Staffordshire Do. (Peckers)	50 0 per 1,000 " "
Hip tiles	4 1 per doz. " "
Valley tiles	3 8 " "

WOOD.

BUILDING WOOD.—YELLOW.	
Deals: best 1 in. by 11 in. and 4 in.	At per standard.
by 9 in. and 11 in.	14 10 0 16 0 0
Deals: best 3 in. by 7 in. and 8 in.	13 10 0 15 0 0
Battens: best 24 in. by 7 in. and 8 in.	10 10 0 11 10 0
and 3 in. by 7 in. and 8 in.	0 10 0 less than best
Battens: best 24 in. by 6 in. and 3 in. by 6 in.	7 in. and 8 in.
Deals: seconds	10 10 0 11 11 0
Battens: seconds	8 10 0 9 10 0
1 in. by 4 in. and 2 in. by 6 in.	8 0 0 9 0 0
1 in. by 4 in. and 2 in. by 5 in.	8 0 0 9 0 0
Foreign Sawn Boards—	
3 in. by 14 in. by 14 in.	0 10 0 more than battens.
Fin timber: Best midding Danzig or Memel (average specification)	1 0 0
by 11 in.	At per load of 50 ft.
Seconds	4 10 0 5 0 0
Small timber (8 in. to 10 in.)	3 12 0 3 15 0
Swedish balks	2 15 0 2 0 0
12-in. pine timber (35 ft.)	3 0 0 3 10 0

JOINERS' WOOD.

JOINERS' WOOD.	
White Sea: First yellow deals,	At per standard.
3 in. by 11 in.	22 0 0 23 0 0
3 in. by 9 in.	20 0 0 21 0 0
Battens, 24 in. and 3 in. by 7 in.	16 10 0 18 0 0
Second yellow deals, 3 in. by 11 in.	18 0 0 20 0 0
3 in. by 9 in.	16 10 0 18 10 0
Battens, 24 in. and 3 in. by 7 in.	13 0 0 14 0 0
Third yellow deals, 3 in. by 11 in.	14 0 0 15 10 0
3 in. by 9 in.	12 10 0 13 10 0
Battens, 24 in. and 3 in. by 7 in.	11 0 0 12 0 0
Petersburg: First yellow deals, 3 in.	20 0 0 21 0 0
Do. 3 in. by 9 in.	17 0 0 18 0 0
Battens	13 0 0 14 0 0
Second yellow deals, 3 in. by 11 in.	15 0 0 16 10 0
Do. 3 in. by 9 in.	13 10 0 14 10 0
Battens	11 0 0 12 0 0
Third yellow deals, 3 in. by 11 in.	12 10 0 13 10 0
Do. 3 in. by 9 in.	12 0 0 13 0 0

PRICES CURRENT (Continued).

WOOD.

	At per standard.	£ s. d.	£ s. d.
Petersburg :—			
Battens	10 0 0	21 0 0	
White Sea and Petersburg :—			
First white deals, 3 in. by 11 in.	14 0 0	25 0 0	
" " " 3 in. by 9 in.	13 0 0	24 0 0	
Second white deals 3 in. by 11 in.	11 0 0	22 0 0	
" " " 3 in. by 9 in.	10 0 0	21 0 0	
" " " 3 in. by 7 in.	9 10 0	20 10 0	
Pitchpine :—			
Under 2 in. thick extra	10 10 0	21 0 0	
Yellow Pine—First, regular sizes.	32 0 0	33 10 0	
Broads (12 in. and up).	4 0 0	more.	
Second, regular sizes	24 10 0	25 10 0	
Yellow Pine Oddments	20 0 0	22 0 0	
Kauri Pine—Planks, per ft. cube.	0 3 6	0 4 6	
Compound Oak Logs	0 2 6	0 3 0	
Large, per ft. cube	0 2 6	0 3 0	
Small	0 2 6	0 3 0	
Wainscot Oak Logs, per ft. cube.	0 5 0	0 5 6	
Dry Wainscot Oak, per ft. sup.	0 10 0	0 10 0	
inch	0 7 0	0 8 0	
2 in. do. do.	0 7 0	0 8 0	
Dry Mahogany—			
Honduras, Tabasco, per ft. sup.	0 0 9	0 0 11	
Selected, Figury, per ft. sup.	0 1 6	0 2 0	
Dry Walnut, American, per ft. sup.	0 0 10	0 1 0	
as inch	0 0 10	0 1 0	
Teak, per load	16 0 0	20 0 0	
Per ft. cube—	0 3 0	0 3 6	

Prepared Flooring—	Per square.	£ s. d.	£ s. d.
1 in. by 7 in. yellow, planed and			
shot	0 13 0	0 16 6	
1 in. by 7 in. yellow, planed and			
matched	0 13 6	0 17 6	
1 in. by 7 in. yellow, planed and			
matched	0 13 0	0 16 6	
1 in. by 7 in. white, planed and			
shot	0 11 0	0 12 6	
1 in. by 7 in. white, planed and			
matched	0 11 6	0 13 6	
1 in. by 7 in. white, planed and			
matched	0 13 6	0 15 6	
6 in. at 6d. per square less than 7 in.			

JOISTS, GIRDERS, &c.

	In London, or delivered	£ s. d.	£ s. d.
Rolling Vans, per ton.			
Rolled Steel Joists, ordinary sections	6 5 0	7 5 0	
Compound Girders	8 2 6	9 5 0	
Angles, Tees and Channels, ordinary sections	7 17 6	8 17 6	
Flat Plates	8 5 0	8 15 0	
Cast Iron Columns and Stanchions, including ordinary patterns	7 2 6	8 5 0	

METALS.

	Per ton, in London.	£ s. d.	£ s. d.
IRON—			
Common Bars	7 15 0	8 5 0	
Staffordshire Crown Bars, good merchant quality	8 5 0	9 15 0	
Staffordshire "Marked Bars"	9 0 0	10 0 0	
Mild Steel Bars	9 0 0	10 0 0	
Hoop Iron, basis price	9 5 0	10 0 0	
" galvanised	16 0 0	17 0 0	
" (And upwards, according to size and gauge.)			
Sheet Iron, Black—			
Ordinary sizes to 20 g.	10 0 0	11 0 0	
" 22 g.	12 0 0	13 0 0	
" 24 g.	12 10 0	13 10 0	
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	12 15 0	13 0 0	
" 22 g. and 24 g.	13 5 0	14 0 0	
" 26 g.	14 5 0	15 0 0	
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	16 0 0	17 0 0	
" 22 g. and 24 g.	16 10 0	17 10 0	
" 26 g.	18 0 0	19 0 0	
Galvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 15 0	13 0 0	
" 22 g. and 24 g.	13 5 0	14 0 0	
" 26 g.	14 5 0	15 0 0	
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g.	12 0 0	13 0 0	
" and thicker	12 0 0	13 0 0	
" 22 g. and 24 g.	14 0 0	15 0 0	
" 26 g.	14 5 0	15 0 0	
Cut nails, 3 in. to 6 in.	9 5 0	9 15 0	
(Under 3 in. in usual trade extra.)			

LEAD, &c.

	Per ton in London.	£ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	13 15 0	14 0 0	
Sheet, American, 3 lbs. & up.	14 5 0	15 0 0	
Soil Pipe	15 10 0	16 0 0	
ZINC—Sheet—			
Vielle Montagne	20 0 0	21 0 0	
Silesian	23 15 0	24 0 0	
Copper—			
Strong Sheet	0 10 0	0 11 0	
Thin	0 11 0	0 12 0	
Copper nails	0 11 0	0 12 0	
BRASS—			
Strong Sheet	0 10 0	0 11 0	
Thin	0 11 0	0 12 0	
Tin—English Ingots	0 1 5	0 2 0	
SOLDER—Plumbers'	0 7 0	0 8 0	
Timmen's	0 8 0	0 9 0	
Blowpipe	0 10 0	0 11 0	

PRICES CURRENT (Continued).

ENGLISH SHEET GLASS IN CRATES.

	15 or thirds	24d. per ft. delivered.	£ s. d.
21 or thirds	24d. per ft. delivered.		
" fourths	24d. per ft. delivered.		
26 or thirds	24d. per ft. delivered.		
" fourths	24d. per ft. delivered.		
32 or thirds	24d. per ft. delivered.		
" fourths	24d. per ft. delivered.		
Fluted sheet, 15 or thirds	24d. per ft. delivered.		
21 or thirds	24d. per ft. delivered.		
1 Hartley's Rolled Plate	24d. per ft. delivered.		
2 " " "	24d. per ft. delivered.		
3 " " "	24d. per ft. delivered.		
4 " " "	24d. per ft. delivered.		
Raw Linseed Oil in pipes or barrels	per gallon	£ s. d.	
" " in drums	per gallon	£ s. d.	
Boiled " in pipes or barrels	per gallon	£ s. d.	
" " in drums	per gallon	£ s. d.	
Turpentine, in barrels	per cwt.	£ s. d.	
" in drums	per cwt.	£ s. d.	
Genuine Ground English White Lead	per ton	£ s. d.	
Red Lead, Dry	per ton	£ s. d.	
Best Linseed Oil Putty for inside work	per cwt.	£ s. d.	
Stockholm Tar	per barrel	£ s. d.	

VARNISHES, &c.

	Per gallon.	£ s. d.
Fine Elastic Copal Varnish for outside work	per gallon	£ s. d.
Best Elastic Copal Varnish for outside work	per gallon	£ s. d.
Best Elastic Carriage Varnish for outside work	per gallon	£ s. d.
Best Hard Copal Varnish for inside work	per gallon	£ s. d.
Best Extra Hard Church Oak Varnish for inside work	per gallon	£ s. d.
Fine Hard Copal Varnish for inside work	per gallon	£ s. d.
Best Hard Copal Varnish for inside work	per gallon	£ s. d.
Best Hard Carriage Varnish for inside work	per gallon	£ s. d.
Extra Pale Paper Varnish	per gallon	£ s. d.
Extra Pale Gold Size	per gallon	£ s. d.
Best Black Japan	per gallon	£ s. d.
Oak and Mahogany Stain	per gallon	£ s. d.
Brunswick Black	per gallon	£ s. d.
Berlin Black	per gallon	£ s. d.
Knottin	per gallon	£ s. d.
Best French and Brush Polish	per gallon	£ s. d.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.
We cannot undertake to return rejected communications.
Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.
We are compelled to decline pointing out books and giving addresses.

Any communication to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.
All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 1000, unless in some exceptional cases and for special reasons.]

* Denotes accepted. † Denotes provisionally accepted.
ABERYSTWYTH.—For the erection of school buildings, Cwmystwyth, for Llanfangel Upper School Board. Mr. J. A. Jones, architect, 7, Queen's-terrace, Abergystwyth—
David & Williams... £730
David Davies... 687
John Morgan... 673
angel-y-Croyddin... £599

AYOT ST. LAWRENCE (Herts).—For the erection of a new rectory for the Rev. Joseph Ray. Messrs. Smee, Mence & Houchin, architects, St. Albans, Herts.—
Miskin & Sons... £2,652
Thos. Turner, Ltd... £2,390
J. Francis Newton... £1,681
J. Fenwick Owen... £2,479
Goldhawk & Sons... £2,999

BERKDALE.—For the erection of a chapel and lodge, Liverpool-road South, for the Urban District Council. Mr. Albert Schofield, architect, 45, Weld-road, Birkdale, near Southport. Quantities by architect—
T. Spencer... £6,090
O. Irving & Sons... £1,849
Halliwell Bros... 1,972
Duxfield Bros... 1,972
Birkdale... 1,815

CANNOCK (Staffs.).—For alterations, &c., to Rawnsley Schools, for the School Board. Messrs. Bailey & McConnell, architects, Bridge-street, Walsall. Quantities by the architects—
John Dalow... £2,455
Smith & Son... £1,023
Smith & Son... 2,380
Wm. Wintance... 2,350
F. Springer... 2,044
A. C. Hughes... 1,992
M. B. Anderson... 1,928
Hednesford... 1,810
Walton Bros... 1,787

CATFORD.—For the erection of a Baptist church in the Brownhill-road. Messrs. Smee, Mence, & Houchin, architects, 12, West Smithfield, E.C. Quantities by Mr. A. Goodchild, 11, Finsbury-pavement, E.C.—
Holliday & Green... £6,377
Smith & Sons... £6,390
Kiddle & Son... 6,700
Liggs & Hill, Ltd... 6,880
Castle & Son... 6,489
Campbell, Smith, & Co... 6,400
Holness... 6,147
Jeard & Sons... 5,879

CORK.—For the erection of two houses, Lancaster Quay, for Mr. W. Kinnmont. Messrs. W. H. Hill & Son, architects, 28, South-mall, Cork.—
J. Buckley, Lancaster Quay, Cork... £1,000

GREAT BROUGHTON (Cumberland). For alterations, &c., to schools, Wyndham-row, for the School Board. Messrs. W. G. Scott & Co., architects, Victoria-buildings, Workington—
Building—Geo. Mann, Workington... £437
Joinery—John Steel, Workington... 264
Slating—Lythgoe & Sons, Workington... 75
Plumbing—J. Dunbobbin, Keswick... 104
Plastering—Lawson & Co., Workington... 122
Painting—J. McKay, Maryport... 63

Accepted subject to Education Department's sanction and approval.

HUDDERSFIELD.—For the construction of sewage disposal works, for the New Mill Urban District Council. Messrs. Marriott, Son, & Shaw, C.E., Church-street-chambers, Dewsbury—
Waring & Sons, Bow-st., Huddersfield... £4,537
10s

HURLINGHAM.—For the erection of Hurlingham Court Mansions, for D'Ersey House, Ltd., including roof garden. Messrs. Palgrave & Co., architects, Westminster—
Mead & Burton, Chesham... £8,845

KINGSGATE.—For the erection of The White Cottage, Kingsgate, near Broadstairs, for Mr. A. C. Norman, J.P. Messrs. Swan & Norman, architects, 8, Clifford-street, Temple Bar, E.C. Quantities by Mr. James H. Swan—
Paramor & Sons... £2,500
W. W. Martin... £2,457
Johnson & Co., Ltd... 2,417
F. G. Minter... 2,490

LONDON.—For the erection of a chapel at Thane Villas, Seven Sisters-road, N. Messrs. Smee, Mence, & Houchin, architects, 12, West Smithfield, E.C. Quantities by Mr. A. Goodchild, 11, Finsbury-pavement, E.C.—
Sims & Wood... £4,734
Miskin & Sons... 3,800
Palman & Fotheringham... 3,710
McCormick & Sons... 3,584
Turtle & Appleton... 3,567
Smith & Sons, Ltd... 3,614
Campbell, Smith, & Co... 3,587
Lawrence & Sons... 3,584
Battley, Sons, & Holness... 3,497

LONDON.—For erection of engine-house at temporary electricity generating-station at Loughborough Junction, for the London County Council—
W. Harbrow... £5,148
J. McManus... £4,184
Peirson & Co... 5,015
The Jones Iron Foundries... 4,939
Westwood & Co... 4,692

LONDON.—For the construction of public conveniences South End-green, for the Hampstead Borough Council. Mr. O. E. Winter, C.E., Town Hall, Hampstead—
Thos. Adams... £2,998
Killingback & Co... 2,747
Morton & Hale... 2,694
Finch & Co... 2,550
Doulton & Co... 2,440
Ballard, Ltd... 2,437
Rogers & Co... 2,413

RAVLEIGH (Essex).—For the erection of a Wesleyan Sunday school. Messrs. Smee, Mence, & Houchin, architects, 12, West Smithfield, E.C.—
J. Byford, Rayleigh... £630

REIGATE.—Villa at Reigate, Surrey, for Mr. C. E. Robinson. Messrs. Holland & Sons, architects, High-street, Newmarket. Quantities not supplied—
Buckland & Waters... £1,467
Bagally & Sons... 1,177
Richard Killick... 1,100
Reigate... 1,137

RUGELEY (Staffs.).—For the supply of 600 tons of granite macadam, for the Urban District Council. Mr. W. E. Rogers, surveyor, Rugeley—
Ellis & Everard... £2,788
Rowley Regis Granite Co... 277
Kewley Regis Granite Co... 277
Ireland & Knight... 270
Griffiths & Co... 270
Crown Granite Co... 266

ST. ALBANS.—New infants' schools, Garden Fields, St. Albans, for the St. Albans School Board. Messrs. Smee, Mence, & Houchin, architects and quantity surveyors, 12, West Smithfield, London, E.C., and St. Albans.—
Miskin & Sons... £1,886
Whitley & Jarvis... £1,781
E. Dunham... 1,864

ST. ALBANS.—For the erection of a Congregational church at the junction of Victoria-street and Beaconsfield-road, St. Albans. Messrs. Smee, Mence, & Houchin, architects, 12, West Smithfield, E.C., and 14, London-road, St. Albans. Quantities by Messrs. Colwill & Son—
Whitley & Jarvis... £8,300
Battley, Sons, & Holness... 8,600
Albans... 8,450
Wilmot... £8,300
Miskin & Sons... £8,181
Albans... 8,173

[See also page 23.]

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

[See also next page.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
Architectural Assistant	London County Council	Not stated	July 14
Municipal Training Assistant Instructors in Woodwork	London School Board	5 l.	do.
Building Inspector	Willesden District Council	150l.	July 15
Road Foreman	Berkhamstead U.D.C.	150l.	July 18
Engineer and Clerk of the Works	Littonville Asylum Committee	3l. 3s., &c., per week	July 10
Works Foreman	Wimbledon U.D.C.	3l. 3s. per week	July 30

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv. vi. viii. x. & xiii. Public Appointments, xix. & xix.

TENDERS (Continued).

TOTTERIDGE.—For the erection of a private house. Messrs. Smee, Mence & Houchin, architects, 12, West Smithfield, E.C. Quantities by Mr. A. Goodchild, 81, Finsbury Pavement, E.C. 1.

Miskin & Son £3,800
Brown 2,750
Lawrence & Sons 2,684
Wade 2,583

Stewart £2,560
Newton 2,437
Bartley, Sons, & Holness, London* 2,479

WALSALL (Staffs.).—For new infants' schools and cookery kitchen, Whitehall, Walsall, for the School Board. Messrs. Bailey & McConall, architects, Bridge-street, Walsall. Quantities by architect.

Smith & Son £4,840
T. Tildesley 4,727
T. Mallin 4,578
W. & J. Webb 4,375
S. Wootton 4,152

Brookhurst & Wood £4,504
W. Wistance 4,418
T. Mason 4,408
Smith & Pitts 4,200
J. Dallow 4,144
J. W. H. Gibby, Small Heath, Birmingham* 3,909

WEST BROMWICH.—For the erection of school buildings, Oak-lane and Lodge-road, for the School Board. Mr. Alfred Long, architect, 21, New-street, West Bromwich.

Thomas Hardy, West Bromwich £12,225

* Accepted subject to the approval of the Board of Education.

WEST HAM.—For the erection of a mortuary, Ordnance-road, Canning Town, for the Town Council. Mr. J. G. Morley, Borough Engineer, Town Hall, West Ham.

A. E. Symes, £1,966 o o
General Builders Ltd. 1,777 o o
Yates & Co., 1,689 o o
Foster Bros., 1,597 o o
Goodman & Sons 1,512 4 10

Horlock & Son £1,464 o o
G. Wise 1,435 o o
Calnan & Son, Commercial-road, E.C. 1,376 o o

WOMBWELL (Yorks.).—For the erection of a house, Goldthorpe, for Dr. Craik. Mr. John Robinson, architect, Wombwell.

Masonry.

Taylor & Son, Barnsley £450 o o

Carpentry and Joinery.

Jas. Smith, Barnsley 170 o o

Plumbing and Painting.

Snowden & Son, Barnsley 70 o o

Slating.

Chas. Kemp, Swinton* 22 o o

Plastering.

Bendelow & Bennett, Mexborough* 36 5 6

£757 5 6

LONDON SCHOOL BOARD TENDERS

At the last meeting of the London School Board, the Works Committee submitted the following lists of tenders. Mr. T. J. Bailey is the Board's Architect.

* Recommended for acceptance.

BROOMSLEIGH-STREET SCHOOL (Hampstead).—For drainage and sanitary works.

Durbin & Co. £3,005 o o
Sanitary Lead-lining and Pipe-bending Co., Ltd. 2,950 o o
Lathes Bros. 2,919 o o
G. Neal 2,764 o o

J. Peattie £1,762 o o
Gordon & Sons 2,700 o o
R. P. Beattie 2,688 o o
Marchant & Co. 2,688 o o
T. Cruxys 2,680 o o
Stevens Bros.* 2,480 o o

CLYDE-STREET SCHOOL (Deptford).—For heating works in infants' department.

Harlow & Son £270 o o
Canon & Sons 175 o o

Stevens & Sons £130 10 0
J. Grundy* 130 o o

GLENGALL-ROAD SCHOOL (Cubitt Town).—For partitions.

Johnson & Co. £730
T. H. Jackson 745
Spencer & Co. 670
F. & F. J. Wood 650
J. T. Robey 640

Gibb & Co. £634
Bruce, Croom, & Co. 603
Barrett & Power 596
Galbraith Bros.* 439

GLYN-ROAD SCHOOL, HOMERTON.—For heating works.

Stevens & Sons £132 o o
G. Davis 130 o o
W. Simmons 120 o o
Palowkar & Sons 108 o o
R. Clarke 106 o o

Vaughan & Brown, Ltd. £104 o o
Brightside Foundry and Engineering Co., Ltd. 97 o o
G. & E. Bradley* 95 10

Running Contract for the Supply of Tubular Boilers.

	12 ins. wide.	14 ins. wide.	16 ins. wide.	18 ins. wide.
	A. d. B. d.	A. d. B. d.	A. d. B. d.	A. d. B. d.
Hayward Bros. & Eckstein, Ltd.	£ 3 12 6	£ 4 0 0	£ 4 10 0	£ 4 10 0
Hartley & Sugden, Ltd.	£ 3 10 0	£ 3 10 0	£ 4 0 0	£ 4 0 0
Humbley & Co., Ltd.	£ 3 10 0	£ 3 10 0	£ 4 0 0	£ 4 0 0
Jenkins & Co., Ltd.	£ 3 10 0	£ 3 10 0	£ 4 0 0	£ 4 0 0
The Hope Foundry Co.	£ 3 10 0	£ 3 10 0	£ 4 0 0	£ 4 0 0
The Palace Stove Co.	£ 2 14 6	£ 3 0 0	£ 3 0 0	£ 3 0 0
The Albion Iron Co.*	£ 2 11 0	£ 2 0 0	£ 3 0 0	£ 3 0 0

GRATE FRONTS:—

	Size A. each.	Size B. each.
Robbins & Co.	£3 12 6	£3 17 6
Wright & Co.	£ 2 0 0	£ 2 6 0
Coalbrookdale Co., Ltd.	£ 1 18 0	£ 1 12 0
Palace Stove Co.	£ 1 15 0	£ 1 15 0
Fletcher, Russell, & Co., Ltd.	£ 1 12 0	£ 1 12 6
O'Brien, Thomas, & Co.	£ 1 6 0	£ 1 6 0
Carroll Co.	£ 1 6 0	£ 1 6 0
McDowall, Steven, & Co., Ltd.	£ 1 5 6	£ 1 5 0
J. Grundy	£ 1 0 10	£ 1 0 10
Hayward Bros. & Eckstein, Ltd.	£ 1 0 0	£ 1 0 0
Fallick Iron Co.	£ 0 10 0	£ 0 10 0
Albion Iron Co.	£ 0 18 5	£ 0 18 5
Ashdon and Green Iron Co.*	£ 1 7 0	£ 0 17 0

LAVENDER HILLS SCHOOL.—For heating works:—

Wippell Bros. & Row. £301
Cannon & Sons 275
J. Eason 262
Williams & Sons (Car-diff), Ltd. 182
Duffield & Sons 198

J. & F. May £105
Wenham & Waters, Ltd. 194
Brightside Foundry and Engineering Co., Ltd.* 182

LVHAM-ROAD SCHOOL (Brixton Hill).—For partitions in boys' and girls' departments.

G. Kemp £360
Maxwell Bros., Ltd. 790
Bulled & Co. 780
Rice & Son 713

F. & H. F. Higgs £690
Marland & Son 684
Bulled & Co. 660
Garrett & Son* 587

MUNSON-ROAD SCHOOL (Hatcham).—For partitions.

W. Downs £1,860
J. Appleby 1,338
W. V. Good 1,196
G. Kemp 1,135
Maxwell Bros., Ltd. 1,100
Ri. & Son 1,093

Marland & Sons £1,085
Black & Son 1,083
T. D. Leach 1,064
J. C. Bowyer 1,039
Bulled & Co. 964
H. Groves* 945

NAPIER-STREET SCHOOL (Hoxton).—For porch at end of infants' hall:—

Barrett & Power £292
H. Line 249

Staines & Son £220
Stevens Bros.* 226

OLDFIELD-ROAD SCHOOL (Stoke Newington).—For partitions, &c.:—

North of England School Furnishing Co., Ltd. £676 11
Bruce, Croom, & Co. 533 o
T. L. Green 533 o
(Unsign'd) 557 o

Shurmer & Sons, Ltd. £320 o
Barrett & Power 500 o
London School Furniture Co. 488 12
W. Martin 487 o
H. Bouneau* 413 16

PORTELLO-ROAD SCHOOL (North Kensington).—For enlarging cookery centre, &c.:—

S. Polden £635 o
Lathes Bros. 592 o
M. Pearson 419 o
Chinchen & Co. 449 o

General Builders, Ltd. £397 o
C. H. Scaly 384 o
W. R. & A. Hide* 385 15

ST. JOHN'S SCHOOL (Halley-street, Limehouse).—For additional heating:—

Verner, Pleidier, & Perkins, Ltd. £95 10
R. Clarke 89 o

J. Eason £88 10
Comyn, Ching, & Co. 69 18
G. & E. Bradley* 67 o

THE WHITTINGTON SCHOOL (Highgate Hill).—For reconstructing furnace flue:—

Deering & Son £265
Marchant & Hirst 257
General Builders, Ltd. 125

Stevens Bros. £144
Rockhill Bros.* 12
Stevens Bros. 12

WILTON-ROAD SCHOOL (Dalston).—For drainage and sanitary works:—

Lathes Bros. £1,410 o o
E. Triggs 1,191 o o
Lawrence & Son 1,182 o o

Johnson & Co. £1,370 9 4
Williams & Son 1,314 o o
Stevens Bros. 1,252 o o
R. P. Beattie* 1,202 14 10

WIRTEMBERG-STREET SCHOOL (Clapham).—For drainage and sanitary works:—

H. & G. Hall £1,949 o o
G. Parker 2,005 o o
W. Down 2,061 o o
Whitehead & Co., Ltd. 2,061 o o
Johnson & Co. 1,977 o o

Rice & Son £1,949 o o
Durbin 1,831 o o
Katesmak 1,770 o o
J. & M. Pat 1,781 o o
Lacey Bros. 1,770 o o
R. P. Beattie 1,700 o o
Lenny & San* 1,638 o o

WOOLMORE-STREET SCHOOL (Poplar).—For drainage and sanitary works:—

G. Parker £7,533 o
Johnson & Co. 2,909 o
T. Cruwys 2,134 o

J. Peattie £1,311 o
R. P. Beattie 1,949 7
Stevens Bros.* 1,895 o

YORK-ROAD SCHOOL (King's Cross).—For partitions, &c.:—

T. L. Green £293 o
Denshaw & Sons 286 15
Chinchen & Co. 279 13
Stevens Bros. 275 o
Marchant & Hirst 273 10

Grover & Son £224 o
General Builders, Ltd. 219 o
McCormick & Sons 206 o
Williams & Sons 206 o

CLEANING AND PAINTING.—The work at the following schools will be done during the summer holidays—July 25 to August 23, 1902. Where exterior as well as interior work has to be done an additional week will be allowed for the former:—

AMBLER-ROAD.—Painting interior and exterior:—

J. Stewart £663 o
Deering & Son 554 o
Grover & Son 486 o
McCormick & Sons 456 o

G. Kirby £440 o
T. Cruwys 439 10
Stevens Bros. 410 o
C. & W. Furnings* 398 12

BROCKLEY-ROAD.—Painting interior and exterior:—

J. & C. Bowyer £426 o
W. Read 351 10
W. Banks 345 o

C. G. Jones £308 o
E. Proctor 299 10
G. Kemp* 295 o

BUCKINGHAM GATE.—Painting interior:—

J. Watkins £328 o
J. R. Sims 324 o
Lathes Bros. 239 10

W. Hornett £228 o
M. Pearson 210 o
W. Chappell* 195 o

CENTRAL-STREET.—Cleaning interior and painting exterior:—

Haydon & Sons £358 o
G. Wales 348 o
W. Hornett 337 o
Staines & Son 270 o

Stevens Bros. £370 o o
G. Barker 340 o
Belcher & Co., Ltd.* 197 14 6

CHICKSAND-STREET.—Painting interior:—

Dolman & Co. £471 o
Haydon & Sons 424 o
Vigor & Co. 418 o

J. P. Holliday £397 10
Gibb & Co. 381 o
G. Barker* 345 o

COLLINGWOOD-STREET (old portion).—Painting interior:—

Vigor & Co. £285 o
J. P. Holliday 275 o
Gibb & Co. 273 o
Corfield & Co. 271 o

G. Barker £255 o o
Barrett & Power* 228 o
Haydon & Sons 224 10

CREDON-ROAD.—Painting interior:—

J. Harries £629 o
Rice & Son 489 o
E. Triggs 475 o

H. Line £462
Sayer & Son 433
E. Proctor* 374

GARRATT-LANE.—Painting exterior:—

I. & M. Patrak £237 o
Hudson Bros. 215 o
E. Flood 203 o

R. S. Rinald £166 o
Lorden & Son 144 9
Bulled & Co.* 125 o

HAGGERSTON-ROAD.—Painting exterior:—

G. Wales £150 o
Grover & Son 248 o
Marchant & Hirst 246 o
Barrett & Power 239 o

Chapman & Sons £230
G. Barker 226
Stevens Bros. 226
W. Martin* 209

[See also next page.

HALFORD-ROAD.—Painting interior :—
W. Chappell £420 0 | W. Hammond £344 0
Curd & Son 360 0 | Brown & Sons 327 0
Rice & Son 359 0 | F. Chidley 254 0
C. Gurling 354 10

HALSTOW-ROAD.—Painting exterior :—
W. J. Howie £145 10 0 | Hayter & Son £115 0 0
H. Groves 136 0 0 | E. Proctor 114 0 0
W. Banks 134 15 0

RINGWOOD-ROAD.—Painting interior and exterior :—
W. Read £386 10 | Lathey Bros. £540 0
Rice & Son 579 0 | W. Hornett 524 10
J. R. Sims 579 0 | Belcher & Co. Ltd. 453 9
E. Triggs 570 0 | W. Hammond 449 0

LANGFORD-ROAD.—Painting interior :—
Balfour & Co. £390 7 6 | Ltd. £411 8 0
J. R. Sims 470 10 0 | C. Gurling 346 0
Rice & Son 460 0 | W. Hammond 343 10 0
E. Triggs 448 0 | W. Hornett 444 0 0

NECKINGER-ROAD.—Painting interior :—
J. Appleby £469 0 0 | J. Greenwood £405 4 6
Sayer & Son 432 0 0 | H. J. Williams 330 0 0
J. Harries 425 0 0 | H. Line 368 0 0

ORANGE-STREET.—Painting exterior :—
H. Line £171 0 0 | H. J. Williams £106 0 0
Sayer & Son 157 0 0 | J. Harries 104 0 0
Johnson & Co. 139 0 0

PAINTING the interior and exterior of the Gordon House School :—
Sole & Son £525 0 0 | E. B. Tucker £399 4 0
Lathey Bros. 425 0 0 | J. W. Brooking 387 0 0
Speecheley & Smith 417 10 0 | W. Hornett 347 16 0
H. Tinkler 379 18 9

PORTOBELLO-ROAD (Main School) —Painting interior of old rooms only. (Special School).—Painting interior and exterior :—
S. Polden £412 0 0 | W. R. & A. £359 0 0
W. Hornett 359 10 0 | Hide £259 0 0
Chinchen & Co. 339 0 0 | Bristow & Bat. 257 15 0
Balfour & Co. 289 5 6 | well 257 15 0
Brown & Sons 268 0 0 | G. H. Sealy 215 0 0

RAYWOOD-STREET.—Painting interior :—
General Builders, Ltd. £669 | Lathey Bros. £397 0 0
Bulled & Co. 470 0 0 | Rice & Son 380 0 0
E. Triggs 434 0 0 | Garrett & Son 369 0 0
E. Flood 420 0 0 | C. Gurling 342 0 0

ST. PAUL'S-ROAD.—Painting interior :—
T. Willson £412 0 0 | C. Barker £345 0 0
Vigor & Co. 354 0 0 | Gibb & Co. 338 0 0
Cornfield & Co. 359 0 0 | A. W. Derby 295 0 0

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SIGDON-ROAD.—Painting interior and exterior :—
Chesum & Sons £485 0 0 | M. Pearson £419 0 0
Barrett & Power 450 0 0 | Silk & Son 399 10 0
Marchant & Hirst 430 0 0 | G. Barker 371 0 0
G. Wales 430 0 0

STANHOPE-STREET.—Painting interior of school :—
T. Cruwys £424 0 0 | Vincey & Stone £282 0 0
J. Appleby 197 0 0 | W. Chappell 315 0 0
W. Hornett 401 0 0 | J. R. Sims 305 18 0
Marchant & Hirst 398 0 0

TOOTING GRAVENY (Boys', Girls', and Infants').
—Painting exterior :—
J. & M. Patrick £217 0 0 | H. H. Wood, Ltd. £173 0 0
J. Appleby & Son 197 0 0 | L. L. L. 166 0 0
R. S. Ronald 195 2 0 | Lorden & Son 166 0 0
Rice & Son 181 0 0 | Johnson & Co., Ltd. 152 0 0

TRINITY-PLACE.—Painting interior and exterior :—
J. Stewart £380 0 0 | T. Cruwys £274 0 0
Haydon & Son 121 10 0 | Stevens Bros. 254 0 0
Vincey & Stone 285 0 0 | G. Barker 225 0 0

UPPER NORTH-STREET.—Painting interior :
A. W. Derby £287 10 0 | Vigor & Co. £258 20 0
Gibb & Co. 261 0 0

WIRTEMBERG-STREET.—Painting interior and exterior :—
E. Flood £365 0 0 | Garrett & Son £262 0 0
J. Appleby 324 0 0 | Rice & Son 261 0 0
E. Triggs 307 0 0 | Maxwell Bros., Ltd. 244 18 0
Holliday & Greenwood, Ltd. 254 0 0 | E. B. Tucker 227 12 0

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The Builder.

VOL. LXXXIII.—No. 3197.

JULY 17, 1909.

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Harrogate Town Hall Competition: Third Premiated Design By Messrs. Heazell & Son.
Lochee Free Library and Baths The late Mr. J. Murray Robertson, F.R.I.B.A., Architect.
Mission Buildings, Theobald-street, New Kent-road, S.E. Mr. G. A. Lansdown, Architect.

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The Betterment of London.

THE announcement made by Sir W. Richmond in a letter in the *Times* of Monday last, of the formation of a new society, under the title of "The Betterment of London Association," seems a hopeful sign that some systematic effort is about to be made to get rid of some of the nuisances which have so long been allowed to exist in London, apparently from a mere habit of lazy conservatism which is a peculiarity of the character of the average Londoner. In most large provincial towns we find that there is, in the habit of mind of the population generally, a reasonable desire for improvement and for getting rid of things and customs that are injurious or offensive. In London the prevailing feeling of the average inhabitant is a kind of stolid acceptance of things as they are, merely because "we have always done so"; and if a provincial visitor expresses surprise at anything which strikes him as out of date or inadequate, he is probably told "we do not mind it," or "it suits us very well"; in short, the Metropolitan creed seems to be that "whatever is, is right."

Sir W. Richmond's sketch of the objects of the Association, of which he is the first President, includes some subjects which, although highly important both in a social and sanitary sense, it is not within our province to touch upon. There are other points on which we have in the past frequently protested, and in regard to which we hope the new Association will be able to bring about some improvement.

One of these is, the disgraceful manner in which litter and papers are allowed to accumulate and lie about in the London streets, without it being supposed to be any one's business to see to their removal. To come back from Paris, where every street is scavenged in the early morning, and see the thrown away papers, scraps, orange-peels, &c., lying about in the streets for days, ought to make a Londoner blush for his local government. This is one of the first things that ought to be taken up, and with that

should be taken in hand (a point not mentioned in Sir W. Richmond's letter) the proper cleansing of road-crossings in dirty weather by paid officials, in place of the ridiculous habit of allowing crossing-sweeping to be practised as a private profession and an attempted imposition on the public, for it is nothing else.

The partial and illegible naming of streets in London is another matter of which we have often complained, and which argues a most reprehensible indifference on the part of the municipal authorities to an obvious duty. Every street corner ought to be labelled, and the labels should be of the same size and design, so as to give uniformity and render them obvious to the eye at once. As it is, we come upon corner after corner, even in the better quarters of the city, where there is no indication of the name of the street; and the names that are written up are in all kinds of different form and character. To set all this right would require but a moderate expenditure of public money and a little business-like determination on the part of the County Council; but apparently they cannot give their minds to any such obvious and easily supplied deficiency.

In the matter of public conveyances there has been an immense improvement in London in regard to the omnibus system during the last twenty or thirty years, and it would be rather curious to know how this came about, for it was certainly not due to any general public spirit; on the contrary, we remember hearing people, in the old days of straw-filled omnibuses, lazy drivers, and insolent conductors, snub their provincial visitors who complained, and affirm that the London omnibus (of that day) was just what was wanted for London. It is owing no doubt to the existence of this same spirit of lazy acceptance of things as they are that, while many of our large provincial towns can show excellent and comfortable four-wheeled carriages at the service of the public, London has still the ill-built, narrow, ramshackle "growler." Cannot the licensing authorities do anything to insist on a better type of vehicle? Will the Betterment Association take up that point, and also agitate for the provision of an adequate and convenient river boat service, on the same lines as that of Paris? That will be a very important

benefit to the city, not as yet mentioned in their programme.

Sir W. Richmond's letter suggests "a quieter London" as one of the objects of the Association, and to this end the registration of all street musicians, street traders, &c. That is a very tame and inadequate half-measure. With regard especially to street musicians (so-called), the object ought to be, not to register or control them, but to wipe them out altogether; and we shall never have a desirable London till that is done. The majority of these "street musicians" are simply vagabond beggars who grind hand-organs, a sort of thing which has no pretence to be called music, and is one of the worst and one of the entirely unnecessary infictions of London, supported only by the stupidity of the more ignorant classes (rich and poor). And in any case the streets are not the place for musical performances, even of an improved character; they come in at the wrong time, and disturb other people's avocations. Outdoor music should only be licensed for specified places and specified hours, for performers of a certain ascertained standard of accomplishment; and all hand-organs should be eliminated. If the Betterment Association can secure that, they will have removed one of the most serious and utterly unnecessary grievances of London life.

These are points which are intimately connected with the general comfort, dignity, and healthfulness of life in London. But we would suggest that there are other forms of "betterment" not to be neglected, and which an Association like that to which we have been referring might very well include in its programme; we mean those which refer to the beautifying of London. The increase and maintenance of trees in the streets and squares, for instance, should be made an object of constant attention. Look at the liberal manner in which Paris provides for the constant watering of trees in the streets and squares; the constant opportunities which are taken, also, to lay out as an ornamental oasis any little bit of cleared space which is rendered available. We attempt this now and then in London, but in a most half-hearted and economic spirit. We commend these points to the consideration of the Betterment of London Association.

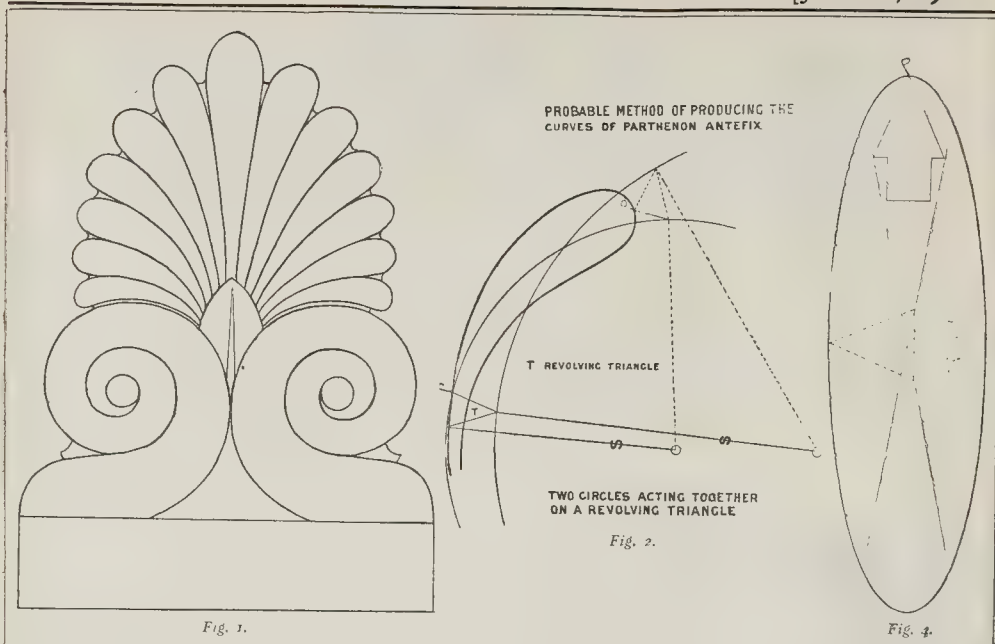


Fig. 1.

Fig. 2.

Fig. 4.

GREEK METHODS OF DRAWING CURVES.

BY MR. DANIEL WOOD.

IN our issue of February 1 we published an interesting communication from Mr. Daniel Wood, on a method of drawing the curves in Greek vases and other details. Since then Mr. Wood, who has made a special study of this subject, has sent us the following further suggestions and diagrams on methods of describing the curves occurring in Greek architectural detail.

One day I was looking at the Parthenon antefix (fig. 1). I knew that the spiral could be drawn from a cone held in the hole in its centre. Then I noticed that the edge of the lowest leaf of the fan coincided with the curve of the volute, and that the next leaf differed but slightly from it, and so on up to the centre leaf. I said to myself, "That fan was drawn by an instrument," and set out to find how it was done, not knowing that the journey would take five years, but it did. Again and again I gave up the task, but something fresh would suggest itself, and I went on. The first combination I tried would have answered, but I did not then know how to use it. Not that I could not draw the curves of the leaves, for they are produced by many of the movements, in fact they are only a variety of the kylix curve, but I had decided that the same instrument must be used throughout. It was not enough that two or three could be drawn in successive relation, if the line went wrong at the fourth. At last I found that the movement shown (fig. 2) would produce the complete series in proper order and relation, though I believe it might be drawn by other combinations.

But during my five years' search every curve seemed to come but the one I was

looking for; the other two forms of the anthemion, viz., the honeysuckle and the reversed honeysuckle, came out, but not the Parthenon antefix.

As I went on I was constantly coming across the movements I had already discovered. I would get a curve very near to the one I wanted, and then, making an alteration that I thought would give it exactly, would find that I had come back to an old movement.

The idea gradually came to me that there must be some essential feature common to all these instruments, and this I found to be the revolving plane, and I arranged the movements according to the following plan:—

	•		○
1	SEE 2	SEE 4	
PENROSE			
2	3	SEE 5	
NIKOMEDES	TRAMMEL & C.		
4	5	6	
JOPLING			

• = FIXED POINT

| = FIXED STRAIGHT LINE &c.

○ = FIXED CIRCULAR LINE, OR CIRCULAR MOTION &c.

Fig. 3.—A Method for Drawing Curves by the Revolution of a Plane Governed in its Motion by Two Powers of Control.

It is not necessary to illustrate all these but only to give specimens of the curves and describe those that are most likely to prove useful to artists.

No. 1 will produce the curve called the cardioid,* and the circle.†

No. 2 gives the conchoid of Nikomedes, the cissoid of Diocles,‡ and other mathematical curves, which were probably used artistically by the ancients.§

No. 3 includes the common trammel, and was probably used by the Egyptians¶ and Greeks for their column lines. It is very handy for drawing ellipses on paper, which can be varied by ruling the two guiding lines nearer or farther apart, using a triangle of card (leaving a piece for a handle) as a moving plane (fig. 4).

No. 4 I described in my last paper.

No. 5 is emphatically the potter's instrument, and yields vase forms freely, a very important one being the lekythos. ¶

No. 6 is the king of all the Greek drawing instruments. It gives the three forms of the anthemion, many vase lines, and all kinds of architectural curves. The Assyrians used it for the fan of their sacred tree, the progenitor of the Parthenon antefix. Indeed, its powers seem unlimited. Mr. Joseph Jopling suggested its use (with the revolving rod only) about fifty years ago. || James

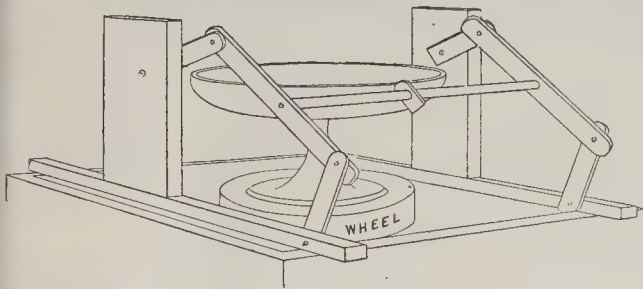
* Penrose, "Athenian Architecture," Appendix, 19A.

† Euclid, iii. 22.

‡ Salmon's "Curves," Second Edition, page 180.

§ The Builder, April 1, 1893, letter of Mr. Inwards.

¶ "Septenary System of Generating Lines by Simple Continuous Motion." By J. J. 1844, p. 222.



DUPLICATED INSTRUMENT ATTACHED TO A POTTER'S WHEEL, PRODUCING A GREEK KYLIX.

Fig. 5.

Watt used it for his parallel motion, with the rod, and R. Roberts for a like purpose with the triangle.* It is here we touch the question of linkages, but that belongs rather to the engineer than to the artist.

The use of No. 5 raises an important question because of the difficulty in using it upon a drawing-board, owing to the fact that the curves cross the fixed straight line. They can be used on the round by duplicating the instrument and connecting the two movements by a guide-rod fastened to P at either end, this rod will then move on the line of the curve and the guiding parts being all outside the work do not clash, but on a drawing-board you have only half the instrument, and your guides being fixed to the board, get in the way. I have tried many plans to get rid of the difficulty, the best being the use of a Peaucellier cell for the straight line, but even with this it is difficult to get the whole curve without interruption.

I have come to the conclusion that the Greeks used the duplicated instrument on the clay on the wheel. Let us consider the evidence.

In Greek vases we have a certain number of well defined forms—the Lekythos, Amphora, Kylix, &c., yet it is almost impossible to find two alike. How could such a result have been obtained, except by the use of some one movement for each class; the slight change that a little alteration in one of the powers would make would give infinite variety, the taste of the potter guiding him in the selection of forms.

When I was investigating this part of the work, not being a potter, I took my plans to two of the largest pottery firms I knew, and met with the reception an inventor usually gets in England from that British pig-headedness which is now costing the nation so dear. I had the same answer from both: "If you have anything that will enable us to turn out 1,000 pots where now we turn out 100 we shall be glad to look at your invention, but if it is only a matter of art—well, we have quite as much of that as we want." It is to be wondered at that design in English pottery has sunk so low during the last twenty years? If it had been in America we should no doubt by this time have had Greek pots to educate the eyes of our young designers, instead of degrading their taste by setting them to copy the bad forms, too, often, even now, set before them.

I thought, "Very well, if you do not care to use my work, you may leave it alone," so I set to work, bought a potter's wheel, engaged a potter, who got far enough to prove that the instruments would work the clay on the wheel, which was all I wanted, and there the matter ended.

There is, however, one thing which I take to be a convincing proof that the Greek potters used these instruments on the wheel (fig. 5). If the Lekythos movement be not properly set the line of the bowl of the vase will turn inwards at the top, and this defect can be seen in some of the commoner vases of this class in the British Museum. I will endeavour to illustrate this in my next paper.

NOTES.

The Glasgow Disaster.

SOME further light is thrown upon the causes responsible for the recent failure of the

Ibrox Park] football stand, by the evidence given on Tuesday at the trial of the contractor. Mr. Holmes, Burgh Surveyor of Govan, made the statement that the accident was due to the substitution of inferior and brittle yellow pine for the red pine specified. This theory coincides with one of the alternatives suggested in our previous note on the subject, but, according to the evidence of Sir Benjamin Baker, it appears that the stand was altogether too light, and that the disaster would have occurred even if red pine had been used. Sir Benjamin estimated the load upon the terrace to have been 75 lbs. per square foot, instead of the 25 lbs. that he considered would have been safe if red pine had been employed, but the report before us does not say whether he expressed any opinion relative to vibratory or oscillatory stresses due to movement of the crowd. From the details of construction already published, it seems quite clear that the magnitude and effect of the load were under-estimated, or that too much reliance was placed upon the resistance of the timber joists, or that errors were made in both directions. Sir Benjamin Baker considers the trouble to have been largely owing to reliance on data given in out-of-date textbooks, many of which refer to straight, selected, and knotless timber, and are, in his opinion, "absolutely and cruelly misleading." This raises a very important point, for until recently most tests of timber have been made with small specimens of exceptional quality, and the data recorded are therefore much in excess of those obtainable from the testing of planks,

Workmen's Compensation Act.

WE commented recently on the case of *Tong v. Great Northern Railway Co.*, a decision under the Workmen's Compensation Act to the effect that under Section 6 of the Act, if a workman has sustained injuries in circumstances which give him either the right to obtain compensation from his employer, or the right to proceed against some other person independently of the Act, if he selects the first alternative he cannot afterwards also bring an action against the other party. In the case of *Elliott v. Tiggins*, reported in the *Law Reports* for the current month, a curious attempt was made by a workman to obtain wages as well as compensation under the Act from his employer. The man sustained an injury to his arm on July 11, 1901, and by agreement with his employers was paid, as compensation under the Act, 50 per cent. of his average weekly earnings. On November 2 the man received a week's notice to leave the employ, and he then sued his employer for the balance of his wages from the date of the accident to November 9. The report is not at all clear whether at the time he was dismissed his incapacity had ceased or not, but the Court decided he could not recover wages in addition to the compensation he had agreed to take during incapacity. Employers whose workmen are injured should give them formal notice of the determination of their contract of service, despite the fact that the workman is being paid compensation, to avoid questions arising as to notice of dismissal, &c., after the incapacity of the workman has ceased.

The Legal Position of House Agents.

THE Court of Appeal last week decided a case of some importance to house agents—namely, *Taylor v. Tombs*. The basis of the decision was that unless a house agent can be shown to be acting as principal he is, so to express it, only an agent—that is to say, having brought the parties together, the liability for a breach of the contract rests upon them and not upon him. In the case in question, the owner of the house refused to hand it over to the tenant, who brought an action against the house agent. The importance of the case arises from the fact that it is a custom in London to place a house with a number of agents, which very often tends to some confusion in regard to tenancies. It is, perhaps, even more important at the present time when we appear to be getting into an age of street procession, and when windows and rooms are let so rapidly that it is quite possible for two people to believe that they are both entitled to the same premises. Unless a house agent lets a house or room that he knows is already disposed of, he is clearly not liable if the owner does not hand it over to the tenant for whom he has negotiated the contract.

Telpherage.

THE conveyance of raw materials, finished products, merchandise, and luggage from point to point by means of suspended rail or cable ways offers so much advantage that it is surprising to find the telpher system so little employed in Great Britain. A cable track can readily be suspended across a river or valley or carried along level ground on suitable standards. The tracks may be single or double as preferred, curves can be negotiated and terminal loops arranged

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* "How to Draw a Straight Line." By A. B. Kempe, B.A. 1877.

where necessary, so that complete transport facilities may be provided for mines, quarries, cement works, and other industrial undertakings. In factories, mills, and warehouses the system is of the greatest service; and as an example, we may mention the case of a paper mill in the United States where 6,000,000 bags, weighing over 4,000 lbs., can be transported in less than ten hours at a speed of twelve miles an hour. In this form the apparatus includes steel rails supported from the ceilings of the rooms traversed, and the truck affords standing room for the driver. A somewhat similar arrangement is applicable to the requirements of large railway stations, so that parcels and luggage may be rapidly transferred from one platform to another. Motive power is furnished by a wire conveying electric current to the trolley, through "fishing-rod" arms of the type used on overhead electric tramways. Modifications of the apparatus are made to suit all requirements, speed can be varied as desired, and is automatically reduced when curves are being passed. Hoisting tackle is also provided in order that goods may be lifted to the required height, and deposited at the proper place.

Improvement in Cement Manufacture. OLD-FASHIONED methods of manufacture are gradually being superseded in the cement industry, and one of the most recent examples of progress in this direction is furnished by the Wouldham Cement Works, at West Thurrock, Essex. When the works were taken over by the present Company, they had been in existence for over thirty-five years, and the output was little more than 25,000 tons yearly. After thorough re-organisation, the establishment is now capable of turning out 125,000 tons annually, a large proportion of the cement made being produced by the rotary process, which has only recently been perfected and adopted in this country. The new rotary plant at West Thurrock is driven electrically, and is furnished with various auxiliary appliances for the purpose of saving time and labour. So expeditious is the new process that only about two and a half hours need elapse from the time the raw materials are put into the wet mill to the time when the finished cement is ready for loading into barges, whereas with the old-style plant about fourteen days are necessary. One great advantage possessed by the rotary kiln is that small coal can be used in place of coke, thus rendering the manufacturer independent of the gas companies for supplies of fuel. It is found that the clinker is more uniformly burned and, so far as experience extends, the resulting cement is of exceptionally good quality. Although the rotary process has been employed for some four or five years in the United States, its adaptation to the cement industry of this country has not been unattended with difficulties, which we are pleased to find are being overcome at Wouldham and elsewhere.

Lattice Girders in Buildings. ALTHOUGH infrequently employed in this country in building construction, lattice girders might advantageously be adopted in cases where the use of supporting columns constitutes an undesirable obstruction. The new building for the New York Stock Exchange exemplifies the judicious employ-

ment of trusses forming the main support for the ceiling and four stories above the board room, an apartment measuring nearly 110 ft. wide by 140 ft. long by 52 ft. high. There are four main trusses, with a combined weight of 419 tons, and each is about 15 ft. deep, 4 ft. wide, and 115 ft. long. They are arranged in pairs, the two inner trusses being connected by six lattice girders which support the upper floors and the end walls of a light shaft, while the two outer trusses carry the ends of plate girders extending across to the outer self-supporting walls of the building. The trusses are carried on eight interior steel columns, braced together in pairs, each column measuring 3 ft. 7 in. by 4 ft. in cross section. This mode of construction involves the application of steel on a scale not often contemplated by British architects, and the essential result is a hall of magnificent proportions entirely unobstructed by pillars.

The Municipal Electrical Association. THE meeting of the Municipal Electrical Association in London last week was a very successful one. Several of the papers read were of a high standard of excellence and compare favourably with any read to the Institution of Electrical Engineers this year. Mr. Ruthven-Murray, the Electrical Engineer to the Willesden District Council, gave a full theoretical and practical description of double-current generators. These machines, which are novel in this country, are simply ordinary direct-current dynamos with the armature windings tapped at various points and connected to slip rings on the axle of the armature. Polyphase currents can be taken from these rings by means of collecting brushes, and hence this kind of machine furnishes both direct current and polyphase currents. For distribution to consumers within one or two miles of the station direct current can be used and for transmission to a sub-station at a distance the polyphase currents can easily be transformed up to high tension and then transformed down again at the sub-station. One obvious advantage is that during periods of light load only one machine need be run at the station. We were interested to learn that three of these machines of about 1,500 h.p. each were being put down to work the Mersey Railway. Another valuable paper, read by Mr. Barnard, Electrical Engineer to Hull, was on high-tension direct-current systems. He shows that in certain cases these systems have a decided advantage over polyphase systems. With direct current the transformation from 3,000 to 220 volts can be made by a single machine, whilst, with polyphase currents, as used in this country, there is first a transformation to low pressure alternating by means of an ordinary transformer, and then a further conversion to low pressure direct current by a rotary converter. In the subsequent discussion it was stated that 3,000 volts was the superior limit of pressure to which it was possible to build direct-current dynamos. In *L'Industrie Electrique* for June 10, however, will be found a description of a 25,000-volt direct-current dynamo made by M. Thury.

Conway Castle. WE hear from Mr. Harold Hughes, architect, of Bangor, who has been consulted by the Mayor and Corporation in reference to

Conway Castle, that there are no such "restorative" intentions as those described in a recent letter in the *Times*, on which we commented. Mr. Hughes was consulted in January last in regard to a fund which had been raised for certain works in connexion with the "Queen's Tower." He reported against any works in the nature of restoration, rightly asserting that "new stone would have absolutely no interest"; and he informs us that the Mayor fully agreed with his views. What is being actually done at present, apparently, is this: Plate glass had been fixed in wooden frames in the windows of the "Queen's Tower," in order to prevent further damage from the winter storms. These look unsightly, and a window, designed by Mr. Frederick Shields, is to be placed in the centre portion of one of these plate-glass panels, without touching the stonework of the jambs. It is satisfactory to find that the architect and the Mayor are acting in the right spirit, but we do not of course know how many persons, official or not, may be entertaining much more drastic schemes of restoration, and Mr. Shields' window would hardly account for the 500l. said to have been collected or asked for.

Hainault Forest and Lambourne Common, Essex. AN estimated sum of 27,000l. is needed for the accomplishment of a project to acquire, for 3,600l., the rights of Colonel Lockwood, M.P., and Captain Ethelstone as lords of the manors in Lambourne Common, more than 312 acres, and to add thereto the freehold, which the Commissioners of Woods and Forests are willing to sell, of Fox Burrows Farm, 475 acres. The latter property was formerly waste of Hainault Forest, as enclosed by the Crown in terms of the Hainault Forest Act of 1851, and since let for tillage. The lands lie on the high ridge which rises to an altitude of 300 ft. between the Thames valley and the river Roding; the greater portion of them is well timbered, and would afford a valuable open space for the enjoyment of visitors from London as well as from East Ham, West Ham, Ilford, Romford, and other rapidly extending districts in the nearer vicinity of Hainault Forest, once famous for its July fair around Fairlop Oak, near Chigwell. There still remains not far from Claybury a detached part of charming woodland, about 70 acres in extent, and Chigwell Manor and Common, with Roes' Well, retain much of their pristine sylvan beauty, but the timber at Fox Burrows Farm was cut down soon after Hainault was disafforested in 1851. Lambourne Forest, about 190 acres, has suffered from the ill-usage and depredations of gipsies and vagrants, who for some while past have made it their common camping-ground; Hainault, which at one time appertained to Barking Abbey, lies southwards, between Romford and Chigwell, with Epping Forest on the remoter side of the Roding. The scheme we indicate is warmly espoused by Mr. G. Shaw-Lefevre, Mr. E. N. Buxton, Miss Octavia Hill, and other leading members of the Commons and Footpaths Preservation Society. In the course of next year the Great Eastern Railway will open their new loop line from Buckhurst Hill to their main line at Seven Kings, with stations at Chigwell and Chigwell Row.

The Manor
House, Lee,
Kent.

THE Lewisham Borough Council are about to convert the Manor House, on the south side of Old-road, Lee, for purposes of a branch public library. The Manor House was built in or about 1770 by one Thomas Lucas, whose representatives sold the house and grounds, together with about 400 acres of adjoining land, in 1796, to Sir Francis Baring, Bart., to whom, two years afterwards, Lewis, second Lord Sondes, sold the manors of Lee, Shrofolde (or Shobeholt), and Bankerds (or Banquets), together with 500 acres of freehold property—the two purchases covering a large part of the parish. Thomas Lucas's widow brought the Manor House estate in marriage to John Julius Angerstein, whose collection of thirty-eight pictures, bought for 57,000*l.* by the Government in 1822, formed the nucleus of the contents of the National Gallery. Sir Francis Baring (*obit* 1810), his son Sir Thomas (*obit* 1848), and his grandson Sir Francis, elevations, Baron Northbrook in 1866, lived in the Manor House, which latterly had been occupied by Mr. Wolfram, a well-known "Army coach." The manor of Lee belonged in the Conqueror's time to his half-brother Odo, Bishop of Bayeux and Earl of Kent. It has passed through various hands, and in the fourteenth century belonged to the Banquets. Sir Robert Stury's widow and their son Sir Richard alienated it to Richard Widville, afterwards Earl Rivers, whose daughter married Edward IV. By her first husband, Sir John Grey, Elizabeth Widville had a son Thomas, afterwards Marquis of Dorset, to whom, in 1491, his uncle Richard, a son of Richard, Earl Rivers, had left the manor. Thomas, second Marquis of Dorset, exchanged the three manors above named, with other lands, to Henry VIII. for some estates in Leicestershire by an indenture dated March 4, 1512. Charles I. granted the royalty and fee-simple of the manors at a yearly rent of 87*l.* 10*s.* 2*d.* to Sir Ralph Freeman, of Aspenden, Hertfordshire, elected Lord Mayor of London in 1633, and they ultimately passed to his descendant, Lewis Monson Watson, who, on May 20, 1760, was elevated Baron Sondes of Lees Court, Sheldwick, near Faversham, and in 1795 was succeeded by his eldest son Lewis, already mentioned. The garden grounds, 9½ acres, that formerly supplied the Royal household with fruit and other produce, were acquired twelve months ago from Lord Northbrook and his son for 8,36*l.*, to which sum the London County Council contributed 3,500*l.*, and having been laid out by Lieut.-Colonel Sexby, Chief Officer of the Parks Department, L.C.C., at a cost of about 3,500*l.*, were opened to the public on May 19 last.

A COLLECTION of a few pictures and a good many drawings and studies by the late Sir Noel Paton is on view at the Fine Art Society's Gallery in New Bond-street. His celebrated pictures of "The Quarrel" and "The Reconciliation" of Oberon and Titania, which more than any others made his popular reputation, are not present; but a highly-finished oil-painting of a somewhat similar class, "The Fairy Raid," is exhibited; a picture more interesting for points of detail than as a whole. Part of the foreground is a splendid study of details

of vegetation; and the separate flower studies, which are among the best things in the collection, show how conscientiously Paton studied this class of subject. The "Water-colour Study of Rock and Vegetation" (22) takes one back to the period of the pre-Raphaelites. The many pencil studies are of unequal interest; some of them are weak in drawing and conception. The study of a head for the picture of "Christian Arming" (3) is very beautiful, and the small portrait heads of the late Queen and some members of the Royal Family are very good. It is a pity that we could not have the finished series of pen drawings for the "Ancient Mariner," one of the best things Paton ever did; there is only a rather rough pencil study for one of them. Sir Noel Paton was an artist of great industry and high aims, but hardly with a genius commensurate with them.

At the Woodbury Gallery there are two small exhibitions, one of Mr. G. R. Halkett's political cartoons, which are admirable specimens of burlesque in drawing, and show a great deal of power in the management of black and white effect; he is best known to the general public by his drawings of facial chairs in *Punch*—"the seats of the mighty"; but there are better things than these here. The other exhibition is a collection of Miss Maud Beddington's fanciful but slight studies in oil and water-colour. The water-colours, chiefly studies of children, are the best; they show, no doubt, the influence of Kate Greenaway, but are very clever. The oil-paintings are fanciful groups of ideal figures: the "Forsaken Merman's" children on the downs at night, gazing on the old church; a troop of shadowy figures symbolising "Sleep"; and others of the same class. There is a good deal of poetic feeling in these slightly executed conceptions.

MAGAZINES AND REVIEWS.

THE *Art Journal* is naturally a good deal occupied by lengthy articles on the two leading exhibitions, the Academy and the New Gallery. It contains also an article by Mr. Walter Crane on Decorative Art at the Turin Exhibition, which is to be continued.

The *Magazine of Art* includes an article by Mr. W. J. Loftie on "Some Artistic Aspects of the Coronation." Mr. Loftie is no doubt quite right in saying that there has been a much better feeling on this occasion as to the careful and reverential treatment of the Abbey fabric than there was on the occasion of the Coronation of Queen Victoria, but we are sorry (on his account) to see that he condones and even admires the foolish piece of sham ancient architecture erected at the west end of the Abbey. Mr. Loftie is one of the "Anti-Scrape" party, and one never knows where to have them; they will go into fits of indignation over something that, like Shylock's cat, is both harmless and necessary, and then will condone a perfectly unnecessary piece of theatrical restoration. The first article in the number is on the etchings of that remarkable French artist Félix Buhot, by M. Octave Uzanne. The article is partly suggested by the fact that the Directors of the Luxembourg have recently arranged a roomful of Buhot's etchings. Buhot presented the unusual combination of being an artist exceedingly French in feeling and style, and at the same time a great lover of English scenes and scenery. Some of his English scenes are given as illustrations to the article—"Landing in England" (Dover Pier in the rain), "The River at Gravesend," "Westminster Palace"—the latter a very fine and broadly treated piece of light and shade.

The *Architectural Record* (New York) commences with three articles on "L'Art

Nouveau"; an "Interview" on the subject with M. Charpentier (but not in the form of a conversation), by a Frenchman, M. Mourey; "An Architect's Opinion" on the subject, by a French architect, M. Guimard; and "The New World and the New Art," by an American, Mr. Herbert Croly. The first is, as might be expected, entirely in favour of the movement, as an emancipation from precedent and a seeking of new life. M. Guimard takes the line that every age must evolve its style, and that we are at present witnessing the creation of a style; to which we should reply that the history of art gives us no example of a style consciously made. He has a hit at the Americans, however, who are, he thinks, in the best position for creating a new style, and are not trying to do so. Mr. Croly, on the other hand, believes that the New World emphatically needs an old art, with a basis of established form to start from, and that intentional striving after originality would be fatal to American artists. But he does not approve of their too faithful reproduction of French models:—

"That local architects and decorators should appropriate and copy foreign models is all very well; but the reproduction is for the most part altogether too faithful. It is as often as not the result of being either too lazy or too busy to undertake the work of proper modification or even of intelligent imitation. The prominent American designers have for the most part more work in their offices than they are able conscientiously to supervise, so they naturally fall back upon the excellent manufacturing method of 'standardising' their products—methods absolutely fatal to æsthetic originality and distinction. And so American artists are always tossed on the horns either of one dilemma or another. Either they adapt themselves to business conditions and compromise the integrity of their work, or they are forced aside and continue to work conscientiously along their own lines, and are 'good but lonely.'"

Give the American architects, however, "two or three generations," and they may be able to modernise and Americanise the old forms and materials. Among other articles is a good one on "The Formal and Natural Style of Gardening," by Mr. G. F. Pentecost, junr., who misquotes Walpole in a rather absurd manner, making him say that Kent "leapt upon a wall, and discovered that all Nature was a garden." What Walpole really said, of course, was that Kent "leapt the fence" (supposed to be the dividing line between the garden and Nature) and made the discovery referred to. His two illustrations, figs. 2 and 3, of the really natural style of gardening (or rather "parking") and the usual result of what is supposed to be the natural style, form a very good bit of satirical criticism. No. 3 represents really the ideal of "Capability Brown," though his name is not mentioned. The writer, however, seems uncertain in his convictions, and rather leaves us with the idea that the formal garden and the "natural" garden are each beautiful in their place—though we do not quite gather what their place is. An article on Crocombe Church, Somersetshire, with illustrations, is a pleasing instance of the charm which a genuine old English church has for the American mind, native of a land where there are no medieval churches.

What can be the quality which is supposed, in the *Architektonische Rundschau*, to render the country house by Herr Ludwig Otte worth a coloured plate? It is absolutely devoid of architectural interest or character, and presents only the negative merit of not having the gimcrack style of detail usual in German country houses. The new Municipal Council House in Nuremberg, by Herr Hans Pylipp of that city, is a highly creditable attempt to combine something of the picturesque character of the ancient city architecture with a modern quality; and the plain treatment of the ground story in the principal front, with its round-arched openings without imposts, is most important in giving value to the more ornate treatment of the upper portion. The design for a town theatre, by Professor Dülfer of Munich, represents the "new art," and is original and picturesque in its way, though hardly a design that any one would seriously think of carrying out. As for the two ideal sketches for gateways, by Herr Fritzsche (Dresden)—Heaven preserve us!

In the *Berlin Architekturwelt* the best thing illustrated in architecture is Herr Hoffmann's Public Baths in the Oderberger-Strasse; a building marked by a great deal of originality without display or eccentricity; the interior of the swimming bath, with a plain vaulted roof, is well and architecturally treated, but it must

be rather deficient in light, with its small side windows high up at the springing of the vault. Among the ideal designs published are two for a town gateway, one of which, by Herr Werle of Berlin, might be made a fine thing with a little toning down of some of the details; and there is a design for a Walpurgishalle on the Brocken, by Herr Max Schandl, a characteristic example of the German taste for idealised structures in which architecture is made to look as much as possible like a production of the forces of nature.

Feilden's Magazine contains both an editorial note and a signed article on the metric system, the article being one by Mr. H. E. P. Cottrell, A.M.Inst.C.E., entitled "A Short Cut to the Metric System." By some tabular statements Mr. Cottrell explains a system by which existing measures in common use—the inch, the 2-ft. rule, &c., might by a very slight alteration in their actual lengths be harmonised into a metric system. "The new metric inch," he says, "fixed at '025 m., would be for all ordinary and unscientific forms of measurement indistinguishable from the present inch." He gives also a table of "new values for old names." The main object kept in view is to effect the change to a metric system of measurement without departing materially from units of measurement, such as the foot, which have been dictated to a great extent by practical convenience. The article is a very useful contribution to the literature of the subject, which ought to be pressed on public attention in this country, since, as is truly observed in the editorial note, "if we delay much longer we shall be the only civilised nation which does not officially use the metric system"; and as we are certainly bound to come to it sooner or later, there is not much sense in holding out until we can no longer have any credit in adopting it but that of yielding to necessity. The same number contains "Some Notes on British Bridge Work," by Mr. W. H. Thorpe, A.M.Inst.C.E., chiefly in regard to earlier developments of English bridge-building, but touching also on the vexed question, at present, of standard sizes, and also on the American system, under which each manufacturer, while limited in one sense by a rigid specification, tends on his own design, (with, we presume, his stock or standard sizes of parts). We quote Mr. Thorpe's concluding words on this subject, with which we are entirely in sympathy:—

"To adopt that procedure in this country would completely disorganise our present routine, upset both engineers and makers alike, and though it may come to that in time it need not, if our present methods, cumbersome and wasteful, are improved; retaining the one advantage our system possesses, that the engineer has his own designs carried out, not those of a manufacturing firm.

It is not to be denied that, however excellent the work of first-rate American firms may be, the not uncommon practice in that country of leaving so much to the maker, without efficient and independent professional control, has resulted, and still does result, in an extraordinary number of bridge failures, a record without a parallel in any other country."

The *Engineering Magazine* contains a short but striking article on the subject of "The Effect of Waterways on Railways," tending to show, very conclusively, that the effect of a canal system adjacent to a railway system is not, as our English railway managers appear to suppose, to rob the railway of goods traffic, but to bring more to it. After the canalisation of the River Main from Mayence to Frankfurt the railway lines on each bank of the river more than doubled their goods traffic in two years. This is certainly a matter worth the attention of English railway companies, who seem to regard a canal as merely a kind of drain from their own traffic.

Page's Magazine is a new publication devoted to various engineering industries, and, according to the introduction, its object is "to focus the rays of progress in each sphere of action upon successive issues." So far as we are able to judge from the first issue, the system of focussing very much resembles that adopted by several other publications of the same character. There is an interesting article upon the "Glasgow Electric Tramways," which constitute the most extensive and perfect installation of the kind in Europe. "Iron and Steel Manufacture" is the title of a contribution by Mr. E. H. Thwaite, who deals briefly with the comparative progress of the industry in various countries, and emphasises the importance of its development in British colonies. Several diagrams in this article are worthy of examination, notably one showing the favourable

position of New Zealand and Australia as centres for the supply of iron to countries bordering the Indian and Pacific Oceans. It is rather questionable whether "Hints on Advertising," by Mr. E. E. Matheson, A.M.Inst.C.E., are altogether appropriate in a technical publication professing to reflect the progress of engineering science.

The *Antiquary* contains an article by Mrs. Rhoda Murray on "The Great Church of St. Padarn, Aberystwith." The article, though as its writer says, "fragmentary," contains a good deal of information about an interesting building, accompanied by some sketches of various details. Among the "Notes of the Month" is a communication from Mr. T. Ward, F.S.A., on the traces of ruined Christian sites beyond Khartum. In the garden of the palace at Khartum he saw "a huge stone of Soba, on the Blue Nile, twenty-five miles beyond Khartum. Some further particulars are given, for which we refer the reader to the magazine.

Blackwood has a really interesting and scientifically-written article (anonymous) "Concerning Celestial Photography." From it the reader may learn what is the real part which the photographic plate plays in modern star-observation, what are the difficulties connected with its use, what are its triumphs, and how far are the facts from the popular idea of the observer leaving the plate and telescope to do their work while he sleeps. This is a model magazine article on a scientific subject, obviously written by an expert, and while perfectly intelligible to an educated reader, not descending to any of that sensational literary style which is too often supposed to be necessary to render a scientific article "popular." In the always pleasant section, "Musings without Method," are some remarks with which we entirely sympathise, on the value of great spectacles and pomps, such as were to have been celebrated in London last month, and the unexpected manner in which the English love of them suddenly springs up again, to mock the theories of economists who protest that we have given up all these follies.

To the *Monthly Review* Mr. Arthur Morrison contributes the first portion of an essay on "The Painters of Japan," with illustrations. The article is written in a thoughtful spirit, and the author does not rant over the Japanese as some amateurs do—or used to do, for the fashion is rather on the wane now; and probably he is right in his theory as to the aim of the older Japanese artists, to perpetuate an idea of the thing they painted, rather than the material facts of animal, bird, or landscape; and that this is the cause of their superiority, when regarded from the right point of view, to the later painters of more finished representations. But this principle of expressing an idea, which is attributed to the Japanese, is one likely to lead to very queer results in art. "The [Japanese] artist spiritualises what he sees, and when Tanyu draws a horse, it is grace, strength, and fleetness that he attempts to express by his lines, rather than the exact anatomical form of the animal." It appears to us that "grace, strength, and fleetness" will be best expressed by the lines of the actual horse than by a travesty of them. In the same way the tiger, by No-ami, facing p. 125, is defended as being an ideal expression of tiger nature, and as such is no doubt very creditable to an artist who had probably never seen a tiger; but we are inclined to the prejudice that the actual tiger of nature expresses it better than this hideous monstrosity. A good deal of nonsense is talked about Japanese art.

In *Scribner* the section of the "Field of Art" is devoted to a review of twenty-five years of American art, by Mr. W. A. Coffin. It is hardly necessary to say that the opinion is expressed that in the 1889 Paris exhibition the American section of art was "second to none except the French," and that at the 1900 exhibition the American galleries were "the most satisfactory to visit in the whole show" (!) The American exhibits at the 1889 exhibition we have forgotten, but the galleries in the 1900 exhibition we remember, and we can only express our astonishment at how American national self-appreciation could believe such a verdict about them. This blowing of their own trumpet seems to be the "last infirmity" which the Americans cannot shake off.

The *Century* contains an article by Miss Anabel Parker on "Curious Electrical Forms,"

being a description, with a number of illustrations, of the process by which Mr. T. Burton Kinraide, of Boston, has succeeded in taking photographs of the forms of sparks and rays in electrical discharges by means of a special apparatus, for the description of which we must refer the reader to the article. The forms photographed are most curious and beautiful, giving phenomena of form which rather remind one of snow crystals, only that they have less geometrical precision of line. Lord Armstrong, we are told, has been experimenting in the same direction. The illustrations to this article, a very small selection from Mr. Kinraide's large store of photographs, are alone enough to make this number of the *Century* worth acquiring. They may, moreover, suggest some new ideas in decorative design. An article on "Prince Louis Napoleon and the Nicaragua Canal" records the attempts made by the late Emperor of the French, long before his successful coup d'état, to promote the carrying out of a Nicaragua Canal. Mr. Robert Hill's article on "The Volcano Systems of the Western Hemisphere" is of special interest at the present moment; especially, one may suppose, to dwellers in some regions of South America.

Harper has an article by Mr. Edmund Gosse on "Elizabethan Dedications of Books," which, though essentially a literary article, is artificially interesting on account of the facsimiles of some old dedication pages, showing the decorative arrangement of the page. "What the Astronomers are Doing" is a short and very rudimentary article by Dr. Newcombe, obviously intended only for the popular mind, and indeed going into explanations (as to parallax, for instance) on matters about which we should have thought even the "general reader" had some notion by this time. The most interesting point in the article is that the Geodetic Association has established four observatories on the same parallel of latitude—at Gaithersburgh, Maryland; on the Pacific coast; in Japan; and in Italy—to study by continuous observation the occasional variations in the earth's axis of rotation; with the view, no doubt, of ultimately establishing a theory as to their cause. A short article on "America's Private Forests," by Mr. Overton W. Price, of the United States Forestry Department, is of interest to timber growers and timber dealers. We learn from it that in the United States the official Department will work in co-operation with private owners, and advise them in a system of treatment which gets the most timber out of the property with the least injury to its continued maintenance, thus assisting the interests both of the private owner and of the State. The Department drew up rules to govern "lumbering" (the operation of converting trees into marketable timber), of which the following were the main objects:—

"The leaving of a sufficient number of seed-bearing spruce in the forest to invite reproduction, and of those smaller trees which, although of merchantable size, can be harvested much more profitably when they have reached a larger diameter.

The elimination of all unnecessary waste of merchantable timber, as in high stumps, lodged trees left in the woods, and failure to run the logs well up into the tops.

The avoidance, wherever practicable, of damage to young growth.

It is believed that the application of these rules by a large paper company to its own lands in Maine is the strongest argument in their favour which has yet been made. . . . The co-operation which is now carried on between private owners and the Bureau of Forestry has been undertaken with the belief that example will prove more powerful than precept in the institution of improved methods upon private forest lands. It is intended to provide practical examples which show that conservative lumbering not only leaves the forest in better condition than does ordinary lumbering, but that it is usually a sounder financial policy."

The *Fall Mail Magazine* contains an article by Mr. H. G. Archer on "A Revolution in Railway Signalling," being the substitution of pneumatic or electric power for manual labour in working the levers and points; or rather, the levers are done away with. The Great Eastern have had an electro-pneumatic signal cabin installed on their Spitalfields goods sidings for two years, with entire success; and an electric installation has been in work at Grately Junction. The London & North-Western have an electric system of their own, known as the "Crewe System," which has been at work at Crewe since 1893, and is now being added to. The ordinary mechanical levers are here retained in miniature, so that the signal-

man has nothing new to learn, only he is saved all exertion. The general adoption of such a system must be only a question of time. Every magazine must have its Rodin article now, and so one appears in the *Pall Mall*, with illustrations of his broken up and twisted figures and half-figures, and a "Mother and Child" with iron skewers stuck in them in various directions, looking as if they had some bad form of skin disease.

The *Revue Générale* contains an article by M. H. Primbault on "La Navigation Aérienne." The article, which is a very well-written and practical one, going thoroughly into the subject, is to be concluded in a future issue of the *Revue*.

In the *Gentleman's Magazine* Mr. W. J. Lawrence, in an article entitled "History of a Peculiar Stage Curtain," cites various passages from Ovid, Horace, Ariosto, Vasari, &c., speaking of the removal of the curtain for the opening of a play as the *falling* of the curtain, leading to the belief that at various periods in theatrical history the curtain was one which was not raised but lowered to disclose the scene. He quotes also from the first edition of Jonson's "Masque of Blackness"—"First for the scene was drawn a landschap (*sic*) consisting of small woods, and here and there a void place filled with huntings; which falling, an artificial sea was seen to shoot forth," &c. In *Knowledge* Mr. Maumder's useful articles on "Astronomy Without a Telescope" are continued, and in this issue he suggests how the astronomer without a telescope may even lend, and has lent, assistance in that interesting pursuit, the search for new stars—*novæ*, as they are now generally called.

THE CASTLES OF BELLINZONA.

BELLINZONA, a small town or village in Italian Switzerland, has the distinction of possessing three ancient castles which survive at the present day in a complete condition. These three castles were built for the residence of three bailiffs representing the Cantons of Uri, Schwitz, and Unterwalden, in the early days of the Swiss Confederation—that is to say, in the fourteenth century. They seem to



Castles of Schwitz and Unterwalden, from the Castle of Uri, Bellinzona.

have been built simultaneously for some political purpose of the period, but they do not appear to have ever been used for any warlike purpose. In later ages they have been abandoned to other uses. The castle of Unterwalden is now a beer-garden, the castle of Uri is partly used as the arsenal or headquarters of the cantonal militia, and the castle of Schwitz is shortly to become a national museum. This latter is now undergoing a thorough overhauling. The inner portions, which at different times have been adapted to forgotten uses, are now being cleared out, and when once the débris of comparatively modern ruins has been removed such traces as remain of the Middle Ages will be restored as far as possible, and new roofs and floors will be provided for the portions to be utilised for the museum.

From an architectural point of view there is little, if anything, to arrest the attention in the ancient military engineering of Switzerland. Few, if any, of the numerous castles of the

fourteenth and fifteenth centuries display the sumptuousness and feudal splendour of contemporary buildings of the class in Italy or France. In the case of the castles of Schwitz and Unterwalden, at Bellinzona, the most remarkable thing is their comparative intactness; the walls, *meurtrières*, and *merlons* have not been touched, save by the hand of time; but of decorative or architectural detail nothing survives.

In the clearing away of rubbish and débris very little has been found beyond a few fragments of broken pottery and a number of cross-bow bolts.

Our slight sketch of the castles sufficiently explains their character.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

THE annual meeting of the Incorporated Association of Municipal and County Engineers was opened at Bristol on Thursday. The members assembled in the Grand Committee-room of the Council, where they were received and welcomed by the Lord Mayor of Bristol, who was accompanied by Chairmen of Committees and other members of the Council. The members then proceeded to the theatre of the Corporation Museum, Queen's-road, where the business proceedings were held. Mr. E. G. Mawbey, C.E., Leicester, the retiring President, presided, supported by Mr. T. H. Yabbicom, M.Inst.C.E., Bristol, President elect; Mr. T. Cole, Westminster, Secretary; the members of Council, and many members. The report of the Council relating to the work of the past year having been read and passed, Mr. T. H. Yabbicom was installed as President of the Association.

The President, in his inaugural address, said it was with peculiar satisfaction that he was the first President to have the privilege of addressing an annual meeting of the extended franchise, and it was not without its significance that the first meeting should be presided over by one who, while holding a subordinate position, knocked for many years, but knocked in vain, at the portals of this Association. He therefore gladly welcomed the spirit of progress which gradually, and at first slowly, breathed over the minds of their members, culminating in the resolutions adopted at the last annual meeting. It was natural that such an important change in the constitution of the Association should meet with a certain amount of opposition, but this was decidedly beneficial, as it ensured a more searching examination of all the arguments for and against the proposal and a closer investigation, and therefore avoidance of, the hidden rocks on which the newly-commissioned ship might have suffered wreck. As President, he said that the Association hoped and expected a large addition of strength, and the opening up of new channels of usefulness by the admission of the Class of Associates, not so much by the numerical increase to its ranks as by the introduction of new blood instinct with enthusiasm and the desire for progress, which, combined with thoroughness, was the concrete foundation on which all improvement in engineering rests. If, however, the advantages of the change would be great to the Association, he ventured to hope they would be equally so to those younger members of the profession who were now united with them in fellowship, and that while they viewed things with the more ardent enthusiasm fitted to their years and hopes, would not disdain to profit by the experience of those who had already borne the burden and heat of the day, whose prudence might at times appear vexatious, and whose caution might seem to approach timidity. One central point to be kept before them in their deliberations was that, whether as Members or Associates of this important body of Municipal Engineers, they should strive their utmost to improve and extend their knowledge by inter-communication for the benefit of the Councils that had entrusted them with the performance of the duties pertaining to their offices. In this way, and in this way only could they justify to those Councils their existence as an Association; a justification that had been fully recognised for many years, not only by the municipal bodies of our large cities, but by the smaller, though relatively important, District and Parish Councils, all forming integers in the Local Government of the country. They must press home to their rulers that they did not com-

bine in any way for self-aggrandisement; that they had no idea of forcing upon them claims in favour of the members as members of the Association which they would not be willing to admit to the individual; that, in fact, they were not united from any selfish wish to do good to themselves, except so far as in improving themselves they were enriching the governing bodies by bringing to bear upon their daily practice the accumulated experiences derived from the whole body. As the Council, whether Borough, County, District, or Parish, was the body by whom the surveyor had been placed in his position of responsibility, it was to the Council that he looked for support to enable him to carry out his duties, and its reception should be met by him with unswerving loyalty. The discipline that he had received with his training had taught him that the orders issued by the Council were to be executed without question. The Council having deliberated, and come to a decision on any matter, were the persons who would have to answer for their acts to the body of ratepayers, and the surveyor's duty [was to obey; but discipline not combined with loyalty must result in only a calculating head service, without the warmth of heart required for thorough obedience. A council was at its best but a fortuitous agglomeration of persons usually actuated by genuine honesty of purpose, but some were furnished by their constituents with coloured glasses, and others were returned to advance specific objects. At times his council would be divided in opinion on a question of expediency, and the surveyor would find plenty of opportunities of displaying such tact, as it was to be hoped he possessed, in steering clear of the rocks of faction. But the surveyor had a higher and nobler responsibility than simply to act as the agent of his council in carrying out their behests, or as the machine to prepare schemes and estimates; it was his duty, as recognised by every right-minded member, to advise where he thought advice necessary, and should occasion require, and he be convinced of the righteousness of his judgment, to press home his opinions emphatically; but in that case, he should, like Pliny, be able to say "experience has taught me," and experience was the finest master. It was quite unnecessary to say to such an Association as this that the surveyor should keep himself in the van of improvements and be a pioneer to remove obstacles to advancement, and in this respect the admission of their younger friends would be laden with advantage. There were, however, times and places where it became the duty of the surveyor to utter his note of warning against schemes fanciful and chimerical, against schemes which, while serving their purposes admirably in one place, were unsuited to another. Having given his opinions to the best of his ability, the surveyor must treat the council as a jury and loyally accept their decision. The probabilities were that very few, if any, of the members were experts, but the fact of holding the position they do, indicated that they were possessed of rather more than the average of common sense, unless they had been sent to the council as the exponents of any particular theory, or supporters of any particular class. Even these had their uses, and could give an unprejudiced opinion on matters not connected with their own fads. Most members of the councils of the local authorities in this kingdom were actuated by the highest and most unselfish motives, and the few, who seek to use their position for the benefit of themselves or the advancement of their friends to the detriment of the public good, show up by contrast the brighter example of their fellows. Municipal government might not offer to those engaged in it the same brilliant prospects that were looked forward to with hope by those representatives at Westminster who made their mark in Parliament, but it did give a good citizen who had at heart the welfare of the place he lived in an opportunity to work for the benefit of his fellow burghers without reward, and sometimes with but scant thanks. From the nature and multiplicity of his duties the surveyor must be brought into daily contact with the numerous body who contribute willingly or unwillingly—usually the latter—of their substance in order that the local machinery might be kept going, and it would depend very much on himself whether the result was perfect confidence or active resistance. There was in Englishmen an innate

desire for just treatment, a wish to see the game played fairly, that usually prevented an individual or a small majority from taking advantage of a position he or they might have acquired to unreasonably harass and worry an official. Still, they knew that such things did sometimes occur, and a man of sensitive temperament had to suffer acutely for the sometimes unintentional pain inflicted on him by persons of robust natures, who could not feel themselves nor understand the distress of mind they imposed on others. It was, therefore, of the utmost importance that the surveyor, whether of a large city or of a parish council, should so act in his relations with the body of ratepayers that it might be felt and acknowledged that all private interests were subordinate to the public good; there must not be the breath of suspicion that one matter of public importance was put aside because it might clash with the personal concerns of the individual. Nothing but the strictest impartiality could avail an official who was constantly called upon to administer laws restraining persons from doing things they believe to be harmless or had from long custom come to think right, but which the modern investigations of sanitary science had declared inconvenient or dangerous to the community; laws directing them to do things costing sometimes considerable sums of money from which they apparently reaped no personal benefit, but were intended for the gratification and satisfaction of the public; laws insisting that a man should, in the interests of his workpeople, build in fashion that he did not think would enable him to get so much floor space out of a given and restricted area as he had hoped to do; laws that insisted upon the landowner, when laying out his estate, devoting ample space, at the expense of ground rents, for wide roads and ventilation in order that the light of the sun and the sweet breath of heaven might annihilate the bacilli that flourish and rejoice in darkness and stagnation; laws that compelled an owner having an inflated idea of the value of his possessions to give them up for the public good at a value that the surveyor acting as a trustee of the public funds deemed reasonable. It was all very well to say that the surveyor did not make the laws, but had only to administer them. The fact remained that the advancement of the common benefit might press heavily on the individual, and for that reason it was necessary that the official carrying out these duties should act with discretion and consideration, while never losing sight of the fact that his first duty was to advance the interests of the community. The reception and dealing with complaints was another means by which the surveyor was brought into daily touch with the body of ratepayers, and might be made an exercise, agreeable or otherwise, according to the way in which the complainants were treated. In the larger boroughs it was the assistant who usually had to see to the carrying out of remedies for the small vexations which worry the ratepayer, and it was no unimportant part of his duties, for he might easily bring his council and chief into bad odour with the public if he be careless or inclined to lightly treat what seemed to him unimportant, but yet might be of much consideration to the individual. Day by day the municipal engineer must be brought into contact with his brother officials serving the same Local Authority, and much of the success attending the execution of their duties depended on the loyal support accorded by one officer to his fellows. The duties of each should be so well defined as to ensure a total absence of friction in the working of the machine, and this end might best be gained by every member of the staff making up his mind to do his own work in the most thorough manner possible, and not to interfere with the actions of other people. The work of the municipal engineer might not be so showy or reap such golden rewards as that done by other members of the engineering profession, but of late years the public had been brought to acknowledge the importance of a branch on which they depend so largely for their daily comfort, convenience, and even luxuries, and, above all, for those works for the prevention of the spread of disease and inducing a healthy, vigorous tone, without which the workers of our great centres of civilisation were sapped of their vitality and energy.

Municipal Progress in Bristol.

Mr. T. H. Yabbicom then read a paper on "Twenty-five Years of Municipal Progress in Bristol." He said the area of the city had in-

creased from the 4,687 acres of 1877 to 11,607 acres at the present time; the population had increased from 203,000 to 334,632; and the rateable value from 772,023*l.* to 1,596,213*l.*

The success of the city was largely bound with the docks. In the early part of the nineteenth century the docks were owned by a private company, but subsequently acquired by the Corporation, the policy of this action being shown by the fact that the tonnage of foreign imports increased at once nearly fourfold under the civic management. For a number of years a series of fierce battles was fought over rival schemes for dock extension or for converting the river Avon into an elongated dock by placing a dam across its mouth; but last year a Bill was obtained which sanctioned an expenditure of something like two millions sterling on dock extension at Avonmouth. The work had been auspiciously commenced this year by the visit of the Prince and Princess of Wales to cut the first sod. Broadly speaking, the principle of the system of sewerage was that all the main sewers draining the various districts into which the city had been divided were constructed to discharge the sewage by gravitation into the tidal river, and were all built at such a level that the sewage might be concentrated at one or two points, either for treatment or for carrying by main trunk sewers into the estuary of the Severn; and had dockisation of the river Avon been decided on, it would have been necessary to have removed all sewage below the dam before commencing. In 1899 he, in conjunction with the late lamented Mr. W. Santo Crimp, prepared a scheme for dealing with the sewage, not only of Bristol, but of the Avon Valley as far as Bath, by a discharge into the Severn; but docks were occupying people's minds, and it has been aptly said that an Englishman could think of one thing only at a time. So it was that the popular vote was against the scheme, which would have to be revived, in probably a somewhat altered form, to meet altered circumstances, before a very distant date. Every summer brought with it a crop of indignant complaints, and the discharge of crude sewage into the river within the city, but every winter effaced to a certain extent the memories of the faded perfumes. There was no doubt that the low death rate and comparative freedom from zymotic disease enjoyed was due to a great extent to the scouring action of the tide, that rises at springs to 34 ft. and 36 ft. above low water at Cumberland Basin, and with its ebb carried the sewage with it. The narrow, crooked street of Bristol had truly been a by-word and a reproach, but these were failings that it possessed in common with all mediaeval cities. Unfortunately, the valuable efforts of the New Streets and Improvement Committees to make new, or widen and straighten old, thoroughfares, while they had admitted light and air, convenience, and utility, had sometimes resulted in the loss of many picturesque "bits" of civic architecture and historical connexions. The Corporation had kept steadily improving and widening such streets as the nature and amount of traffic required, and since 1877 had spent nearly 1,000,000*l.* in these works, including the construction of bridges across the river, in addition to about 200,000*l.* expended in minor improvements in setting back projections. The total area of the public parks and open spaces was now 678 acres. Since 1877 the Baths Committee had built or acquired six establishments, each having swimming-baths, and was now constructing another in the east end of the city that would be provided with some of the most modern appliances that experience had shown to be necessary for the health and cleanliness of the people, including swimming, slipper, and spray baths.

The hospital accommodation for infectious diseases was 120 beds, and was to be increased by a further 58 beds. A consequence of some of the numerous street improvements effected during recent years had been the demolition of a number of small houses occupied by persons of the labouring class. After numerous plans of artisan dwellings had been prepared, and rejected on the score of cost by the Committee, and as not being sufficiently palatial by the Local Government Board, a mean was struck to which the Board assented. The principle had been previously tried in Birmingham, and consisted in constructing the dwellings in blocks; those on the ground floor being quite separate from those on the first floor, the latter being approached from the street by a flight of stone steps leading to

balconies giving access to the doors of the houses. The houses had in some cases three rooms, and in others two rooms, but each was complete in itself. The accommodation of the three-roomed houses consisted of a living room, 14 ft. by 14 ft.; one bedroom, 14 ft. by 8 ft.; and one bedroom, 12 ft. by 9 ft.; wash-house, water-closet, sink, and coal-bunker; these were let at 4*s.* 6*d.* per week. The two-roomed houses, calculated to accommodate three persons, have a living-room 14 ft. by 14 ft., and one bedroom 12 ft. by 9 ft., with offices similar to those provided for the larger house; these let at 3*s.* 3*d.* per week. Four blocks had already been built, containing an aggregate of forty-four three-roomed houses and twenty-six two-roomed, sufficient to house 208 persons. The museum and valuable reference library in Queen's-road had been acquired for the city through the liberality of a former occupant of the civic chair, and recently the adjoining land had been purchased, on which was commenced the construction of a municipal art gallery to be presented to the city by Sir W. H. Wills, Bart. Although the municipality had not been idle during the last quarter of a century, yet the important undertakings of gas-making and distribution, water supply, and tramways still remain in the hands of public companies. The gas company, unaffected by the competition of electric light, still paid handsome dividends; the water company provided a constant supply, unsurpassed in any town in England; while the tramway company was one of the first to adopt electric traction, and now served every district of the city with a quick, regular service in large well-appointed cars. The pluck and enterprise which had started and carried on successfully these great undertakings was to be admired; but it was a matter for regret that the financial advantages were not retained for the benefit of the citizens, but went to enrich numberless others whose only connexion with the town was to receive their dividends from the commercial undertakings carried on in it.

COMMONS AND FOOTPATHS PRESERVATION SOCIETY:

ANNUAL GENERAL MEETING.

The annual general meeting of the Commons and Footpaths Preservation Society was held on Tuesday at the Royal United Service Institution, Whitehall. The Right Hon. G. J. Shaw Lefevre presided, and amongst those present were Lord Monckswell and Lord Balcarres, M.P., Mr. J. Bryce, M.P., Sir W. T. Thistlethorn, Sir Robert Hunter, and Mr. E. N. Buxton.

The annual report, presented by the Secretary, stated that during the past year technical advice on intricate phases of the law had been given to a large number of Local Authorities who had applied for expert aid, and, owing to the Society's guidance, many disputes had been amicably settled. On the other hand, several actions-at-law had been fought under the direction of the Society, while material assistance had been given in carrying out various Metropolitan and other Open Space Schemes—such as that which had added forty-three acres of land to Brockwell Park. The Society had also been able to render considerable service in the movement which had led to the scheme promoted by Mr. E. N. Buxton for the provision of a park of 850 acres, situated on the eastern confines of the Metropolis, and consisting of part of the ancient Royal Forest of Hainault. About 314 acres of land, forming practically the whole of the original Lambourne Common, and including 106 acres enclosed from the common, had been offered to the public for the moderate sum of 3,640*l.*, Captain Ethelstone conveying, without payment, the 14 acres of the common still remaining unenclosed in his manor. The preservation of the valuable and beautiful timber, for which the common was noted, was thus ensured; and the Society felt that the arrangement formed the basis of a most favourable settlement, which should be satisfactory alike to the commons and to the public.

With regard to the enclosure of Stonehenge and the erection of a hut and turnstiles and the imposition of a charge of 1*s.* for inspecting the monument, it was understood (the Report continued) that the action of the owner was in some measure approved by certain learned societies, but, while admitting the expediency of protecting the monument by proper caretaking, the Society viewed its enclosure with alarm. Stonehenge had been

freely open to the public from time immemorial, and no doubt its original use was a public one, whether religious or otherwise. It had been annually resorted to by large numbers of tourists and others, who had approached the monument on foot or in carriages by several clearly-defined, and, indeed, deeply-marked ways, which start from and terminate in public roads. Apart, however, from the fact that the ways referred to had good termini, it was clearly established that a way may lead to a monument or place of interest or beauty and terminate there. This important principle was directly challenged by the enclosure of Stonehenge, and the Society felt it essential that steps should be taken at once, on behalf of the public, to restore, if possible, that access to Stonehenge, hitherto freely enjoyed by all. The Committee's determination to do so was strengthened by the fact that, in the Giant's Causeway action—in which the Society was able to render legal and pecuniary assistance—the Irish Court of Appeal maintained the important principle referred to. Stonehenge was a national monument of unique importance, and it undoubtedly ought to be permanently preserved by the nation at the general expense. But until it was thus preserved, nothing should be done which would in any way interfere with the national interest in the monument. The erection of a fence around it, and the consequent blocking of ways which must have been used by millions of people, together with the charge of 1s., which had now to be paid before it was possible to satisfactorily view the monument, were acts which must prejudicially affect the national interest in Stonehenge, and, as such, the Society felt assured that in resisting them it might rely upon the support of a large section of the community.

The Chairman, in moving the adoption of the Report, confessed that they were rather disappointed that there should be no diminution of their work, which had rather increased. Within three years the Society had dealt with nearly 1,000 cases from every part of the country, and involving every variety of circumstances, and rather more than one-half of these cases had reference to footpaths. In every case in which the advice of the Society had been sought in regard to enclosures, the cases had been successfully fought, and the enclosures had been held to be illegal. The Society had also been successful in resisting encroachments by railway companies in the matter of schemes of light railways, and in regard to improvement schemes by Local Authorities. They had also been very successful against Government Departments, defeating them in five cases out of six, including the military manoeuvres scheme—in which the Government proposed to seriously interfere with the rights of the public—and in respect to Richmond Old Deer Park. By far their most important success had been against the Charity Commissioners. He regretted that District Councils were rather averse to assisting the Society in their action, but County Councils were more amenable and active. With regard to Stonehenge, he hoped the Wiltshire County Council would do its duty. At any rate, the Society were determined that the question should be fought out, if not by the Council, at any rate by somebody else.

Sir W. Vincent seconded the motion, which was adopted.

Lord Balcarres moved :—

"That, in the opinion of this meeting, the success of the Commons and Footpaths Preservation Society during the thirty-seven years of its existence, in preserving for the public use and enjoyment commons, open spaces, and rights of way in every part of the country, merits the support of all persons having sympathy with its objects."

This was seconded by Sir Thiselton Dyer, and adopted.

Sir R. Hunter moved.—

"That this meeting, approving of the action taken by the Society and kindred associations in relation to the enclosure of Stonehenge and the subsequent obstruction of the ancient ways leading thereto, expresses its conviction that no means should be spared to preserve the free access of the public to Stonehenge and the permanent preservation of the monument to the nation."

The enclosure was, Sir Robert said, a serious injury to the monument. One would next expect to hear of a variety entertainment being given at the spot. They had been

asked for 120,000l. for the conveyance of the monument to the nation, but the sum demanded might just as well have been 500,000l.

Mr. Bryce, M.P., in seconding, said he visited Stonehenge before it was enclosed, and the ways leading to the monument bore all the traces of having been an immemorial way. The resolution was adopted.

Mr. E. N. Buxton moved :—

"That this meeting is of opinion that the proposed purchase as an open space of 850 acres of land, part of Hainault Forest, and situate on the eastern confines of the Metropolis, is of the utmost importance to London, and, while urging the members of the society to support the scheme, it confidently hopes that the Corporation of the City of London, the London County Council, and the Local Authorities of the district more immediately concerned, will combine in providing the small sum still needed for the acquisition of the land."

This was seconded by Mr. J. F. Torr, and agreed to.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir J. McDougall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Greenwich Borough Council 1,740l. for paving works, and 2,400l. for alterations to new offices; Hackney Borough Council 14,400l. for street improvement; Islington Borough Council, 2,985l. for a similar purpose; Kennington Borough Council 32,597l. for street improvement, and 6,250l. for road paving works; Camberwell Borough Council 18,710l. for land and for paving works; and Guardians of St. Olave's Union 45,000l. for erection of cottage homes for children.

Street Naming and Numbering.—The General Purposes Committee reported as follows :—

"We have had under consideration a suggestion that questions relating to the naming of streets and numbering of houses should be transferred from the Building Act Committee to the Historical Records and Buildings Committee. We have communicated with the two committees, who are both in favour of the proposed transfer, and we now recommend : (a) That the order of reference to the Building Act Committee be amended by the insertion of the words 'except such as relate to the naming of streets and numbering of houses' after the word 'it' in the following paragraph of the present reference :—'The London Building Act and all matters arising out of it shall stand referred to the Committee.' (b) That the order of reference to the Historical Records and Buildings Committee be amended by the addition of the following paragraph—'All matters relating to the naming of streets and numbering of houses, arising under the London Building Act, shall stand referred to the Committee.'"

The recommendations were agreed to after discussion.

Fielder's Meadow, Fulham.—The Parks and Open Spaces Committee brought up an adjourned Report, recommending the Council to vote 12,000l. towards the cost of laying out 8½ acres of land, known as Fielder's Meadow, and proposed to be added to Bishop's Park, Fulham. The cost of the existing Park had been 35,245l., towards which the Council contributed 17,500l. The proposed addition was estimated to cost 16,957l. The total cost, therefore, would be 52,202l., and should the Council now grant 12,000l., its contribution to the whole would be 29,500l., or slightly more than half the cost.

Upon this the Finance Committee pointed out that the general practice of the Council was to contribute only half the cost. They considered that was a sound rule, and they complained of the action of the Parks Committee in intimating to the Fulham Borough Council that they would recommend a grant of 12,000l. Upon the faith of that intimation the Borough Council had commenced the work, and thus the freedom of the Finance Committee and the Council was hampered.

Mr. Antrobus moved, and Mr. Sidney Low seconded, an amendment to refer back the recommendation of the Parks Committee.

After a long discussion the amendment was rejected.

A question then arose as to the necessity of expending so much money as was proposed by the Borough Council on the river wall, and

upon this question the report was referred back.

Lyceum Theatre.—The Theatres and Music-halls Committee reported as follows :—

"We have to report for the information of the Council the result of the arbitration before Sir W. Emerson, President of the Royal Institute of British Architects, with respect to the works required to be executed at the Lyceum Theatre, Wellington-street, Strand, under the Council's sealed notice which was served on the owners of the premises on October 8, 1901. The notice contained forty requirements and the award of the arbitrator with respect to them is eminently satisfactory to the Council as he has with some very slight modifications confirmed them all. The general principles substantiated by the arbitrator are very extensive, as they include, *inter alia*, the reconstruction of dressing-room staircases in fire-resisting materials, the provision of adequate exits from dressing-rooms and the proper lighting and ventilation of such rooms, the rearrangement of workshops, dressing-rooms, scene dock, stage and auditorium into separate fire risks, the provision of a fireproof curtain and stage ventilation, the substitution of electric light batens for gas, the rendering of flues fire resisting, the removal of wood linings from all ceilings, walls, &c., the fitting of hydrants with couplings of the Metropolitan Fire Brigade pattern, the protection of safety valves of boilers, and the making of the electric lighting arrangements comply with the Council's regulations. The arbitrator has also directed that the openings in the exit way from the pit and stalls to the Strand shall be fitted with hardwood frames, sashes, and doors, and that the windows shall be glazed with fire-resisting glass; and, further, that a new exit shall be provided from the stalls into Burleigh-street, as required by the Council. The award directs that the Council and the owners of the theatre shall each pay their own costs of the arbitration, and that each of them shall pay one-half of the fee and costs of the award. It will be seen by the decision of the arbitrator how very necessary it is that the requirements of the Council for the improvement of the building, which are framed solely in the interests of the public safety, should be complied with, and in this connexion we desire to place on record our appreciation of the very able manner in which the officers of the Council have carried out their duties in connexion with the inspection of the premises, the framing of the requirements, and the conduct of the case before the arbitrator, to enable such a satisfactory result to be attained."

The Condition of Regent's Canal.—The Public Health Committee reminded the Council that in July, 1900, a very serious nuisance arose from the Regent's Canal in the neighbourhood of Regent's Park. The Committee then pointed out that, although that particular nuisance had been abated, the condition of the water in the canal was such that during hot weather the nuisance might recur. Their attention had now been again called to the canal, and, as a result of official inspections, the Committee suggested that the Regent's Canal Company should be asked to clear the surface of the water of carcasses of animals, to cleanse the lay-bys from deposit, and to change the water in the canal by passing a large quantity down from the higher to the lower reaches. This was agreed to.

Proposed Music Hall at Chelsea.—The Theatres and Music Halls Committee reported that they had considered plans of a music-hall which it was proposed to erect at the corner of King's-road and Sydney-street, Chelsea. The site complied with the Council's regulations, and the building would have accommodation for 2,220 persons. The Committee recommended an intimation from the Council that, provided the works were commenced within six months, a certificate would be granted upon certain conditions for the prevention of fire and panic. The recommendation was agreed to. Messrs. Wyllon & Long are the architects.

Old Kent-road Bridge.—The Bridges Committee stated that in connexion with the reconstruction, for electrical traction, of the London County Council tramways between the Elephant and Castle and New Cross-gate, it had been found necessary that the bridge carrying Old Kent-road over the Grand Surrey Canal should be rebuilt. The present structure, which belonged to the Canal Company, consisted of a single brick arch, and on more than one occasion the attention of the Committee had been called to the inadequacy of the structure for the heavy traffic which passed over it. They now proposed to replace it with a girder bridge, at an estimated cost of 3,000l.

The report was withdrawn.

Fire Brigade Requirements.—The Fire Brigade Committee submitted a report recommending an expenditure of 1,430l. on the provision of forty-three additional hydrants in Blackfriars-road, Southwark-street, and South-

work Bridge-road, for the better protection of property in that neighbourhood, where there are now many large buildings and manufacturing premises.

This was approved.

The Committee further recommended the purchase of four additional long ladders, extending to a height of 70 ft., at an expense of 400l. The Brigade already possessed sixteen such ladders, three of which were delivered last March.

This was also agreed to.

Theatres and Fire Alarms.—The Fire Brigade Committee also reported that facilities were afforded to the owners of theatres and places of public entertainment for such places to have direct telephonic communication with the nearest fire-station. The Theatres and Music-halls Committee, however, represented that it was desirable, in the interests of the public safety, that additional means of communicating with the fire brigade should be available. Upon this representation the Fire Brigade Committee arranged that there should be connected with the chief station of the fire brigade the National Telephone Co.'s Gerrard and Holborn exchanges, with which many theatres and other places of public entertainment were likewise connected.

The Council approved the course taken by the Committee.

Newington Recreation Ground.—The Parks and Open Spaces Committee reported that they had had before them a scheme, prepared by the chief officer of the Parks Department, for laying out the land already acquired, and in process of acquisition, for addition to Newington Recreation-ground. The works proposed comprised the removal of the remaining portions of the prison wall, the formation of new footpaths, the removal of the band-stand to a site on the new land, and the consequent enlargement of the girls' playground. The approximate estimate of the cost of laying out the land was 2,000l.

The Council approved the Committee's estimate.

Electric Light Installations at Fire Stations.—The following recommendations of the Fire Brigade Committee were agreed to:—

"That the tenders of Messrs. Jackson Brothers to execute the wiring and supply the fittings for electric light installations at the Camberwell and Battersea stations and the Battersea river station for 121. 8s. 133l. 18s., and 111l. 17s. respectively be accepted. That, subject to the result of inquiries to be made by the solicitor being satisfactory, the tender of Messrs. W. Monop & Co. to execute the wiring and supply the fittings for an electric light installation at the Battersea Park-road sub-station for 58l. 11s. be accepted."

Having transacted other business, the Council adjourned.

ARCHÆOLOGICAL SOCIETIES.

ROYAL ARCHÆOLOGICAL INSTITUTE.—A general meeting of this Institute was held on the 2nd inst., Mr. Emanuel Green, V.P., Hon. Director, in the chair. Mr. Philip Norman, F.S.A., read a paper on "Exchequer Annuity Tallies." After mentioning that the origin of tallies is a point of extreme doubt, he suggested that they were introduced as a part of the system of the Exchequer from Normandy soon after the Conquest. When their use was established in this country tallies became general in matters of account, not only in the Exchequer but among merchants and traders. By the end of the fourteenth century they went out of fashion for ordinary mercantile transactions, but Government, always conservative in such matters, continued to employ them till 1782, when they were abolished by Act of Parliament. Their use, however, did not entirely cease till 1826, on the death of the last Chamberlain of the Exchequer; and an attempt to get rid of the great accumulation of them by burning them in the stoves at Westminster caused the fire which destroyed the Houses of Parliament in 1834. A description of the ordinary form and notches of a tally followed, and an account was given of a large number of tallies found last year at Martin's Bank, formerly the Grasshopper, in Lombard-street, and of the documents associated with them, which showed that they recorded the transactions relating to certain terminable annuities granted under an Act for continuing an additional subsidy of tonnage and poundage and certain duties of excise, and for settling and establishing a fund thereby, and by other

ways and means for payment of annuities to be sold for raising a further supply to her Majesty for the service of the year 1706." The annuities were for ninety-nine years, and were granted at the rate of 155l. purchase money for each 10l. annuity, or at the rate of fifteen and a half years' purchase. The varying prices at which they were afterwards sold appeared to be of special interest. The complete set of tallies and documents relating to one annuity of 10l. were exhibited. Other fine specimens of tallies had been borrowed from friends for the occasion.—Professor Bunnell Lewis read a paper on the "Roman Arches at Aosta and Susa," and, by way of introduction to the description of them, gave some account of the circumstances that led to their erection. Julius Caesar rendered the greatest service to his country by subjugating trans-Alpine Gaul. Augustus completed his work by subduing the sub-Alpine tribes on the Italian frontier, and these arches permanently commemorate his successful campaign. The one at Aosta consists of a single vault with Corinthian columns at the corners, but the triglyphs in the entablature belong to the Doric order. A crucifix suspended from the centre of the arch records the flight of Calvin about the year 1530. The Reformer had endeavoured to spread the Protestant religion on this side of the Alps, but his efforts were unsuccessful. The arch at Susa, considered from various points of view, has an interest of its own, and, though erected for a similar purpose, is quite distinct from that at Aosta. It is admirable on account of its delicate proportions, but the sculptures in the frieze are the part of the monument which claim special attention. The composition is generally good, but the figures are rudely executed, probably by provincial artists. On the west side is depicted the signing of a treaty between Augustus and the Gallic chieftain, Cottius, son of Donnus. The Emperor is seated at a table, and an eagle, carved over his head, in the cornice distinguishes him from other personages. On both fronts the subject is a sacrifice—the *suovetaurilia*. The inscription on the attic has been carefully edited by Mommsen. Mr. Green, Dr. Cresswell, Mr. Rice, Mr. Greg, and Mr. Brabrook took part in the discussions which followed the reading of the papers.

COMPETITIONS.

HOSPITAL, DUNSTABLE.—The first premiated design in the competition for an Infectious Disease Hospital, Dunstable, was that sent in by Mr. Alfred Hale, 255, Monument-road, Edgbaston, Birmingham.

FREE LIBRARY, LILKINTON.—In the competition for a Free Library, Ilkinton, the first premium has been awarded to Messrs. Hunter & Woodhouse, Belper, Derbyshire. The second premiated design is by Messrs. E. R. Sutton & F. W. E. Gregory, Bromley House, Nottingham; and the third by Messrs. H. H. Goodall & A. W. Bradshaw, 14, Market-street, Nottingham.

SCHOOL, BEDMINSTER.—The first premiated design for the Windmill Hill Girls' School, Bedminster, near Bristol, is by Messrs. Herbert J. Jones & Son, Bridge-street, Bristol.

BOOKS RECEIVED.

THE ORDERS OF ARCHITECTURE. By R. Phené Spiers, F.S.A. Fourth edition, revised and enlarged. (B. T. Batsford.)

MEASURED DRAWINGS OF OLD OAK ENGLISH FURNITURE, &c. By T. Weymouth Hurrell. (B. T. Batsford.)

MODERN PRACTICAL JOINERY. By George Ellis. (B. T. Batsford.)

PATTERN DRAWING AND DESIGN. By John Carroll. (Burns & Oates.)

TIMBER SAWING MOULDING, &c., AND HOW TO MASTER IT. Revised edition. By A. Mackintosh. (Office of *Ayrshire Post*.)

ARCHITECTURAL DRAWING. By R. Phené Spiers, F.S.A. New and revised edition. (Cassell & Co. 7s. 6d.)

MANUEL D'ARCHÉOLOGIE FRANÇAISE: PREMIÈRE PARTIE—ARCHITECTURE. Par Camille Enlart. (Alphonse Picard et Fils: Paris.)

HELLENIC SOCIETY.—In the report of the Hellenic Society's meeting in our last issue, the name of the young architect mentioned by Mr. Carr Bosanquet as his assistant should have been spelt "Comyn" not "Cumming." It was Mr. Heaton Comyn, whose excellent drawings of St. Catherine's College, Cambridge, we published some time ago.

Books.

The Parson's Handbook. By the REV. PERCY DEARMER, M.A. Fourth Edition, rewritten, with much additional matter, and with 16 illustrations. London: Grant Richards, 1902.

MR. DEARMER may be congratulated on having written a really useful book, which few architects could study without profit. In these days of loose eclecticism one is especially thankful for the author's fidelity to English tradition. He is wisely silent about style, but his illustrations give some idea of the sanity and simplicity of those old church arrangements which are independent of style, and in striking contrast to the blatant triviality of modern work.

Given good proportion, which, as the author says, is one of the most difficult secrets of the architect's craft, the first aesthetic requirement of a church, whatever its actual size, is spaciousness. The chancel must not be crowded with benches, but the singers should be accommodated in a gallery with the organ. The pulpit will be brought forward into the body of the church, well away from the chancel arch. There will be a screen, for mystery, and that not of iron. The fixed seats will occupy a small area, allowing for much wider alleys than usual, and there will be plenty of vacant space at the west end, and before the rood-screen. The walls will be whitewashed, as a good setting for pictures and hangings. The altar, with its low reredos, will be but slightly raised above the chancel floor, which, in turn, will be either below, or only a few inches above the nave level. This is Mr. Dearmar's ideal, but how many parsons or architects are content with such sobriety and quiet taste?

The book would be improved by the addition of a chapter on the care of an old church, as it is here that the ignorant or innovating clergyman has the greatest power for harm. Surely the author is not serious in his suggestion that chromo-lithographs or Filzroy pictures look well in church. This is the only serious lapse in taste that we have noted. However, he seems to have a leaning to the "new art," and advises clergymen to consult the Church Crafts League. But, excellent as the objects of this body may be, a recent exhibition at Westminster shows that its accomplishment is at present on a low level. The paragraphs on artificial lighting, considering how often it is undertaken without advice, are thin and inadequate. "People are more drawn to and impressed by a church that is not filled with glaring light" is sensible and true. The secret of church lighting is the proper disposition of shadow. But one would have liked a word on the practical and aesthetic advantages of candles. The kneeling pads recommended are intolerable. Where chairs are used, the only convenient form of kneeler is the kneeling chair, which makes each person's kneeling requirements independent of the occupant of the chair in front. In future editions the unpleasant word "reliable" should be dropped, and the familiar English "sexton" be substituted for the slightly pedantic "sacristan."

The references to the illustrations are inconceivably careless; a tolerably thorough search has not shown more than one correctly given.

Electrical Installations. By RANKIN KENNEDY, C.E. In Four Volumes. Vol. I. London: The Caxton Publishing Company, 1902.

The object of this work is to give fairly complete descriptions of installations of electric light, power, and traction. The first volume is mainly an introduction to the subject, and describes electrical measurements, dynamo and motor design, arc lamps and meters. To those who wish to acquire a sound knowledge of electro-technics this volume can be recommended. Practically no mathematical knowledge beyond a little elementary algebra is presupposed on the part of the reader, and yet Mr. Kennedy manages to discuss some rather abstruse questions in an intelligible manner.

The treatment of Ohm's law, &c., is sound, the author always keeping the requirements of the practical man in view. His description of polyphase machinery is clear and simple. It is particularly interesting as Mr. Kennedy was a pioneer in this branch of engineering which has recently made such enormous advances.

He calls in question the economy of three wire direct current systems, and points out that the economies effected in saving the expense of copper in the mains may possibly be more than wiped out by the extra expenses entailed in balancing machinery. His ideas on this subject are worth careful consideration. If three-wire systems are unnecessary, then the working of direct current-supply stations will be very considerably simplified; the location of faults on the mains will be easy, and a knowledge of the theory of the regulation of the leakage currents will not be too difficult for the average electrician.

The chapter on meters is very carefully written, and the author is thoroughly familiar with his subject. For example, the description of the complicated clockwork in the Aron meter is carefully done, and the various electrolytic meters are described. The description of the Nerust lamp, however, is much too brief and is misleading. No mention is made of the iron regulating resistance, and in all the lamps of this type we have come across the heating spiral is of china clay with a fine platinum wire embedded in it.

The writing in places is very abrupt, and might easily be polished up with advantage. On p. 189, for example, "to measure the consumption" cannot be described as elegant. On p. 36 there is a misprint in a formula, $C = \frac{R}{E}$ being given instead of $C = \frac{E}{R}$. We were astonished at the table given on p. 52. The resistance of iron wire of various diameters is there given to ten significant figures. As resistances can only be measured correctly to four figures, and as the diameters of the wires can hardly be determined more accurately than five figures, it will be obvious that more than half of the figures given in this column must be purely imaginary. If they were correct it would mean that we could determine the temperature of a wire to the millionth part of a degree centigrade.

An annoying feature in this volume is the large number of names wrongly spelt, probably printer's errors, but at least they are evidences of hasty proof reading. "Brockeii Piel" for Brockie Pell, "Schallenberger" for Shallenberger, &c. Again, "Elektricitäts Gesellschaft" is not the same as Elektricitäts Gesellschaft, and some people might not recognise that "synetronous" was a misprint for synchronous! The author has also the Scotchman's inveterate habit of writing "shall" for "will." "No doubt much simpler and cheaper meters shall yet be brought out." We point out these defects in Mr. Kennedy's book, as we hope that he will eliminate them from the succeeding volumes.

Refrigeration, Cold Storage, and Ice-making.
By A. J. WALLIS-TAYLER, C.E., A.M. Inst.C.E.
London: Crosby Lockwood & Son. 1902.

THIS is one of the best and most complete treatises on the production of low temperatures for trade and industrial purposes which we have seen. The 361 diagrams illustrating modern refrigerating machines and the modes of erecting and using them in factories, ships, and stores, are for the most part clear and of a useful character.

The chapter of greatest interest to most of the readers of this journal is that which discusses the various manufacturing, industrial, and constructional applications of refrigeration. After enumerating some of the most modern uses of refrigerating machinery, such as the preservation of dead bodies awaiting identification in public morgues, the cooling of the holds of vessels carrying live cattle, and the regulation of plant growth to enable fruit to be obtained at any season, Mr. Wallis-Taylor proceeds to describe the methods employed for refrigerating ground of a wet and loose character to facilitate the laying of foundations, or the construction of shafts or tunnels, when the volume of water is too large to be pumped out, or in cases where the removal of the water would cause damage to neighbouring structures.

Mention is made of a tunnel for foot-passengers which was driven through a hill in Stockholm some fifteen years ago. For a length of about 80 ft. the tunnel had to pass through loose ground, consisting of gravel mixed with clay and water, which possessed so little cohesion that the ordinary methods of excavation could not be employed. By means of a refrigerating machine capable of delivering 25,000 cubic feet of cold air per hour the

gravel was frozen into a hard mass to a depth varying from 5 ft. near the bottom of the tunnel to 1 ft. near the top. The work was carried out in 5-ft. lengths, the excavation commencing at the top. The progress made while employing the freezing process was about 1 ft. per day.

During the last ten years refrigerating machinery for solidifying the soil when sinking shafts through the water-bearing strata of coalfields has been extensively employed in France and elsewhere. A description is here given of the Poetsch system commonly used for this purpose, and also of Gobert's modification of the Poetsch process. When the wet ground has been solidified by refrigeration it is excavated by means of picks, wedges, and blasting powder.

The Law Relating to Building Societies. By E. A. WARZBURG, Barrister. Fourth Edition. London: Stevens & Sons. 1902.

THE appearance of another edition of this standard work should be noted by all who are interested in building societies, for unquestionably Mr. Warzburg's book is a thoroughly sound authority. No fresh legislation since the last edition has to be noted, nor are the new judicial decisions numerous or very important, but they are incorporated in the text. One or two improvements in form have been introduced, so that the work is well entitled to maintain the high place it has taken as a sound and almost indispensable book in regard to the subject matter of it.

The Building Trades Pocket-Book. Bury: Robert Hall. 1s.

THIS is a small and conveniently-shaped pocket-book having a number of pages ruled for memoranda, preceded by forty pages of useful statistics for builders, including rates of carriage, weights of given quantities of various materials, &c., to which is added a wages table. It seems a useful little publication.

TRADE CATALOGUES.

MESSRS. J. SAGAR & Co., of Halifax, send us a handsomely produced volume of over 300 pages devoted to their wood-working machinery. The present catalogue comprises nearly 100 pages more than its predecessor, most of the additional matter relating to new machines, which are designed specially for builders, joiners, cabinet-makers, wheelwrights, and proprietors of planing and moulding mills. All the machines and appliances described are clearly illustrated by woodcuts, and the catalogue is really a very complete compendium of wood-working plant.

The General Electric Co., of Queen Victoria-street, have sent us a leaflet describing some of their novelties. The "Stanley d'Arsonval" ammeters and voltmeters, which are of the most modern and improved type, they are now selling at remarkably low prices. We have tested some of these instruments and find them very accurate and almost as dead-beat as Weston instruments, which they resemble in many important particulars. For out-door illuminations a cheap and effective lampholder is described which can easily be fixed to battens, casing, or other suitable support. As a substitute for ordinary indoor bell-wire covered with india-rubber insulation they are selling "papierwire," the paper insulation of which is well adapted for this purpose and for use in dry situations. It is quite as good as ordinary bell-wire and is very much cheaper. We were also struck with the illustrations of the special "stage plugs" shown for fixing in walls. They are made of cast-iron and seem designed to stand the roughest usage.

We have received from the General Electric Co. of Queen Victoria-street, a leaflet describing their new flexible electric light cords. Station engineers make many stringent regulations concerning the electric cables to be used in an electrical installation, but as a rule they say nothing about the tests to which the flexible cord is to be subjected. Considering how closely conductors of opposite polarity are brought together in this kind of cord, and the consequent great risks there are of short circuits and leakage, it is curious that insulation tests are not made compulsory. The General Electric Company seem to have taken up the subject very thoroughly, and they publish an exhaustive series of tests on various qualities of flexible cord. The results show

that the insulation of their "omega" cords can withstand very high alternating pressures for a considerable time, and also that placing them in the steam of boiling water for forty minutes had very little effect on the insulation resistance. Cords which can withstand such severe tests will doubtless prove satisfactory on ordinary lighting circuits.

The Burmanolfts Company send us a handsome folio volume giving photographs of interiors and exteriors of buildings which have been faced with their material. In the prefatory note they remark that the buildings have been more especially selected in order to show how, by combination of their material with brickwork, &c., a complete structural polychrome architecture can be carried out with practically no limitation as to colour. As the illustrations are not coloured, of course they do not really show this, though we can see indication of the existence of various values of colour in the buildings. The photographs of various decorative details "as submitted for the architect's approval" show good work.

Messrs. Messenger & Co. (Loughborough) send us a small catalogue of their work in glasshouses and conservatories. Some of the illustrations show that they have succeeded in imparting to erections of this kind a less commonplace and more architectural character than we usually see.

Messrs. A. J. Arrowsmith send us an illustrated catalogue of some of their wooden chimneypieces and other decorative interior woodwork, to which we can give unqualified praise. Everything in the book is in good taste, and this is more especially the case with simpler things—the plain wood chimneypieces, which are carefully designed so as to get a little character while preserving simplicity and cheapness. The execution of the illustrations is excellent.

The General Electric Co., of London, send us their catalogue of the "Freezor" electric fan, which is designed in forms suitable for attachment to a desk, wall, or ceiling, to perform the duty of a pankah. Another type of electric fan for ventilating buildings is described and illustrated in the same catalogue.

The B. and S. Folding Gate Co., of London, send us a catalogue of steel rolling shutters made by the Kinnear Manufacturing Co., of Columbus, U.S.A. Fire tests and practical experience have demonstrated the value of these appliances, which can be arranged to close instantly and automatically in case of fire. A device can also be applied which enables the firemen in the street to raise the shutter by directing a stream of water upon a particular point, and thus it is possible for water to be poured into a building on fire without any unnecessary delay.

The Campbell Gas Engine Co. send us some new sections of their catalogue relating to oil-engines suitable for ordinary and electric light purposes, self-starting apparatus for large engines; oil-engines combined with pumps of various types, and oil-engines combined with winding and hauling gear. The sections in question constitute a most serviceable series for reference.

Correspondence.

DANGERS IN CROWDED BUILDINGS.

SIR,—I acted on Saturday as a steward at one of the King's dinners, and would like to call your attention to the way in which it is possible to assemble large numbers of people together in buildings which are extremely dangerous in case of fire or panic, without any supervision from those authorities who so wisely insist on proper exits to public buildings, factories, and warehouses.

The building I was in was a hop warehouse of four floors. On each floor at least 650 people were seated as close together as possible, with a 2 ft. gangway between every second table, and a gangway some 3 ft. wide at each end. The approach to these floors was up a steep staircase about 3 ft. wide, with winders. It is terrible to think what would have occurred in case of a panic, as this stair would have been the only means of escape for the 2,000 people on the three upper floors, and many lives—probably hundreds—would have been lost.

We have much good and necessary legislation for the regulation of public buildings, &c., against fire and panic risk, and surely there should be some legislation to prevent buildings such as I have described being used for the assemblage of large numbers of people.

It was probably difficult to get suitable accommo-

dition for such large numbers in a crowded neighbourhood, and it was very good of the owner of the warehouse to lend it; but some authority should have had power either to prevent such buildings being used, or to insist on proper temporary exits being made and gangways kept, and the numbers of people being limited so that all would have had a chance of escape.

In the case I am speaking about, owing to some miscalculation on the caterer's part, there was not nearly enough meat to go round all the people, and at one time I feared they would get out of hand, and only the most admirable self control and good temper on the part of the people (who were of a class where one hardly looks for such qualities) prevented a disaster which one trembles to think of.

I bring this matter to your notice, as it is very important, and a suggestion from you that the buildings used for such purposes should be under proper supervision would be most valuable.

I enclose a rough sketch plan of the floor on which I was on duty, and should be glad to give you any further information if you thought any good would be done by calling attention to the matter.

CHARLES MARSHALL, A.R.I.B.A.

A CURIOUS OLD COTTAGE.

SIR,—At Harrowley Green, one mile north of Horley Station, is an ancient cottage (about to be demolished) of some interest as being one of the few in existence that were built without chimney or glazed windows.

The only fire hearth was in the living-room. The smoke ascended in a space partitioned off up to the roof, and escaped through the tiles and apertures in gable, until at some subsequent period a short chimney was built on the tiled roof, and at a later period still, but probably nearly two centuries ago, a fireplace was built in the principal bedroom.

The windows are about 3 ft. 6 in. by 2 ft., of 4½ in. oak with three vertical oak bars ½ in. square, morticed angle-wise into head and side. At some remote period leaded casements have been put to some of the windows.

H. ROWLAND HOOPER.

Illustrations.

THE SOUTH ARCADE, ST. SOPHIA.

THIS illustration of the interior of St. Sophia, Constantinople, is from a fine water-colour drawing by Mr. Arthur E. Henderson, which was exhibited recently at the gallery of the Society of British Artists in Suffolk-street.

Mr. Henderson, as some of our readers are aware, has made a special study of St. Sophia, and of the Byzantine remains of Constantinople generally.

HARROGATE TOWN HALL COMPETITION.

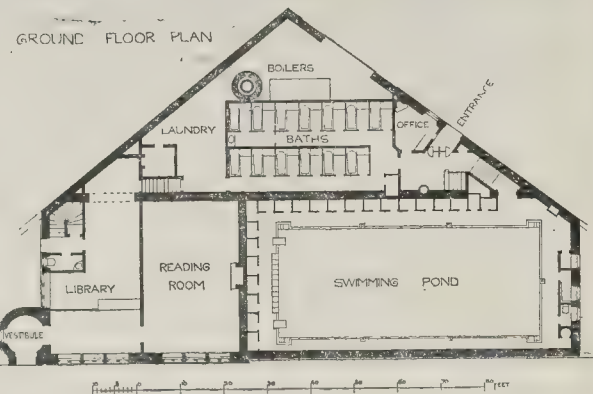
We give this week elevations and plan of the design by Messrs. Heazell & Son, which obtained the third premium in the competition. The following is their description of their intention in the design:—

The main entrance is, in accordance with the instructions, placed in Station Parade, and gives immediate access through a dignified entrance-hall to the apartments of the Mayor and Council, committee-rooms, Council Chamber, and Town Clerk's offices on the one side, and to the Accountant's department on the other. Leading immediately out of the entrance-hall is the staircase to the Engineers' offices of the various departments, which are arranged round well-lighted corridors on the first floor.

The library and the court are self-contained, and have no connexion with the other departments, except in so far as the caretaker has supervision of them. The library has a separate entrance from Victoria-avenue. The court has distinct entrances from Raglan-street. The entrances for the public to the Council Chamber and the rate office open directly to the same street.

The court is on the Raglan-street side of the site, with one entrance for the use of magistrates, jury, and officials, and another for the use of public and witnesses.

The public library is placed on the first floor, and is entered from Victoria-avenue through a spacious entrance by a wide stair of easy gradient. The various sections of this department have clearly-defined entrances from the staircase landing, and are so arranged as to be well under the supervision of the officials.



Lochee Free Library and Baths.

The Sanitary Inspector's office, with store and testing-rooms, are, in addition to the heating boiler, provided in the basement.

LOCHEE FREE LIBRARY AND BATHS.

The late Mr. Thomas Hunter Cox, of Maulsden, left a sum of about 11,000l. to be used in the way found most beneficial for the inhabitants of Lochee. After consideration, it was decided that the erection of public baths and free library was the best way to utilise the gift.

The buildings here illustrated were erected at a cost of 6,000l., and it has been settled that the remainder of the money be applied as an endowment for their regulation and upkeep.

The lower part of the building is of local stone, greenish grey, and the upper part of Ballochmyle red stone, and the roofs covered with green slates. The bath is used as a gymnasium in the winter time. The building is fitted with electric light.

The architect was the late Mr. J. Murray Robertson, of Dundee. The drawing was exhibited at the Royal Academy of 1897.

tower, which contains one of the staircases, with a class-room above. The ground floor of the main building, which is used as boys' and infants' halls, is separated by a swivel partition, enabling the whole space to be utilised as a gymnasium, 54 ft. long by 32 ft. wide. The kitchen is provided with a back-way direct into the ground floor hall, for the purpose of tea meetings, &c. The first floor is used as a girls' hall, but is adapted for concerts and other entertainments, and is covered with an open timber roof, 33 ft. span. There are several smaller class-rooms. The buildings have been erected by Messrs. Colls & Sons, from the designs, and under the superintendence of, the architect, Mr. G. A. Lansdown, of London, at a cost of about 3,300l.

The drawing was exhibited at the Royal Academy of 1897.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

2.—NATURAL BUILDING STONES.

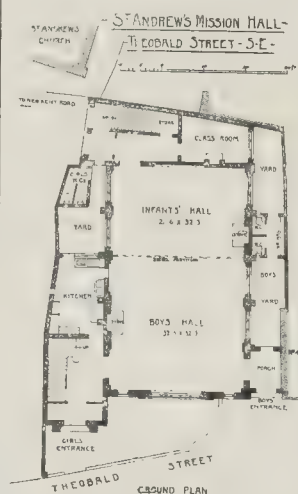
CHEMICAL COMPOSITION OF NATURAL STONES.—Chemical analyses of natural building stones are of very little practical value. The physical structure and properties of substances identical in chemical composition may differ very widely. The element carbon may exist in the form of diamond, or as graphite, or in the form of charcoal, yet the differences in such physical properties as hardness and porosity between the diamond and charcoal are extreme. Similarly, two blocks of stone taken from the same quarry may be identical in chemical composition, and yet one form excellent building material and the other be worthless.

In the manufacture of artificial stone it is possible to always produce blocks practically identical both in chemical composition and in physical properties, but beds of natural stone have, as a rule, been formed under very variable conditions, have usually been for ages in contact with water containing organic impurities and mineral salts in solution, and have been subjected by local subsidences and upheavals to all kinds of strains and stresses. Natural stone, therefore, frequently varies considerably, even in the same quarry, both in physical condition and in chemical composition.

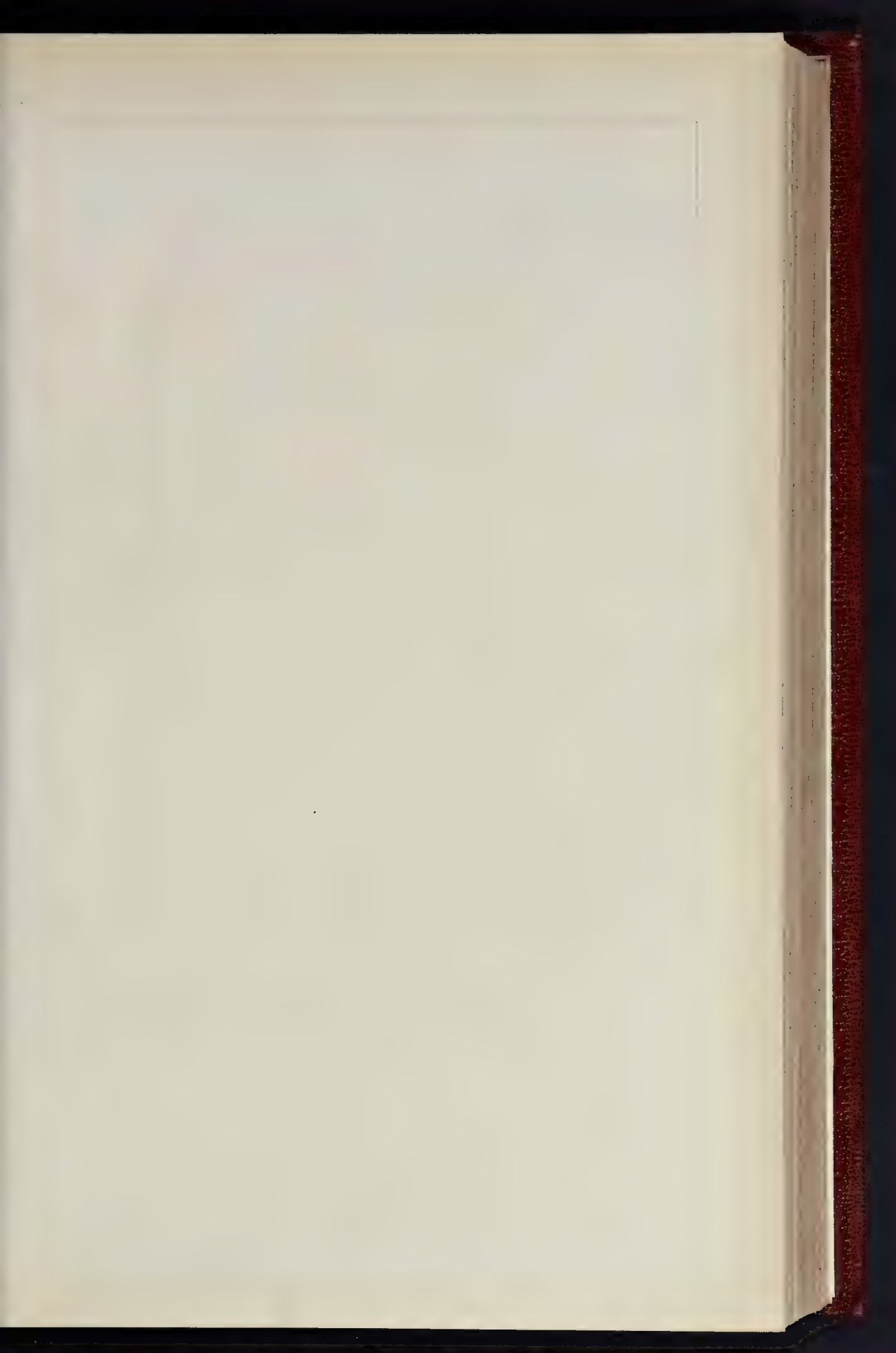
No natural building stone is composed of one chemical element or compound alone. Each stone consists of one or more principal constituents admixed with small proportions of a number of other compounds which may be regarded as impurities, but which may materially affect the value of the stone as a building material. Even white Carrara marble, so celebrated for its purity, contains magnesia and traces of other compounds admixed with the carbonate of lime of which it is mainly composed.

ST. ANDREW'S MISSION HALL, NEW KENT ROAD.

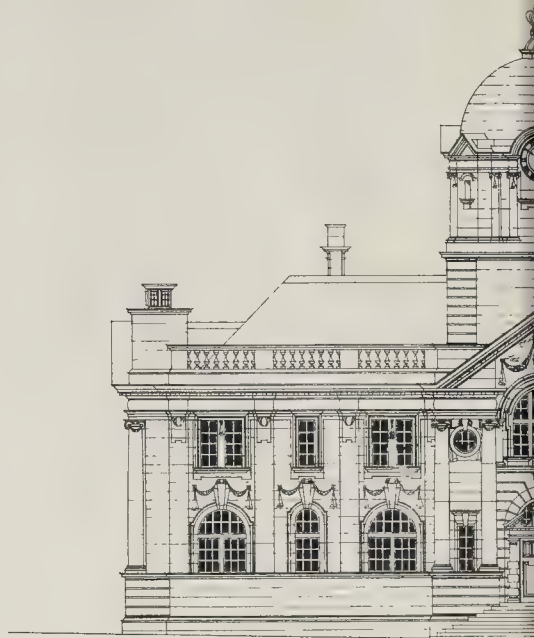
The front elevation of this building is built



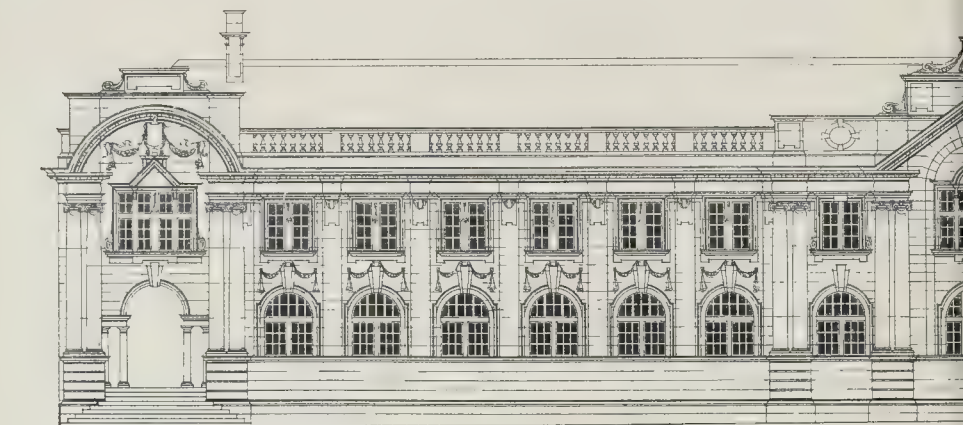
of brown and yellow Luton bricks, with Portland stone dressings. On the east side is a



HARROGATE TOWN HALL



ELEVATION TO
STATION PARADE



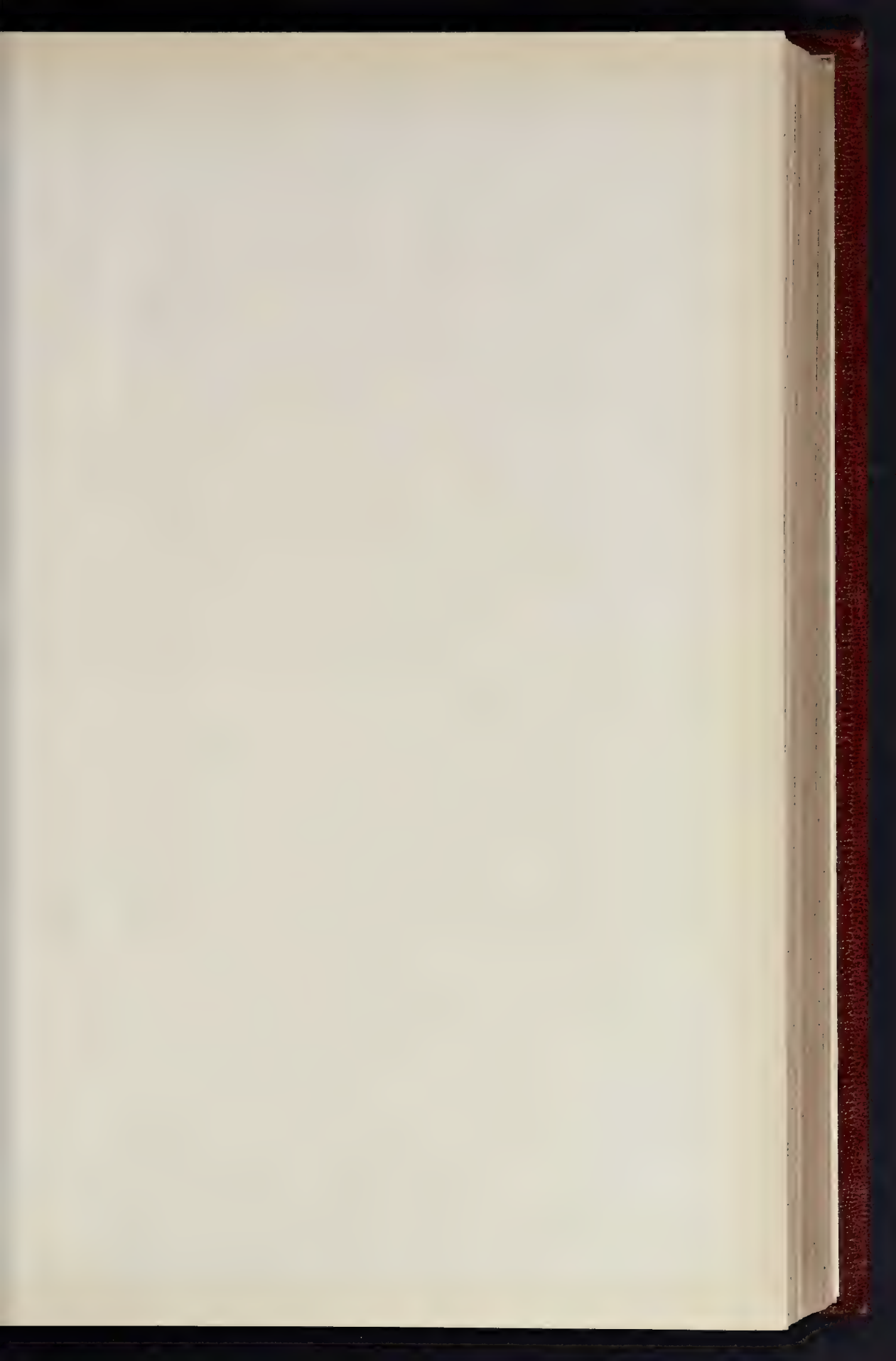
ELEVATION TO
VICTORIA AVENUE



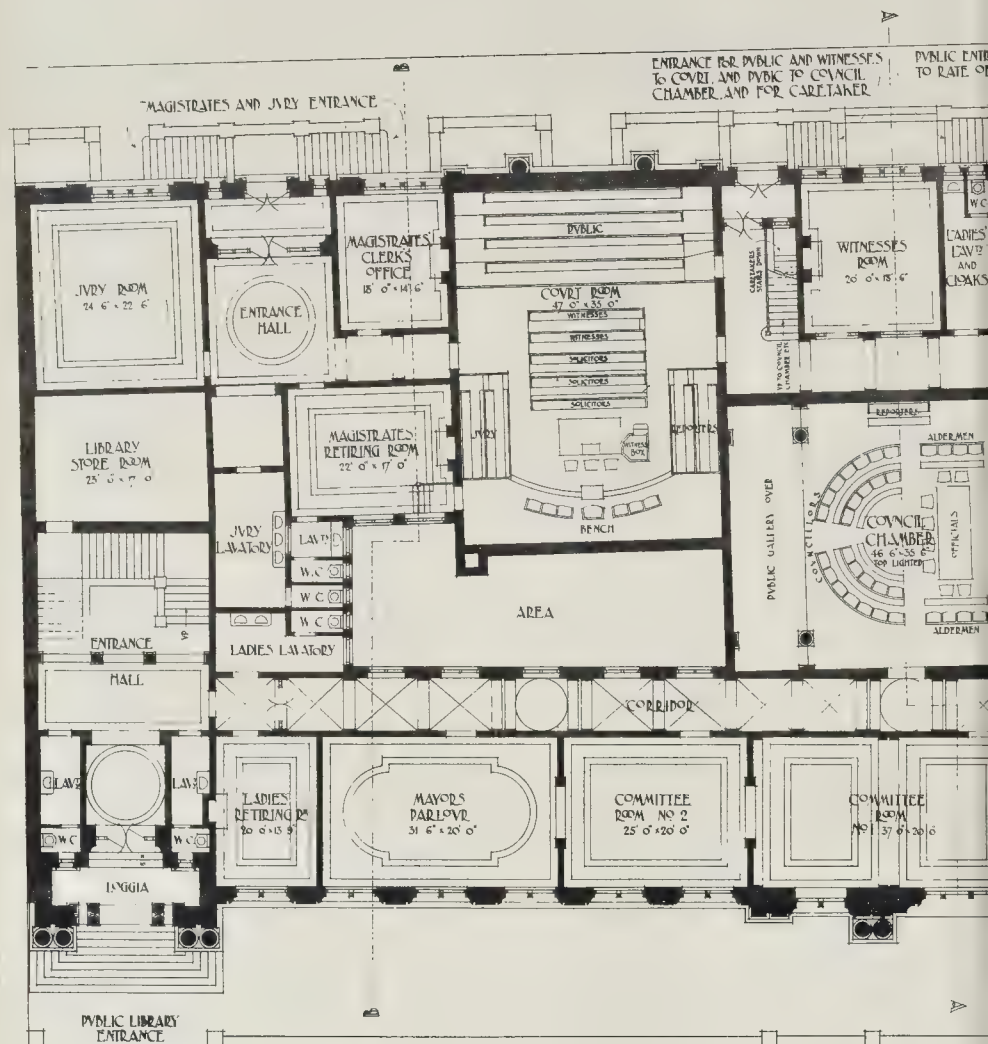


60 70 80 90 100

PHOTO LITHO SPRAGUE & CO. LTD. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

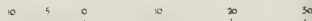


RAGLAN



GROVND
FLOOR
PLAN

VICTORIA



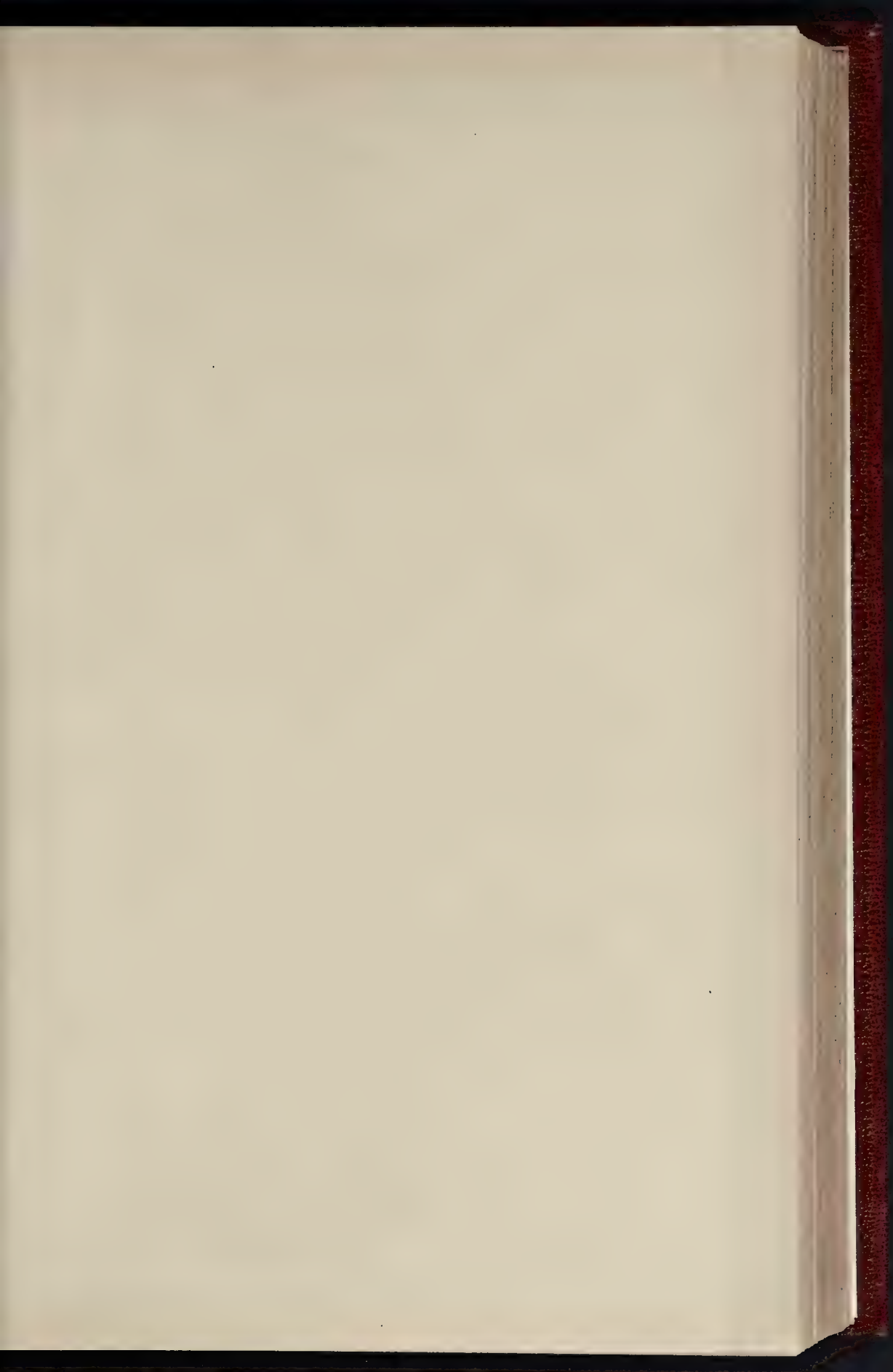


MIATED DESIGN.—BY MESSRS. HEAZELL & SON.

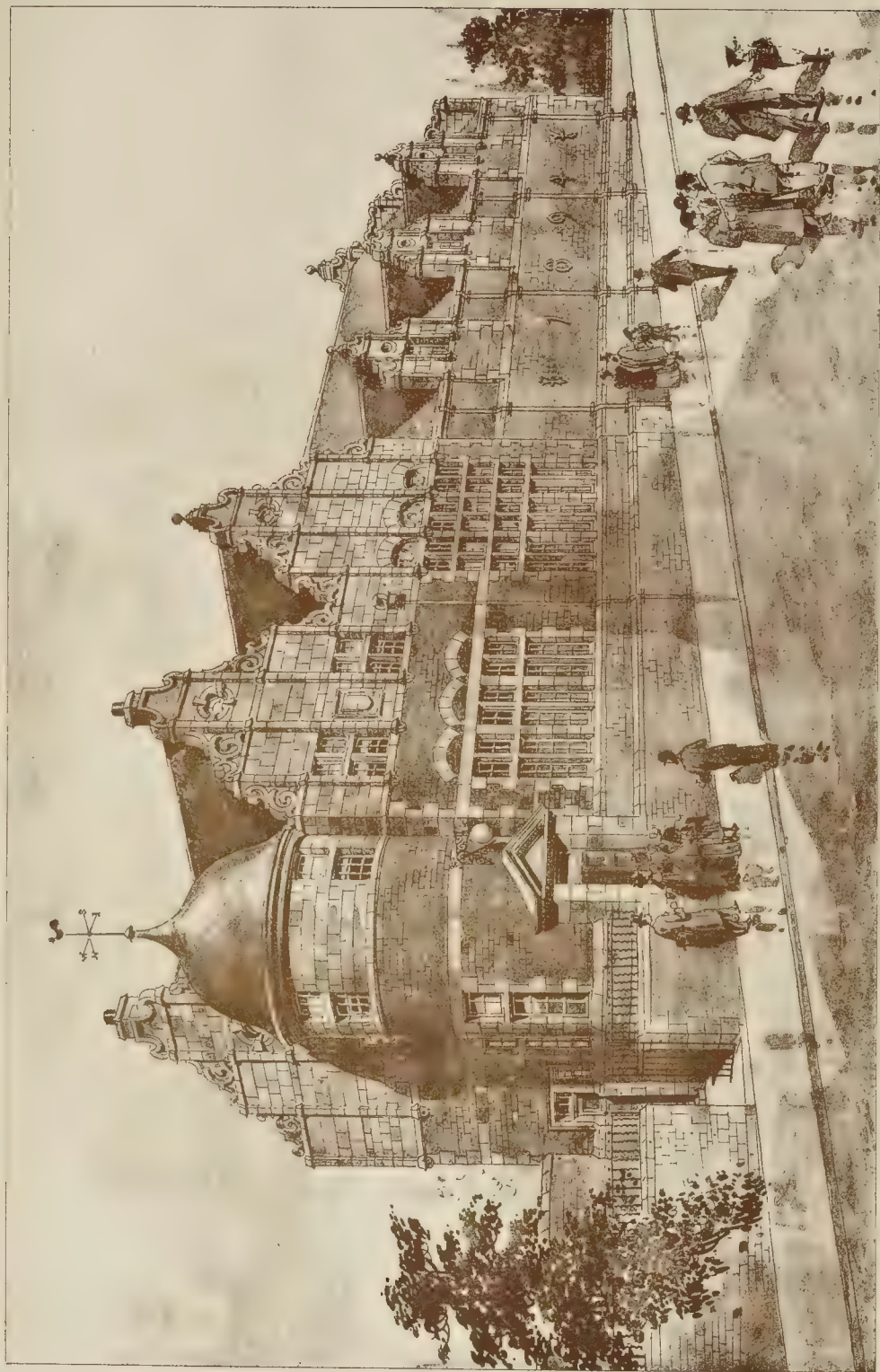




III. SOUTHERN ARCADES OF ST. SOFIA. FROM A WATER-COLOURED DRAWING BY MR. AUGUSTUS P. HENDON.



THE BUILDER, JULY 12, 1902.





The following table shows the composition of some typical building stones, and it will be seen that they are all of a more or less complex composition:—

Table Showing the Chemical Composition of Some Common Building Stones.

Description of Stone. Locality. Authority.	Granite near Dublin. Haughton.	Serpentine, Corrwall. Haughton.	Sandstone. Craigleith. Daniell & Wheatstone.	Limestone. Portland. Daniell & Wheatstone.	White Marble. Carrara. Wittstein.	Magnesian Limestone. Bolsover. Daniell & Wheatstone.
Silica	73'00	38'29	98'3	1'20	—	3'6
Alumina	13'64	—	—	—	—	1'8
Oxide of iron	2'44	13'50	0'6	0'50	—	—
Lime	1'84	—	—	—	—	—
Magnesia	0'11	34'24	—	—	—	—
Potash	4'21	—	—	—	—	—
Soda	3'53	—	—	—	—	—
Water	—	12'09	—	1'04	—	3'3
Loss	1'23	—	—	—	0'25	—
Protoxide of iron and phosphoric acid	—	—	—	—	—	—
Carbonate of lime	—	—	—	95'16	99'26	51'1
Carbonate of magnesia	—	—	1'1	1'20	0'28	40'2
	100'00	98'12	100'0	100'00	99'79	100'0

Most of these analyses were made more than fifty years ago, and modern methods of analysis would reveal the presence of small proportions of other elements not sought for by the earlier chemists. The more complete analyses would not, however, be of any greater value as an aid to the estimation of the values of the stones for building purposes, but would merely show that natural stones are even more complex in composition than the above table indicates. The table might also be extended to include all the modern building stones, but it would be of no greater practical utility.

There is, however, a marked difference in the nature of the action of the atmosphere upon the main constituents of building stones, quite irrespective of the physical condition of the stone, and this is due to differences in the chemical properties of those constituents. The principal chemical characteristics of the different classes of building stone may be summarised as follows:—

Granite usually contains three distinct minerals known respectively as quartz, felspar, and mica. In some granites one or other of these minerals is absent, while others contain one or more additional minerals, such as tourmaline, hornblende, or augite. Granite commonly contains from 30 to 40 per cent. of quartz, about 40 per cent. of felspar, and from 20 to 20 per cent. of mica. Quartz is a form of silica (SiO_2) and is the most durable of the constituents of granite. It is not appreciably attacked by the atmosphere or by rainwater. Felspar varies greatly in its durability and composition. Its main constituents are silica, alumina, and either calcium or potassium. It is slowly disintegrated by exposure to the atmosphere. The white clay known as "kaolin," which is found in large quantities in Cornwall, and which is used for the manufacture of China, is formed by the action of the atmosphere upon the felspar contained in granite. Mica is a complex mixture of silicates of aluminium, potassium, and other elements. It occurs in semi-transparent glistening scales, and is also slowly decomposed by the action of the atmosphere. It is less readily attacked by the atmosphere than felspar, but as it exists in the form of very thin laminae which are easily separated from one another, it is probably as great a source of weakness in granite as felspar.

Sandstone is composed of grains of quartz held together by some cementing substance. When the cementing agent is siliceous, the stone is usually very durable, but when it is carbonate of lime, the stone is sensitive to the same influences as limestone, and is apt to suffer disintegration upon exposure to rain. Some of the sandstones most extensively used for building have their sand grains cemented together by oxide of iron, and these stones are usually found to be durable. Those stones which have their grains held together by matter of a clayey character are termed "argillaceous" sandstones, and do not, as a rule, form good material for external work. Dr. Frank Clowes has shown that the cementitious material in some of the sandstone in the neighbourhood of Nottingham is sulphate of barium. Although, therefore, grains of sand resist more

or less perfectly all atmospheric influences, the durability of a sandstone must largely depend upon the composition of the materials which cement the grains together.

Slate is mainly composed of silicate of alumina. It may be regarded as clay hardened by natural processes. It is of little service for use in mass, but it easily splits along the lines of cleavage, and those forms of slate which are non-porous are useful as roofing material. Even good slates, however, gradually become more porous and decay when exposed to the atmosphere.

Limestone.—The principal constituent of most building limestone is calcium carbonate, but in magnesian limestone the proportion of magnesium carbonate approximates to that of the calcium carbonate. The term limestone is not, as a rule, applied to other compounds of lime such as alabaster, which is a form of sulphate of lime. Calcium carbonate is readily attacked by most of the acids, the carbon dioxide (CO_2) being expelled as a gas, which in escaping through the liquid brought in contact with the stone, produces the phenomenon known as "effervescence." When sulphuric acid attacks limestone, sulphate of lime is formed. When hydrochloric acid attacks limestone, calcium chloride is produced. Calcium carbonate is almost insoluble in pure water; but rain water, which always contains carbon dioxide in solution, converts calcium carbonate (CaCO_3) into a solution of calcium bicarbonate ($\text{CaCO}_3 \cdot \text{H}_2\text{CO}_3$). All carbonate of lime, whether it be in the form of marble, calcite, chalk, or any of the building limestones, is therefore soluble in rain water. When the atmosphere also contains sulphuric or hydrochloric acid, as is usually the case in the neighbourhood of towns, these acids are also absorbed by rain water and increase its destructive power.

Magnesian limestone, sometimes called "dolomite," is a crystalline double carbonate of lime and magnesia. When perfectly crystalline and non-porous it does not disintegrate rapidly, but magnesium carbonate is, like calcium carbonate, soluble in rain water, and magnesium limestone is dissolved by rain water, however perfect its crystallisation.

Specific Gravity of Building Stones.—As a general rule, the higher the specific gravity and the more crystalline the structure of the stone the greater is its strength and durability. Specific gravity alone, however, does not afford any indication of the value of a stone for building purposes. Stones of the same class vary considerably in specific gravity, but the following figures may be regarded as representing the average specific gravity of the most common building stones:—

	Specific gravity.
Granite	2'68
Serpentine	2'50
Sandstone	2'23
Portland stone	2'14
Bath stone	1'84
Magnesian limestone	2'31
Marble	2'68
Chalk	2'33

To convert specific gravity into weight of a cubic foot of stone, multiply by 62'3.

Colouring Matter in Stone.—Iron is nearly always present in one form or another in natural stone, and it is to this constituent that

the predominating colour of a stone is most commonly due. The colour of iron compounds varies with the elements with which the iron is combined, and with the proportions in which the elements are combined. The colour is also affected by the presence or absence of water in a state of combination; anhydrous salts being frequently very different in colour from those which are hydrated. The colour of the stone also varies, of course, with the colour of the main constituent of the stone and with the quantity of iron present. In calcareous stone iron is commonly present in the form of minute black particles of iron silicate. The various shades of red and yellow in stone are usually produced by ferric oxide or ferrous carbonate. Hydrated ferrous carbonate is frequently present in natural stone. This iron carbonate is soluble to a small extent in water containing carbon dioxide, and rain-water therefore dissolves it and carries it to the surface of the stone, where, upon coming in contact with air, the iron carbonate is converted into insoluble ferric oxide, and appears as a brown stain upon the stone. The proportion of colouring matter required to conceal the natural colour of a compound of light tint is exceedingly small. Black marble owes its colour to the presence of less than 1 per cent. of bituminous matter. When black marble is heated the carbonaceous matter disappears and a white residue is obtained. Although iron is the most common cause of colour in stone, other colouring matters, such as compounds of copper and of chromium, are sometimes present in highly-coloured stones.



Fig. 1.—Erosion Test.

Porosity of Stone.—The durability of a building stone is not found in practice to diminish in direct proportion to its increase in porosity, but no natural stone is found to be durable when it is capable of absorbing more than 20 per cent. of its bulk of water. Many inferior stones, as well as those of good quality, are incapable of absorbing so much as 15 per cent. of their bulk of water.

To find the porosity of a sample of stone completely, immerse a small piece of the stone in distilled water for twenty-four hours; then remove it from the water and wipe off the superfluous water from its surface. Weigh the stone while thus saturated with water, then dry it at a temperature not exceeding 212 deg. Fahr., and again weigh it. The loss in weight represents the weight of water absorbed by the stone. Calculate the percentage weight of water absorbed. From the percentage weight of water absorbed the percentage bulk of water, as compared with bulk of stone, can be calculated if the specific gravity of the stone be known.

Erosion or Drip Test.—The following simple test will be found as useful as any of the numerous chemical laboratory tests for determining the value of a stone for external work. In no case can any laboratory test on a small piece of stone be relied upon to give positive

information concerning large masses of the material.

Take a fair sample of the stone (weighing, say, 4 ozs. or 5 ozs.), dry it at a temperature not exceeding 212 deg. Fahr. and weigh it accurately. Then place the stone on the top of an inverted beaker, or any other suitable surface, so that water falling upon it can flow away freely. Above the stone arrange a vessel containing half a gallon of town rain water. The water is to be allowed to fall in drops upon the centre of the stone must be flat. The distance between the surface of the stone and the point at which the water is liberated must in all cases be the same, say 18 in., and the rate of flow must be as nearly as possible uniform, say thirty drops per minute. When the half gallon of water has all fallen upon the stone, dry it again at a temperature not exceeding 212 deg. Fahr., and ascertain the loss in weight. In all cases a certain quantity of solid matter worn away from the stone will be found on the surface which supports the stone, the quantity varying in accordance with the hardness and durability of the stone. The conditions must be similar for all tests. A stone known to be of good quality should first be tested to act as a standard of comparison. The illustration (fig. 1) shows a method of applying the test.

GENERAL BUILDING NEWS.

NEW NURSES' HOME, GUY'S HOSPITAL.—The Henriette Raphael Nurses' Home at Guy's Hospital, opened on the 9th inst. by H.R.H. the Prince of Wales, the President of the Hospital, was founded by the late Mr. Henry Lewis Raphael, who, in memory of his wife, gave 20,000l. towards the cost of its erection. The building, finished externally in red brick and Portland stone dressings, simply and unostentatiously treated, takes the form of an irregular T-shape on plan. The exigencies of the site and the necessity of providing room for the extension of contiguous Medical School buildings and the recently completed new laundries and central lighting and heating scheme compelled this form of building. The home is intended to provide complete living and sleeping accommodation for the whole of the nursing staff of Guy's Hospital, as well as for fifteen pupil-probationers and their instructress. It comprises 213 bedrooms, a sick ward and convalescent-room, with separate sanitary accommodation, sundry sitting and living rooms, a visitors' room, servants' rooms, offices, and kitchens. Lavatory and bathroom accommodation on an ample scale is provided on each floor, as well as a swimming bath in the basement with dressing boxes and a hair-dressing room in the basement. There are three fire escape staircases (external), and three internal staircases; an electric passenger lift delivering on every floor, and an electric boot lift. Each nurse's bedroom contains bed, chair, table, combination chest of drawers and wardrobe, and has a fixed porcelain basin with hot and cold water and the staircases have a gas supply as well. The kitchen contains gas and steam cooking apparatus, as well as a large kitchen range. The dining-hall, kitchen, scullery, entrance halls, and all passages and bathrooms have vitreous mosaic floors. The sitting-rooms and ward have oak wood-block floors. All windows are pivoted, so that they can be cleaned from inside the rooms. "Fire-resisting" construction has been adopted throughout the building, which is also divided into sections by armour-plated doors. Mr. Nightingale, of Albert Works, was the builder, and Mr. J. Wall acted throughout as foreman of works. The architects are Messrs. Wood & Ainslie, of Westminster.

CHURCH, WILLESDEX.—On the 3rd inst. a new United Methodist Free Church was opened at the junction of Harrow-road and Tubbs-road. The church has been designed by Mr. W. H. Dursley, of Chorley, Lancashire. The builders are Messrs. Mossop & Co., Kilburn.

HOSPITAL OF THE HOLY TRINITY, LEICESTER.—The new buildings erected in connexion with this charity were opened by the Mayor of Leicester recently. The new buildings accommodate twenty-two men and seventeen women. The cost has been upwards of 12,000l. It is proposed to restore the ancient chapel at a cost of 1,300l. The architects are Messrs. R. J. & J. Goodacre, of Leicester.

LEIGH INFIRMARY EXTENSION.—A public meeting was held on the 3rd inst. at Leigh to consider the Report of the Infirmary Committee. The Committee were of opinion that an infirmary containing plans should be provided at once, but that the buildings could be extended with the minimum of cost and disturbance of the existing structure to accommodate sixty beds. It had been decided that there should be an out-patients' department, and it was estimated that the total cost of such an infirmary would be 15,000l. The estimated cost of maintenance of the infirmary and out-patients' department would be 1,500l. per annum. Architects

were invited to send in plans in competition. Mr. Alex. Graham, of London, the assessor, awarded the premium to Mr. J. C. Prestwich, architect, Leigh. The Report was adopted.

BUSINESS PREMISES, EDINBURGH.—New premises are to be erected at Nos. 3 to 15, Rose-street for Messrs. Charles Jenner & Co. The architect is Mr. Peter L. Henderson, Edinburgh.

EDINBURGH BUILDING TRADE.—At Edinburgh Dean of Guild Court on the 3rd inst. there were twenty-one warrants granted. These included the following:—Trustees of Edinburgh University Union, to make an addition to Union-buildings, Park-lane; Victoria Hospital for Consumption, to erect three annexes and a boiler-house at the hospital, Craigleith; Messrs. Tod Brothers, Stock-bridge, to reconstruct their premises so as to afford additional storage accommodation for grain; Messrs. Crerar & Swanston, to build four tenements at Logie Green-road; Messrs. Jas. Kinneir, Sons, & Co., three tenements at McDonald-road; Messrs. J. & F. Forrest, two tenements at corner of Morning-side-road and Merchiston-place; and Mr. Alex. Muir, six tenements at Gibson-terrace.

NEW GLASSHOUSES, VERNON PARK.—The Corporation of Stockport have just accepted the design and estimate of Messrs. Messenger & Co., horticultural builders, for a large range of glasshouses at Vernon Park.

COUNCIL OFFICES, HORBURY, YORKSHIRE.—New offices for Horbury Urban District Council are to be erected in Westfield-road. Messrs. Walter Hanstock & Son, of Leeds and Batley, have prepared plans for the new building, and these have been adopted by the Council. Accommodation is to be provided in the new offices for the surveyor, the rate collector, and offices for the Clerk to the Council. The first floor will contain the Council-chamber, 37 ft. by 24 ft. At the rear of the site, and off the side road called Manor-road, will be the stabling for the horses, and sheds for the carts and street rollers are to be erected, together with plumber's shop, workmen's sheds, &c.

RECTORY, MIDDLETON-ST-GEORGE, DURHAM.—The foundation-stone of a vicarage for Middleton-St-George, near Darlington, was laid recently. The total cost is estimated at 1,450l. Messrs. Clark & Moscrop are the architects, Messrs. Boyd & Johnson the builders, and the plumbing work will be done by Messrs. Sykes, and the painting by Mr. Metcalfe.

FIRE STATION, &C., BOOTLE.—The memorial stone has just been laid of the new central fire station and sub-police station in Strand-road, Bootle. On the ground floor the engine house will face Strand-road, with the superintendent's and deputy superintendent's houses on either flank. The stables will be immediately in the rear of the engine-house, divided into two portions by a covered yard. There will also be the engineer's houses and married men's cottages. On the north-west corner of the land facing Pacific-road will be the police station, including quarters for a married and single man, charge officer, and four cells. There are quarters on the first floor for the firemen, both married and single. The front elevation of the building will be faced with red pressed brick, and the other portions of the building are to be built in grey bricks, the whole being relieved with red sandstone dressings. Internally the engine-house and cells will be finished with glazed bricks. The architects for the building are Messrs. Anderson & Crawford, Liverpool; and the contractor Mr. Walter Musker, Bootle.

GRAND HOTEL, LLANDUDNO.—On the 2nd inst. the new Grand Hotel was opened at Llandudno. Mr. Francis Doyle was the architect. The building is situated on the rock overlooking the north end of the bay, between the pier and the Happy Valley. It has dining, drawing, writing, and smoking-rooms, a lounge, 150 bedrooms, an electric lift to all floors, and a restaurant. The main entrance in Happy Valley-road leads into a circular hall, and there is also an entrance from the pier. The total cost is understood to have been 120,000l.

WESLEYAN CHAPEL, DINAS POWIS.—The foundation-stone has just been laid of the new Wesleyan chapel in Station-road, Dinas Powis. The chapel, when built, will accommodate about 300 worshippers, with a pastor's room and seating accommodation for 50 persons, the total cost being 2,000l. The architects of the new chapel are Messrs. Jones, Richards, & Budgen, Cardiff, and the contractor Mr. D. Britton, Barry Dock.

NEW THEATRE, HULL.—A new theatre is to be erected at Hull. The site is bounded on three sides by streets, the main frontage being in George-street, the east by Bourne-street, and the north by Market-street. The theatre will be Renaissance in style, carried out in red bricks and light terra cotta dressings. A verandah, some 15 ft. from the pavement, will be erected over the principal entrance. A feature in the elevation is a tower at the corner of George-street and Bourne-street. There will be eleven entrances and exits for the accommodation of the 3,000 odd people the building is designed to hold. The theatre will be lighted throughout by electricity, from the Corporation mains, with a special system of wiring. The heating of the building will be by the low pressure hot water system, and the stage will be heated. The auditorium is to be constructed of iron and steel. The seating accommodation (according to London County Council measurements) will be for 2,200 people,

with additional provision for standing room for 800 people, made up as follows:—Seating, gallery 620, standing 300, seating, family circle 280, standing 100, seating, dress circle 172; orchestra stalls 56; pit stalls 576; pit 496; standing, pit and pit stalls, 500. A subway has been constructed beneath the stall and pit floor, with an entrance from George-street leading to the rear of the stalls. Retiring-rooms have been constructed for every part of the house. Mr. Thomas Guest, Birmingham, has prepared the design of the building.

LIBRARY, LIVERPOOL.—A new branch library has been erected to supersede the old library at the lower end of Upper Parliament-street. The building, which stands on a site at the corner of Windsor-street and Upper Parliament-street, includes both library and newsroom. The principal front elevation and main entrance are in Windsor-street. The structure has been erected from designs of Mr. Thomas Shelmierdine, the Corporation architect and surveyor. From the entrance in Windsor-street a vestibule is reached. Leading from the vestibule into the library is a staircase, the main central hall on the right is the ladies' reading room, 56 ft. 6 in. by 30 ft. On the left is the general or men's reading-room, 66 ft. by 30 ft. In the central building are the lending department and book store. There are upwards of 25,000 volumes of books in this library. From the vestibule there is a staircase by which access is obtained to the basement, in which is situated the boys' reading room, 47 ft. by 30 ft. In addition to the public accommodation there is a mezzanine or gallery-floor, which provides accommodation for books, for the repair of books, and for the staff. On the ground floor is the librarian's room, and on the first floor the assistant's common-room. The entire building is of fireproof construction. The main walls are of red wire-cut Rusbon bricks and Cefn stone dressings, and the roof is covered with Cumberland green slates. The building is English Renaissance in style. The contract price for the building was upwards of 100,000l.

ST. PAUL'S CHURCH, GARDEN-SQUARE, N.W.—This church was built in 1849-50 after the designs of Messrs Ordish & Johnson. We learn that Sir Arthur W. Blomfield & Sons are appointed as superintending architects for the repairation of all the outside stone work, the boundary walls, and some other portions of the fabric at a computed outlay of about 1,200l.

A NEW CHURCH, SOUTHELD, ESSEX.—A new church, having a capacity for 500 sittings, together with a house for the clergy and a parochial hall, is about to be built at Southeld. The designs will be chosen in a competition, in respect of which we understand that the services have been engaged of Mr. G. F. Bodley as assessor.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Messrs. Lefell & Co., Springfield, U.S.A., builders of turbines, have appointed Messrs. Jas. Gordon & Co., 52, Lime-street, E.C., as their sole British and Colonial agents. Messrs. Lewis & Lewis, engineers and ironfounders, have converted their business into a limited company, and it will in future be known as Lewis & Lewis, Ltd.—Mr. B. Harry Nelson has retired from the firm of F. McNeill & Co., manufacturers of slag wool (Lamb's-burriers, Bunhill-row), and the business will be carried on by Mr. G. Albert Nelson, under the same style of F. McNeill & Co.

ART METAL WORK EXHIBITION AND COMPETITION, GLASGOW.—Since its institution there has been held every year, in the Green Branch Museum (People's Palace), an annual exhibition devoted to the illustration of some special branch of artistic activity. The successive schemes have embraced a competitive section, in which prizes and honorary certificates have been awarded for works of the class embraced in the exhibition, executed and shown by competitors for such distinctions. For the winter season, 1902-3, it has been determined by the Museum and Galleries Committee to bring together a collection of art work in metal. The exhibition section will embrace works, both ancient and recent, in gold and silver, brass, bronze, steel, iron, pewter, and other metals, with illustrations of such ornamental processes as damascening, chasing, engraving, and enamelling on metals. In the competition division awards will be made under the following heads:—I. Repoussé ornamentation on silver, copper, brass, &c. II. Engraving and chasing, separately or combined, applied to vessels and domestic articles executed in gold, silver, brass, steel, or other metal. III. Ornamental wrought iron in the form of gates, grills, panels, brackets, lamps, and other useful domestic articles. The exhibition will be held in the Glasgow Green Branch Museum (People's Palace). It will be opened about December 19 next, and will continue for a period of not less than three months. Prizes to the extent of 15l. will be awarded for the works in competition, in such amounts as may be determined by the judges, and appointed by the Corporation. Certificates of merit in each class will be granted also in accordance with the determination

of the judges. The competition will be open to all without restriction. The judges will be nominated by the Museums and Galleries Sub-Committee, with the approval of the Corporation of Glasgow.—*Glasgow Herald.*

THE CONSISTORY COURT OF LONDON.—At a meeting of the Court in St. Paul's Cathedral on Friday last week, Dr. Tristram, K.C., Chancellor of the Diocese, granted a faculty authorising the rector and churchwardens to effect certain alterations and improvements of Christ Church, in Stafford-street, Marylebone-road. It is proposed to expend an estimated sum of £250, in constructing a side chapel for week-day and occasional services at the east end of the north aisle, together with a porch and entrance at the north-western end of the church. Christ Church was built as a chapel-of-ease to the parish church seventy-five years ago after Thomas Hardwick's designs. It has a tetrastyle Ionic portico with an angle-pediment at the east end standing on a flight of steps, a square clock-tower, carrying a belfry stage surrounded with a Corinthian colonnade, above which rises an octagonal lantern surmounted with a cupola, ball, and cross. The general design is very similar to that of the parish church, also by him (1813-17). In 1867 the late Sir Arthur W. Blomfield re-arranged the east end and added the chancel. The faculty will provide for the erection of a screen to divide the new chapel from the body of the church. The Chancellor agreed to issue other faculties for the erection of a side chapel, with a holy table at All Hallows' Church, near the East India Dock, and for the placing of a holy table at the east end of the north-eastern chapel, Holy Innocents Church, in Tottenham-lane, Hoxney, which was built in 1876, after designs and plans by Sir Arthur W. Blomfield.

THE SIR JOHN CASS TECHNICAL INSTITUTE.—The late Sir John Cass, Alderman of Portoken Ward by Aldgate. The Institute is recognised by the Technical Education Board of the London County Council as one of the thirteen Polytechnics in London, and will, it is stated, receive considerable grants in aid from that body as well as from the official trustees of the City Parochial Charities. The new buildings, of which we published a perspective view with a plan and a section, in our number of July 23, 1897, have been finished in Jewry-street (east side), and to George and Little George streets. They comprise a large lecture theatre and four instruction-rooms on the ground floor, with board-room and secretary's office; a library, a reading-room, and classrooms on the first floor; and on the second floor, a tailor's workshop, a chemical laboratory, and a women's department for instruction in cookery, dress-making, and other domestic work. Provision is made for an art-school, gymnastics, and—in the basement—for instruction in the building and allied trades. Mr. Cooksey's designs were selected, in a competition limited to five nominated architects, in July, 1898.

THE SUN INSURANCE OFFICE.—New premises are being erected for the branch office of the Sun Fire and Life Insurance Office on the sites of Nos. 328 and 330, Oxford-street, and Nos. 1 and 2, Vere-street, after plans and designs by Mr. J. Macvicar Anderson. The decorative sculpture is by Mr. Hawkins, the general contractors are Messrs. Higgs & Hill, Limited.

THE INSTITUTION OF CIVIL ENGINEERS.—On Saturday, July 5, the members of this Institution paid a visit to the American Exhibition at the Crystal Palace, the exhibits of Messrs. Babcock & Wilcox, the Fairbanks Co., Messrs. Charles Churchill & Co., Messrs. W. C. Horne & Sons, the Blaxton Engineering Co., the Niles Bement Pond Co., and Messrs. Stirling's Motor Carriages Co., receiving special attention. Another feature of engineering interest noticed was the re-glazing of the centre transept roof, consisting of 100,000 square feet of Mellowes patent glazing, in which no putty or paint is used. Previously to entering the Exhibition, Mr. J. W. Wilson and Mr. Maurice Wilson, the Principal and Vice-Principal, showed the members over the Crystal Palace Co.'s School of Practical Engineering, situated on the South Tower, which is fitted up for instruction in mechanical, civil, electrical, and colonial engineering.

PROPOSED CATHEDRAL, PRETORIA.—An appeal is being made for funds for the erection by the Anglican community of Pretoria of a cathedral in the capital of the new Colony. The building which is to be built on the site of the parish church of Pretoria and as a cathedral for twenty-five years is, it is stated, small, ugly, and poorly furnished. It is hoped to provide a building to accommodate 1,000 people, and it is estimated that for 20,000, a building, ample for the needs of a parish church, and with a sufficiently large chancel for diocesan purposes, a chapter-house, and a side chapel for daily services, could be built. No. 10, Clements-lane, E.C.

THE CORONATION STANDS.—In the House of Commons, on the 4th inst., Mr. Flynn asked the First Commissioner of Works whether he was

aware of the effect caused by the delay in taking down the Coronation stands on the building trades in London; and whether, in view of the number of bricklayers, carpenters, and builders' labourers now in want of employment, he would direct that the new War Office in Whitehall, the new Foreign Office block, and other Government works should be proceeded with without delay. Mr. Akers-Douglas: The procedure adopted with regard to the Coronation stands is guided by questions of general policy. It is my hope that many of the stands may still be required for the purpose for which they were erected. I do not understand the last part of the hon. member's question. The new War Office is making rapid progress, and the Government offices in Parliament-street are also being proceeded with, under the terms of the contracts.

APPOINTMENT.—Mr. Frank Johnson, C.E., of the Aberdeen Borough Surveyors' Department, has been appointed chief assistant to the City Surveyor of Manchester.

NATIONAL FEDERATION OF MASTER BUILDERS.—The annual conference of the National Federation of Master Builders of Great Britain and Ireland will, this year, be held at Brighton on July 22, 23, and 24.

ROYAL INFIRMARY, MANCHESTER.—A meeting of the Manchester Corporation Special Committee re Royal Infirmary, was held on the 7th inst., the Lord Mayor presiding. The Town Clerk had received a letter from the Board of Management of the Infirmary, informing the Corporation in its capacity as a trustee of the forthcoming meeting of trustees called to consider the plans for rebuilding the institution on its present site which have been approved by the Board. The members of the Committee were by no means unanimous in their approval of the project for rebuilding on the present site. The view of Stanley-groves as against Piccadilly was alluded to. One member proposed as an amendment that steps should be taken to remove the Infirmary to Heaton Park, but of this there was no second. After a long discussion of various points, the meeting closed without any resolution being arrived at. It was adjourned until after the meeting of trustees, for it was generally regarded as undesirable that the Corporation should take any action at this juncture until the view of the whole body of trustees is made known.—*Manchester Courier.*

THE SURVEYORS' INSTITUTION.—On Friday last week the annual conversation of the Surveyors' Institution was held at the Natural History Museum, South Kensington. The members and guests, numbering about 1,500, were received in the Central Hall by the President and Mrs. Vernon, and amongst those present were Viscount Peel, Sir W. Emerson, Sir John Rolleston, the Agent-General for South Australia, the President of the Institute of Chartered Accountants, the President of the Royal College of Surgeons, Captain C. S. Barry, Dr. Henry Woodward, F.R.S., Messrs. Balfour Browne, K.C., H. C. Richards, K.C., E. P. Squirey, J. H. Sabin, T. M. Rickman, Daniel Watniss, and others. The string band of the Royal Engineers, conducted by Lieutenant J. Sommer, performed in the Central Hall, and the Edelweiss Alpine Troupe in the Fossil Mammalian Gallery. Hitherto the conversation has been held at the Institution, 12, Great George-street, but the building is not adapted for the accommodation of so large a company on one evening, and the new arrangement added to the success of the function.

THE BUILDING TRADES AND EMIGRATION.—The Board of Trade's Statistical tables relating to emigration and immigration from and into the United Kingdom in the year 1901 have just been presented to Parliament. They show, *inter alia*, that the 137,838 adults of British and Irish origin who left the United Kingdom in 1901 included thirty-three brick and tile makers, potters, &c.; 795 bricklayers, masons, plasterers, slaters, &c.; 161 builders, 135 cabinet makers and upholsters, 1,536 carpenters and joiners, and 446 painters, paperhangers, plumbers, and glaziers—total 3,106. Of these 1,285 went to the United States, 97 to British North America, 435 to Australasia, and 1,285 to other places.

THE CEMENT MARKET IN SAN FRANCISCO.—It appears from statistics officially supplied that the imports of cement to San Francisco last year amounted to only 105,416,359 lbs. as compared with 270,982,187 lbs. in the year 1900. The quantity imported from the United Kingdom in 1901 was only 22,800 lbs., as compared with 69,442,000 lbs. in 1900. The causes of this remarkable decrease are thus described by Mr. W. Moore, the British Vice-Consul: "Sufficient cement was left over from the exceptional amount received in 1900 for a year's requirements, which accounts for the heavy shrinkage of the imports in 1901. The market exhibited a downward tendency throughout the year, prices closing at from 2 dols. 10 c. (8s. 8d.) to 2 dols. 25 c. (9s. 3½d.) per barrel, according to brand and quality. These figures were unprofitable to the importers, and are said to show a loss of from 25 c. (18. 0½d.) to 50 c. (28. 0½d.) per barrel. The amount of British cement imported was only nominal. Not many years ago it enjoyed an almost complete monopoly of this market, and its present position is entirely due to the manufacturers, who ignored the warnings given them to produce a finer article until the trade had passed out of their hands into those of their

Continental competitors. No consignments were received from China or Japan during the year, and very little came from the State of Utah, the low price of the foreign article and the high transportation charges restricting its sale. The United States naval and military authorities have used the Utah cement on fortification work, but some complaints have been made regarding its keeping qualities, owing to the method employed in packing it in bags. One of the local companies incorporated for the manufacture of cement has completed a plant capable of turning out 800 barrels per day, and expects to place its product on the market during the coming summer (1902). The works are located at Suisun, near tide water, and the tests made are said to have given highly satisfactory results. A syndicate is reported to have acquired sixty-two acres of land at Santa Cruz with the object of erecting a plant thereon, and the concern at Tesla has not abandoned its intention of entering the field, although active operations have not yet been commenced. It seems likely that the entire needs of the state will be supplied from local sources within a few years."

IMPORTATION OF CEMENT AND TILES AT BEIRUT.—Reporting on the trade and commerce of Beirut and the coast of Syria Mr. Consul-General Drummond-Hay states that last year the importation of cement for private industries amounted to about 4,000 barrels, while 12,000 barrels were received by the Damascus-Hama and the Hedjaz railways. This is all sent from France, and costs on an average 48s. the barrel f.o.b. Beirut. The cement known at Beirut as Portland is entirely of French make. Some years ago a small quantity of real Portland cement was received from the United Kingdom, but the French cement was preferred, as it dried much more quickly, which is sometimes a great advantage, especially in rainy weather. In this case, as with many other articles made in the United Kingdom, buyers complain that the British manufacturers refuse to provide what their customers really require, either believing that what is best in the United Kingdom is necessarily suitable everywhere, or not caring to change their methods except for very large quantities. In this way considerable orders that might go to the United Kingdom are now sent elsewhere. The imports of hydraulic lime are increasing every year, as native builders are now using it for many purposes. It is brought from Marseilles, and the importation is reckoned at 15,000 bags, sold at 2s. each for private purposes, while the railways received some 30,000 bags; 750,000 tiles for roofing were imported from France, at a price of 48s. the 1,000 f.o.b. Beirut. This was a decrease on the two preceding years, as the number of new buildings is steadily diminishing. Only a few thousand flooring tiles were received, a composition of cement, hydraulic lime, and rough sea sand, to which a red colour is given, being now generally preferred to tiles, as it is much cheaper.

BUILDING MATERIALS IN HAMBURG AND HANOVER.—Sir W. Ward, British Consul-General at Hamburg, in his Annual Report to the Foreign Secretary, remarks that in a large city of more than 700,000 inhabitants, which is annually growing in size and wealth, there are as a rule a number of public and large private buildings in course of construction, and for these purposes stone of different kinds has to be imported from foreign countries. The two sorts chiefly imported to Hamburg are granite—from Norway, Sweden, Silesia, and Saxony—and sandstone, which is obtained from Saxony. Granite is used in Hamburg for the outside ornamental parts of houses, as well as for steps, staircases, window enclosures, cornices, &c., which are prepared in the city by a number of larger and smaller stonemasons' establishments employing several thousand hands. Some of these stonemasons possess sandstone quarries of their own in Saxony and Bohemia, whence they import their raw material by the River Elbe. Five large cement-works, and about as many brick-works, have their business seats at Hamburg, but the factories are situated in the neighbouring provinces of Holstein and Hanover. There are five mortar and plaster works at Hamburg, and three marble-sawing works. There are four establishments for preparing asphalt in powdered or other form for local use, which is very considerable, and for exportation. A large number of steam-sawmills are employed in and around Hamburg, in preparing the large variety of European and exotic kinds of wood annually imported for various purposes—e.g., wood for building, furniture, &c. Mr. Stevenson, Vice-Consul at Hanover, states that for the cement industry 1901 was the record bad year. Added to general commercial depression, the reduction in orders for public works produced a severe crisis. The Hanover Syndicate, which comprised all "Portland" cement works of North Germany united from January 1, 1901, broke up at the end of the same year, thus proving the futility of dividing the demand between the old and leading companies and those less known and of recent formation, simply on the basis of the output of the mills. Competition during the summer months became acute, especially by the East German mills, and the syndicate was powerless to regulate production and consumption. By general agreement the Syndicate was dissolved, therefore, and from December 1, 1901—for delivery for January 1, 1902

5,020.—SEATS FOR SHOPS, &c.: *G. Lohoff*.—The side cheeks of a pierced bracket-plate are joined together with strips and a ledge, the narrowed back portion of the seat fits between the cheeks, and its loops engage with a crossbar. The seat can be turned up or down by pulling it forwards.

5,038.—WIRING OF INCANDESCENT LAMPS: *Sir H. C. Mance and Ernest Electric Light*.—For lamps after the "Nerost" kind the connecting wires, of platinum, are twisted around the incandescence rod at places near each of its ends, and are also twisted together, otherwise they are secured either by twisting them, or with a solder having a high melting-point, to a connecting-wire of copper or nickel.

5,045.—PIPES OF CEMENT, CONCRETE, &c.: *F. E. Bocuquet*.—Cylindrical reservoirs, pipes, and so on, are formed with metallic frames or skeleton work for strengthening purposes. In a pipe made of cement is adopted expanded metal-work or trellis, around which is wound a wire or a metallic band or strip; two concentric pipes thus strengthened may constitute one pipe, a layer of asphalted cloth or some such impermeable fabric being placed between them. When the pipe sections are joined the cloth is lapped at the ends, and the ends of the sections are kept up with sockets or sleeves of strengthened cement.

5,008.—TERMINAL CAPS FOR MULTIPLE CABLES: *G. H. Nisbett*.—For facilitating the formation of connections are devised insulating caps that will separate the single wires and make them extend in staggered rows, the wires are bared and soldered in metallic glands. The cap, made in either one piece or in sections that are jointed with cement, has a ridged surface, and its base is attached to a metallic gland which is fastened with a wiped-joint to the cable sheathing; insulating material is filled into the terminal which is to be closed with a screw-plug or a hanged cap.

5,100.—CONSTRUCTION OF ROOFS: *F. D. Fulcher*.—Instead of slates, the inventor adopts metallic plates, which he secures to the battens with nails.

5,134.—CONDUITS FOR ELECTRICAL CONDUCTORS: *C. A. W. Hullman*.—Multitubular blocks of terracotta or other material, which are wrapped in a metallic and slightly-tapered casing, constitute the multiple conduits. Gasket-rings are packed into the joints between the block-sections. Tubes of terracotta, &c., are put around the metallic sheaths, and as so disposed that they can be fitted together with gasket-rings, the annular space being filled with some suitable joint-closing substance. A separate sleeve-piece will serve for the outer sections when their ends are recessed either without or within.

5,154.—AN INDICATOR FOR LEVELS (LIQUID): *H. A. Cutler*.—The rise or fall of a float causes a wheel which carries four blocks and four pivoted arms to turn in the one direction or the other. As the arms fall they strike a rocking self-lifting electrical contact-maker (which should be after the mercurial kind) on the right or left side, and thereupon transmit a positive or a negative current to an indicator at a distance. Since the sides of the blocks converge towards eccentric points, the end of an arm—as it descends from one block to another—will sweep out a protruding curve upon the wheel, and thus impinges against the contact-maker, but it will not extend so far as it rises with a block. In a modified form a pair of double-contact tubes are employed at each end of the frame, and form a single battery instead of two batteries may be used.

5,167.—A COLOUR-LAKE PIGMENT: *Farbauerke-torm, Meister, Lucius, & Brünning*.—The pigment which is stated to be capable of resisting both spirit and water consists of an admixture of aluminium hydrate, and the hydrates of zinc, lead, or some alkaline earth with a solution of a nitro, azo, acid, resorcinol dye-stuff.

5,224.—HANGERS FOR SLIDING DOORS: *Perfect Sliding Door Co.*—The hanger, composed of two arms, carries a single wheel that slides upon a rail; two disked plates, riveted to one another, form a wheel or rim-piece having internal and external grooves. On each of the two arms of the hanger is a circular plate set out of the plane of the body and turned over at its edges so that when the plates are bolted together they will form a groove to register with the internal groove of the rim-piece and a race for the bearing balls, an extension from each arm has a dish boss that enters a recess in the rail to which the hanger is fastened by screws inserted through raised rings at the bases of the bosses. The blanks from which the hangers are struck are slotted for the rounding of the lower part of the heads.

5,227.—ELECTRICAL CABLES: *C. A. W. Hullman*.—The conductors, set in pairs or in larger groups, of multiple cables are inserted through insulator-discs, which are so turned as to make spirals in the conductors; the discs may be fitted together with flanges with or without a U-shaped binding, and with an exterior binding-wire or unfanged discs kept together with flanged distance-pieces.

5,252.—IMPROVEMENTS IN PLANIMETERS: *B. W. Bryan*.—For effecting correct integration when the diagram-scale varies at different parts the tracing-arm is pivoted on to a wheeled carriage, which a weight keeps in position upon its rails, whilst the planimetric arm that turns with the tracing-arm is joined to a carriage underneath that contains the

integrating roller which rests upon a long table the roller being pivoted on to a fixed plate upon the carriage; the pivot engages with a cam-groove in the fixed plate, and the curvature of the cam is determined from the variation of the diagram-scale when one has ascertained at what points the reading is correct for the known value of successive strips of the tracing board, a sliding board on the base of the tracing board that can be clamped, together with the recording-sheet upon it, provides for the fixing of the sheet; the invention also relates to instruments that have non-graduated rollers which traverse smooth rods for reading parallel straight scales.

5,255.—CONSTRUCTION OF DRAINS, MANHOLES, TRAPS, &c.: *G. P. Heilman*.—The end of the main sewer of a system is closed and has a series of inlets, which should be fitted with automatic traps at the surface, and a series of side-sewers having their ends closed and with similar inlets, are opened into the main sewer. A casing covered with a top-grating and shut normally with pivoted valves to be closed by the force of gravity, constitutes each manhole or trap. From the main sewer separate ventilating pipes are extended directly to the surface, an arrangement which is described as being especially suitable for the long sewers of hospitals, asylums, and other public buildings.

5,257.—CONSTRUCTION OF FIREPROOF FLOORS, CEILINGS, &c.: *B. Jacquart and F. F. Booram*.—As a safeguard against the effects of fire metallic girders and beams are provided with end-blocks or skew-backs and dove-tailed covering blocks, which will engage with the dovetail-ribs of the end-blocks. The exposed surfaces of arch-bricks and covering blocks are enamelled, but the non-exposed end-blocks are not enamelled.

5,263.—AN ELECTRICAL CURRENT METER: *A. Wright and Reason Manufacturing Co.*—A conical or wedge-shaped measuring glass, into which liquid is displaced, is fitted on to a maximum-demand indicator, so as to provide a long range for large currents and an open scale for small currents. The range of an indicator may be extended by joining two or three such glasses to one another that they may act in succession. In another form the measuring tube into which the liquid is displaced is fitted with a discharging siphon. The discharge is conveyed into an outer receiver that contains a tube having two bends and a second scale. Confer also No. 583 of 1893 for the indicator, and No. 5,593 of 1900 for the latter modification.

5,269.—A CONTRIVANCE FOR CHIMNEY-TOPS: *E. C. Wright*.—Four ears are fashioned on the upper portion of the up-take, which also has brackets upon which is mounted a conical frustum, around which are disposed long and short baffles in alternation. Above the baffles is a cap.

MEETINGS.

FRIDAY, JULY 11.

Incorporated Association of Municipal and County Engineers.—Annual general meeting, Bristol (continued).

SATURDAY, JULY 12.

Incorporated Association of Municipal and County Engineers.—Annual general meeting, Bristol (concluded).

Architectural Association.—Third summer visit to view some of the ruins of E. A. Voysey, New Place, Haslemere, and to Streatley Place.

St. Paul's Ecclesiastical Society.—Visit to the churches of Leeds and Beasted, near Maidstone.

WEDNESDAY, JULY 16.

Builders' Foremen and Clerks of Works' Institution.—Half-yearly meeting of the members. 6 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

JUNE 16.—By FRANK LLOYD & SONS (at Wrexham).	
Haighton, Flint.—The Pandey Farm, 27 a. o. r. 39 p. f.	41,310
Freehold cottage and land	315
Bangor-on-Dee, Flint.—Holly Bush Farm, 34 a. r. 9 p. f.	1,530
Green Lane Cottage, 12 a. r. 21 p. f.	750
Enclosures of land, 17 a. 3 r. 21 p. f.	700
Cottage Gorse Farm, 43 a. 2 r. 4 p. f.	3,500
Cottage Gorse Farm, 10 a. o. r. 12 p. f.	300
Worthenbury, Flint.—The Brook Farm, 14 a. 2 r. 18 p. f.	4,225
The Upper Wern Farm, 39 a. 2 r. 29 p. f.	4,250
Two freehold meadows, 10 a. o. r. 10 p. f.	350
JUNE 23.—By R. & J. MITCHELL (at Cocker-much).	
Brigham, Cumberland.—Sneckyeat Farm, 160½ acres, f.	3,550
Whitchurch, Dorset.—Sheepwash Farm, 75 a. 1 r. f.	2,070
JUNE 30.—By R. DALTON & SON (at Carlisle).	
Irlington, Cumberland.—Broom Hill Estate, 20½ acres, f. & c.	2,500
JULY 1.—By J. BOTT & SONS.	
Herne Hill, 31, Kentish-av., u. t. 73 yrs., g. r. 36, y. r. 43f.	490
33 and 35, Kentish-av., u. t. 77½ yrs., g. r. 156, y. r. 94f.	935

By J. W. COADE.

Bloomsbury, 65, Calsen-yard (stabling, coach-house, &c.), u. t. 72 yrs., g. r. 84, y. r. 57f.	4,580
20, Kenton-st., u. t. 22½ yrs., g. r. 25f., y. r. 55f.	200
By Messrs. SPELMAN (at Great Yarmouth).	
Great Yarmouth, Norfolk.—North Quay, freehold warehouse premises and yard, with goodwill	1,570
Market-gates, tallow-factory premises, u. t. 77 yrs., g. r. 18	900
St. George's-rd., freehold grocery stores, with goodwill	795
44, St. George's-rd., f. y. r. 50f.	580
49, Lancaster-rd. (S), f., with goodwill	600
26, Camperdown, u. t. 66½ yrs., g. r. 11. 108	480
By CRAWFORD, HARRIS, & CO. (at Masons' Hall Tavern).	
Kentish Town.—Doynton-st., the Brookfield Tavern, u. t. 36 yrs., r. 100f., with goodwill	15,630
By S. H. BAKER (at Masons' Hall Tavern).	
Bethnal Green.—Ames-st., the Blue Lion b-h., and house adjoining, f., y. r. 49f. 108	800
JULY 2. By MARK GILBERT.	
Battersea, 3, Brynmarr-rd., u. t. 68 yrs., g. r. 61, y. r. 31f.	385
By F. JOLLY & CO.	
Bethnal Green.—9, Paradise-rd., f., y. r. 35f.	630
Stratford.—7, 9, 11, and 13, Hartland-rd., u. t. 77 yrs., g. r. 20f., w. r. 126f. 25	800
By NOTT, CARTWRIGHT, & ETCHES.	
Fulham.—103, New King's-rd., f., r. 38f.	660
Harrow-on-the-Hill, 15, Gungahurst-rd., f., g. r. 49f., u. t. 75 yrs., g. r. 12	800
By ROGERS BROS.	
Dulwich.—65, East Dulwich-ve., u. t. 67 yrs., g. r. 7f. 148f., y. r. 38f.	370
By WYATT & SON (at Chichester).	
Chichester.—48, York-rd., f., w. r. 14f. 66f.	210
25 and 26, Adelaide-rd., f., y. r. 38f. 88	350
15 and 16, Gungahurst-rd., f., g. r. 39f. 128	795
JULY 3.—By WORSFOLD & HAYWARD (at Dover).	
Dover.—Maison Dieu-rd., Maison Dieu Lodge, f., y. r. 70f.	1,100
124 and 126, Snargate-st. (S), f., p.	500
St. Margaret's-Chiffe, Kent.—Freehold stabling and coach-house, p.	310
JULY 4.—By EDWARD MILLAR.	
Stepney.—Lincoln-st., f., g. r. 31f., reversion in 60 yrs.	930
Holloway.—Ashbrook-rd., f., g. r. 44f. 25, reversion in 74½ yrs.	1,110
Shepherd's Bush.—The Lodge p-h., f., g. r. 39f. 108, reversion in 74½ yrs.	810
Percy-rd., f., g. r. 44f., reversion in 73½ yrs.	325
124 and 126, Snargate-st. (S), f., p.	805
Richmond, Surrey.—Kew-rd., f., g. r. 12f., reversion in 63½ yrs.	350
Kew-rd., the White Swan p-h., f., g. r. 8f., reversion in 63½ yrs.	750
Kew-rd., f., g. r. 9f., reversion in 63½ yrs.	240
Willesden.—Villiers-rd., f., g. r. 56f., reversion in 63½ yrs.	1,615
Maylebone.—Montague-pl., f., g. r. 118f., u. t. 43 yrs., g. r. nil	420
Easton-rd.—No. 315 & also 64, Warren-st., area 4,770 sq. ft., y. r. 60f.	2,900
Fitzroy-sq.—and 3, Hertford-pl., with stabling, f., y. r. 65f.	810
Maylebone.—Great Portland-st. (S), u. t. 27½ yrs., g. r. 50f., y. r. 270f.	3,140
Clapham.—4, Lavender-sweep, u. t. 78 yrs., g. r. 8f. p.	400
By ERNEST OWERS.	
St. John's Wood.—2, Bolton-rd., with builder's yard, u. t. 48 yrs., g. r. 20f., y. r. 87f.	850
By J. D. WOOD & CO.	
Kentish Town.—Peckwater-st., f., g. r. 183f., u. t. 47 yrs.	1,925
By HEARS, SON, & REEVE.	
Plaistow.—50, 52, and 54, Chesterton-rd., f., w. r. 72f. 108	540
Chesteron-rd., a plot of freehold land, y. r. 5f. 69, Howard-rd., u. t. 68 yrs., g. r. 3f., w. r. 27f. 68	200
By E. & S. SMITH.	
Clerkenwell.—St. Helena-pl., f., g. r. 21f., u. t. 15 yrs., g. r. nil	195
22 and 23, New-st., and 12, Wilmington-pl., u. t. 13 yrs., g. r. 20f., y. r. 86f.	205
83, Margaret-st., u. t. 13½ yrs., g. r. 6f. 68, y. r. 100f.	100
g. r. nil, y. r. 30f.	220
Pentonville.—59 to 77 (odd), Cumming-st., u. t. 21 yrs., g. r. 14f., y. r. 118f.	725
Islington.—49 and 47, Liverpool-rd., u. t. 27½ yrs., g. r. 6f., y. r. 60f.	340
Caledonian-rd.—27 and 28, Charlotte-st., u. t. 29 yrs., g. r. 10f. 108, y. r. 62f.	350
By DAVID BURNETT & CO.	
Barbican.—Australian-av., f., g. r. 16f., reversion in 55 yrs.	4,200
Hoxton.—33, Pittfield-st. (S), f., y. r. 80f.	2,050
Kingston, Surrey.—18 and 60, Eden-st. (S), u. t. 76½ yrs., g. r. 38f.	1,345
Wandsworth.—Warple Way, f., g. r. 38f., reversion in 60 and 62 yrs.	720
Alma-rd., f., g. r. 48f. 48, reversion in 63 and 74½ yrs.	1,100
Ballantines-st., f., g. r. 59f., reversion in 74 yrs.	2,275
Dulwich.—59 and 61, Landells-rd., u. t. 76 yrs., g. r. 94f., y. r. 39f.	435
Clerkenwell.—Baker-st., f., g. r. 39f., reversion in 56 yrs.	760
Leyton.—Grove Green-rd., f., g. r. 54f., reversion in 84 yrs.	1,300
Clarendon-rd., f., g. r. 21f., reversion in 83 yrs.	590
New Barnet, Herts.—Midlothian-ter., f., g. r. 80f., reversion in 77 yrs.	1,700

Bermondsey.—The Grange, &c., f.g.r.'s 551. 10s., reversion in 72 yrs.	£1,740
Tottenham.—Philippine, f.g.r.'s 1271, reversion in 96 yrs.	3,255
Arnold-rd. East, &c., f.g.r.'s 3541, reversion in 96 yrs.	8,495
Kilburn.—Carlton Vale, &c., f.g.r.'s 601, reversion in 79 yrs.	3,450
Hampstead.—Messia-av., f.g.r.'s 87, reversion in 84 yrs.	280
Kingsgate-rd., f.g.r.'s 251, reversion in 70 yrs.	6.00
Croydon.—Medway-rd., f.g.r.'s 801, reversion in 25 yrs.	1,790
Easton-rd., f.g.r.'s 81, reversion in 95 yrs.	1,890
Foots Cray, Kent.—St. Paul's Cray-rd., f.g.r.'s 651, reversion in 78 yrs.	2,400
Teddington.—York-rd., f.g.r.'s 1251. 10s. 6d., reversion in 66 yrs.	3,100
Shepherd's Bush.—Vespian-rd., f.g.r.'s 531, reversion in 85 yrs.	1,490
Camberwell.—Mosdale-st., &c., f.g.r.'s 2751, reversion in 66 yrs.	1,640
Highbury.—Kelvin-rd., f.g.r.'s 81, ut. 57 yrs., g.r. 21	140
Mottingham, Kent.—Portland-rd., f.g.r.'s 111, reversion in 66 yrs.	300
High-rd., f.g.r.'s 531. 10s., reversion in 66 and 67 yrs.	1,305
High-rd., f.g.r.'s 101. 10s., reversion in 53 yrs.	400
High-rd., f.g.r.'s 91. 5s., reversion in 64 yrs.	185

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. for estimated rent; w. for weekly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard.

PRICES CURRENT (Continued).

STONE.

Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	s. d.	per ft. super. at rly. depot.
" " 6 in. Rubbed Ditto—	3 0	" "
" " 3 in. sawn both sides slabs (random sizes)	1 3	" "
" " 2 in. self-faced Ditto	0 9	" "
Hopton Wood (Hard Bed) in blocks	2 3	per ft. cube. deld. rly. depot.
" " 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depot.
" " 3 in. do.	1 2	" "

SLATES.

in. in.	£ s. d.
20x10 best blue Bangor—	0 0 per 1000 of 1200 at rly. dep.
" best seconds	11 10 0
16x8 best "	6 17 6
20x10 best blue Portman—	11 7 6
doc	6 5 0
16x8 best blue Portman—	13 10 0
20x10 best blue Europa un-	7 10 0
fading green—	13 10 0
16x8 "	7 10 0
20x10 permanent green	13 10 0
16x8 "	6 0 0

TILES.

Best plain red roofing tiles—	4 6	per 1,000, at rly. depot.
Hip and valley tiles—	3 7	per doz.
Best Broseley tiles—	4 6	per 1,000
Hip and valley tiles—	4 0	per doz.
Best Rubon Red, brown or brindled Do. (Edwards)	57	6 per 1,000
Do. ornamental Do.	60	0 0
Hip tiles—	4 0	per doz.
Valley tiles—	3 7	" "
Best Red or Mottled Staffordshire Do. (Peak)—	50	0 per 1,000
Hip tiles—	4 1	per doz.
Valley tiles—	3 8	" "

WOOD.

BUILDING WOOD.—YELLOW.

Deals: best 3 in. by 11 in. and 4 in. by 11 in. and 11 in.	At per standard.
Deals: best 3 in. by 9 in.	14 10 0
Battens: best 2 in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	10 10 0
Battens: best 2 in. by 6 in. and 3 in. by 6 in.	10 10 0
Deals: seconds	10 0 0
Battens: seconds	10 0 0
2 in. by 11 in. and 2 in. by 6 in.	8 10 0
2 in. by 4 in. and 2 in. by 3 in.	8 0 0
Foreign Sawn Boards—	10 0 0
1 in. by 11 in. by 11 in.	10 0 0
3 in. Fir timber: Best medium Dazig or Memel (average specification)	4 10 0
Seconds	4 5 0
Small timber (8 in. to 10 in.)	3 12 6
Swedish balks	8 15 0
itch-pine (30 ft. long)	3 0 0

JOINERS' WOOD.

White Sea: First yellow deals, 3 in. by 11 in.	22 0 0
Battens, 2 in. and 3 in. by 7 in.	18 0 0
Second yellow deals, 3 in. by 11 in.	18 0 0
Battens, 2 in. and 3 in. by 7 in.	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	14 0 0
Battens, 2 in. and 3 in. by 7 in.	12 0 0
Petersburg: first yellow deals, 3 in. by 11 in.	20 0 0
Do. 3 in. by 9 in.	17 0 0
Battens	13 0 0
Second yellow deals, 3 in. by 11 in.	15 0 0
Do. 3 in. by 9 in.	12 0 0
Battens	11 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	12 0 0
Do. 3 in. by 9 in.	12 0 0
Battens	10 0 0
White Sea and Petersburg: First white deals, 3 in. by 11 in.	24 0 0
" 3 in. by 9 in.	23 0 0
Battens	12 0 0
Second white deals, 3 in. by 11 in.	23 0 0
" 3 in. by 9 in.	22 0 0
Battens	10 0 0
Under 2 in. thick extra	0 10 0
Yellow Pine—First, regular sizes	32 0 0
Broads (12 in. and up)	2 0 0
Oldtimers	28 0 0
Seconds, regular sizes	24 0 0
Yellow Pine Oldtimers	20 0 0
Kauri Pine—Planks, per ft. cube.	0 3 6
Danzig and Stettin Oak Logs—	0 6 0
Large, per ft. cube	0 6 0
Small	0 3 0
Wainscot Oak Logs, per ft. cube	0 5 0

PRICES CURRENT (Continued).

WOOD.

Dry Wainscot Oak, per ft. sup. as 1 in. do.	At per standard.
Dry Mahogany—	0 0 7 1/2
Honduras, Tabasco, per ft. sup. as 1 in. do.	0 0 7 1/2
Selected, Figury, per ft. sup. as 1 in. do.	0 0 9 0 11
Dry Walnut, American, per ft. sup. as 1 in. do.	0 1 6 0 2 0
Teak, per load	0 0 10 0 1 0
American Whitewood Planks—	16 0 0 80 0 0
Per ft. cube	0 3 0 0 3 6

Prepared Flooring—

1 in. by 7 in. yellow, planed and matched	Per square.
1 in. by 7 in. yellow, planed and matched	0 13 0 0 16 6
1 in. by 7 in. yellow, planed and matched	0 13 6 0 17 6
1 in. by 7 in. white, planed and shot	0 15 0 1 0 0
1 in. by 7 in. white, planed and matched	0 11 0 0 12 6
1 in. by 7 in. white, planed and matched	0 11 6 0 13 6
6 in. at 6d. per square less than 7 in.	0 13 6 0 15 6

JOISTS, GIRDERS, &c.

In London, or delivered Railway Vans, per ton.	£ s. d.
Rolled Steel Joists, ordinary sections	8 5 0
Compound Girders	8 2 6
Angles, Tees and Channels, ordinary sections	7 17 6
Flitch Plates	8 3 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 2 6

METALS.

IRON.—	Per ton, in London.
Common Bars	£ s. d.
Staffordshire Crown Bars, good merchant quality	7 15 0
Staffordshire "Marked Bars"	8 5 0
Mild Steel Bars	10 10 0
Hoop Iron, basis price	9 0 0
" galvanised	9 5 0
Sheet Iron, Black—	16 0 0
Ordinary sizes to 20 g.	10 0 0
" 20 g. and 24 g.	12 0 0
Sheet Iron, Galvanised, flat, ordinary quality—	12 10 0
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	12 15 0
" 20 g. and 24 g.	13 5 0
Sheet Iron, Galvanised, flat, best quality—	14 5 0
Ordinary sizes to 20 g.	16 0 0
" 20 g. and 24 g.	16 10 0
Galvanised Corrugated Sheets—	18 0 0
Ordinary sizes, 6 ft. to 8 ft. to 20 g.	12 15 0
" 20 g. and 24 g.	14 5 0
Best Soft Steel Sheets, 6 ft. by a ft. to 10 ft. by 30 g. and thicker	22 0 0
" 20 g. and 24 g.	23 0 0
" 20 g.	14 5 0
Cut nails, 3 in. to 6 in.	9 5 0
(Under 3 in. usual trade extras.)	

LEAD, &c.

LEAD—Sheet, English, 3 lbs. & up.	Per ton in London.
Pipe in coils	£ s. d.
Soil Pipe	23 15 0
ZINC—Sheet—	16 15 0
Vielle Montagne	24 0 0
Silesian	23 15 0
COPPER—	
Strong Sheet	per lb.
Thin	0 10 0
Copper nails	0 11 1/2
BRASS—	
Strong Sheet	per lb.
Thin	0 10 0
TIN—English Ingots	0 1 5
SOLDER—Plumbers'	0 7 1/2
Flatten's	0 9 1/2
Blowpipe	0 10 1/2

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	21d. per ft. delivered.
21 oz. thirds	21d. "
24 oz. thirds	21d. "
30 oz. thirds	21d. "
36 oz. thirds	21d. "
42 oz. thirds	21d. "
48 oz. thirds	21d. "
54 oz. thirds	21d. "
60 oz. thirds	21d. "
66 oz. thirds	21d. "
72 oz. thirds	21d. "
78 oz. thirds	21d. "
84 oz. thirds	21d. "
90 oz. thirds	21d. "
96 oz. thirds	21d. "
102 oz. thirds	21d. "
108 oz. thirds	21d. "
114 oz. thirds	21d. "
120 oz. thirds	21d. "

[See also page 45.]

PRICES CURRENT OF MATERIALS.

* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

Hard Stocks	£ s. d.
Rough Stocks	1 11 0
Grizles	1 9 0
Facing Bricks	2 11 0
Shippers	5 0 0
Flettons	1 5 0
Red Wire Cuts	1 12 0
Best Paviors Red	3 12 0
Best Red Pressed	5 0 0
Ruabon Facing	5 0 0
Best Blue Pressed	4 6 6
Staffordshire	4 11 0
Do. Bullnose	4 11 0
Best Stourbridge	4 6 0
Fire Bricks	4 6 0
Glazed Headers	12 0 0
Best White	12 0 0
Ivory Glazed	12 0 0
Stretchers	12 0 0
Headers	12 0 0
Quoins, Bullnose, and Flats	17 0 0
Double Stretchers	19 0 0
Double Headers	16 0 0
One Side and two Ends	19 0 0
Two Sides and one End	20 0 0
Splays, Chamfered, Squints	20 0 0
Best Dipped Glazed Stretchers and Headers	12 0 0
Quoins, Bullnose, and Flats	14 0 0
Double Stretchers	15 0 0
Double Headers	14 0 0
One Side and two Ends	15 0 0
Two Sides and one End	15 0 0
Splays, Chamfered, Squints	14 0 0
Seconds Quality Whitened Dipped Salt Glazed	2 0 0

Thames and Pit Sand 2. d.
Thames Ballast 6 0
Best Portland Cement 31 0 per ton, delivered.
Best Ground Blue Lias Lime, 25 0

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.
Grey Stone Lime..... 10s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 26s. 6d. per ton at rly. dpt.

STONE.

in. s. d.	
Ancaster in blocks	2 11 0
Each	1 7 0
Farleigh Down Bath	1 8 0
Beer in blocks	2 6 0
Grishill	1 10 0
Brown Portland in blocks	2 2 0
Darley Dale in blocks	2 6 0
Red Corshill	2 5 0
Closureburn Red Freestone	2 3 0
Red Mansfield	2 4 0
Hard York in blocks	2 10 0

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Artisans' Dwellings	Metropolitan Boro of Bermondsey	100l., 60l. and 40l.	Sept. 16
*Municipal Offices and Public Library	Hildeford Town Council	30l., 15l., and 10l.	Sept. 20

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Roadmaking, Paving, &c. Works	Hendon U.D.C.	Council's Engineer, Council Offices, Hendon, N.W.	July 14
*New sewer, Upper Thames-street	London Corporation	Engineer's Office, Guildhall, E.C.	do.
*Drainage Works, 67, North-street	Elmington, &c., Drainage Board	J. D. Watson, Engineer, Tyburn, near Birmingham	July 15
*Completion of St. Matthews Church, Cockington	Tipton U.D.C.	W. H. Jukes, Surveyor, Public Offices, Tipton	do.
*Paving Works	Recces (Lincs.) Corporation	T. S. Picton, Civil Engineer, Town Hall, Recces	do.
*Sewerage Works, Baiton-road	Skelmersdale U.D.C.	J. T. Wood, Civil Engineer, 3, Cook-street, Liverpool	do.
*Well Boring, &c., Searth Hill	Lancs. County Council	H. Little, Architect, Market-places, Preston	do.
*Primitive Methodist Church, Alderley	Cheltenham Corporation	W. Githwaite, Architect, 78, High-street, Cheltenham	do.
*Police Station, Ashton-in-Makerfield	Pympton R.D.C.	E. Church, Springfield Gallery, near Gateshead	do.
*Additions, &c., to Club and Institute, Mexborough	Larbert (N.R.) Town Council	M. Hall, Architect, 29, Northgate, Halifax	July 16
*Reading Room, Springfield, near Gateshead	Rochester Corporation	J. Hall, Civil Engineer, Municipal Offices, Cheltenham	do.
*Twenty-nine Houses, &c., Thornton, Yorks	Harwich U.D.C.	F. W. Cleverdon, 4, Buckland-terrace, Plymouth	do.
*Waterworks	Harwich U.D.C.	A. C. Treherne, Architect, Abchurch-lane, London	do.
*Road Works, St. Andrew-road	Leeds Corporation	J. Berry, Architect, 3, Market-place, Bulwerfield	do.
*Additions to Offices, Charles-street, Cardiff	Mr. J. Jarling	A. & W. Black, Architects, Falkirk	do.
*Shed Extensions, &c., Kirkstall-road	Hampstead Borough Council	W. Banks, Civil Engineer, R. Chamberlain	July 17
*Ten Houses, Port Talbot, Wales	Sevenoaks R.D.C.	H. Utchman, Borough Surveyor, Harwich	do.
*Boundary Wall, &c., at Depot	Stroud R.D.C.	Vaill & Sank, Architects, Cardiff	do.
*Workmen's Cottages, Penrith	Kent Asylum Committee	J. S. Stout, 36, Lower-street, Whitehaven	do.
*Fine Building Grade, Wandsworth Park	Belfast Corporation	H. T. Graddon, Architect, Durham	do.
*Sewers, Thripp, Gloucester	Durham County Council	P. R. Smith, Civil Engineer, Port Talbot	do.
*Asylum Works, Chatham, near Canterbury	Matlock U.D.C.	Borough Engineer, Town Hall, Havestock Hill, N.W.	do.
*Abattoir, Stewart-street	Manchester Corporation	Neil Taylor, Architect, 26, Temple-street, Aylesbury	July 18
*Bridges Works, Bishop Auckland, &c.	Bourne-mouth Town Council	C. S. Cole, Engineer, Bridge House, Ely, near Stroud	do.
*Driving an Adit, Matlock Moor	Darfield (Yorks.) U.D.C.	W. J. Jennings, Architect, 4, St. Margaret's-street, Canterbury	do.
*Business Premises, Sherburn Hill, Durham	Leicester Guardians Council	City Surveyor, Town Hall, Belfast	do.
*Underground Lavatories, Stevenson-square	Grimby Corporation	W. Crozier, Civil Engineer, Shire Hall, Durham	do.
*Sewers, Wimborne-road, Winton	Coventry Guardians	J. Diggle, Engineer, Town Hall, Matlock	July 19
*Sewerage Works (Contract B)	Leeds Corporation	City Surveyor, Town Hall, Manchester	do.
*Infirmary, North Evington	Leeds Corporation	F. W. Lacey, Borough Engineer, Town Hall, Bournemouth	July 21
*Builders Work	Darfield (Yorks.) U.D.C.	Fairbank & Son, Civil Engineers, 14, Lendal, Yorks	do.
*Alterations to Premises, Gosford-street	Grimby Corporation	Giles & Co., Architects, 25, Craven-street, W.C.	do.
*Underground Conveniences, Kirkgate Market	Coventry Guardians	W. A. Vignoles, Engineer, Electricity Works, Grimby	do.
*School Works, Chapel-street, &c.	Leeds Corporation	H. T. Tickner, Architect, 7, Bishop-street, Coventry	do.
*Additions, &c., Prince Albert Inn, Aberlone	Luton School Board	H. W. Chantaway, Architect, Trinity Churchyard, Coventry	do.
*Stables, &c.	Abertillery U.D.C.	City Engineer, Municipal Buildings, Leeds	do.
*Library, Fairfield-road	Elington-upon-Thames Corp.	J. K. Brown & Son, Architects, Castle-street, Luton	do.
*Twelve Cottages, Brithdir, Wales	Building Club	Smith & Davies, Architects, Aberdare	do.
*Electricity Generating Station	Finchley U.D.C.	J. McEwan, Surveyor, 1, King-street, Abertillery	do.
*Paving and Making-up New Street	Camberwell Borough Council	J. A. Cox, Architect, 4, Adam-street, Adelphi, W.C.	do.
*Foundations of New Land Registry Offices	Commissioners of U.M. Works, &c.	E. A. Johnson, Architect, Merthyr	do.
*Additions, &c., to School & Asphalting Playground, &c.	Chelsea Guardians	Chit. Engineer, 2, Broadway, Finchley, N.	do.
*Painting, &c., Infirmary in Cal-street	Willesden District Council	Council's Engineer, Town Hall, Camberwell	do.
*Observation Block (Isolation Hospital)	Kent County Council	H. Tanner, Architect, H.M. Office of Works	July 22
*Road Making and Paving Works	Walhampton U.D.C.	Clerk's House, Chapel Back, Llangorund, near Bridgton	do.
*Reconstructing Hampstead-lane Bridge, Valding	Motherwell (N.R.) Town Council	Clerk to the Guardians, 295, King-street, Colne	do.
*Gas House at Electric Generating Station	G. W. & G. C. Rye Jnt. Comm.	Council's Engineer, Dynevor-road, Barn, N.W.	do.
*Waterworks, &c., at	St. John's Hamstead Guardians	County Surveyor, 88, Week-street, Maidstone	do.
*Thirty-six Cottages, High Wycombe	Adelphi U.D.C.	Chief Engineer, Paddington Station	do.
*Exterior Painting and Cleaning Work	Metropolitan Asylum Board	The Clerk, Workhouse, Hampstead, N.W.	do.
*Making-up Streets	Southborough (Kent) U.D.C.	Council's Surveyor, Council Offices, Aldershot	do.
*Stables, Cart Sheds, and other Buildings	Wirral R.D.C.	Office of the Board, 5, Bankman-street, E.C.	do.
*Cleaning and Painting and Sanitary Works, Sutton	Runcorn U.D.C.	R. E. Buchanan, Civil Engineer, 4, Castle-street, Londonberry	July 23
*Heating system Hall, Loughborough	City of Dublin Electric Supply Co.	T. Davies, 31, Kingsland-road, Brixton	do.
*Pumping Station, Upper Heydon	Commissioners of U.M. Works, &c.	Council Office, 30, High-street, Buxton	July 23
*Seven Houses, Walker-lane, Little Sutton	Ramsgate Corporation	City Engineer, City Hall, Dublin	July 29
*600 tons Granite and Gravel, &c.	Wanstead U.D.C.	H.M. Office of Works, Storey's Gate, S.W.	July 31
*Subway under Grand Canal Dock	Tottenham U.D.C.	C. H. Breasey, Council Offices, Wansford	do.
*Erecting Telegraph Office, Southampton Dock	Wanstead U.D.C.	J. Miller, Architect, 15, Wyndham-square, Glasgow	do.
*Sea Defence Works, &c., East Cliff	Chesterfield Union	Council's Engineer, 714, High-road, Tottenham	Aug. 6
*Artificial Stone-paving	Messrs. Bodley Bros. & Co.	Surveyor, Council Offices, Wansford	Aug. 11
*Additions to Central Station Hotel, Glasgow	Johannesburg Municipality	Rollinson & Son, 17, Corporation-street, Chesterfield	Aug. 11
*Fire Station Depot Buildings, &c., Conway-road		E. Evans, 17, Hanbury-road, Bargoed	do.
*Norwegian Granite Edge Kerb, Chigwell-road		W. H. Oxley, 9, Toller-lane, Marnham	do.
*Kerbs in Infirmary, &c.		D. W. Washbrook, Architect, Low-street, Kington	do.
*Restoration of Holy Trinity Church, Havestock Hill		J. A. Lucas, Architect, High-street, Ketter	do.
*Two Cottages, Aber, Bargoed, Wales		E. W. Catling & Co., St. Dunstan's Hill, E.C.	do.
*Seven Houses, Toller-lane, Bradford			do.
*Four Houses, Wacey, near Braithwaite, Private Drainage			do.
*Roof Works, Old Quay Foundry, Exeter			do.
*Manhole Covers, Iron Columns, Joists, Piping, &c.			do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Building Construction Teacher	County Council of Middlesex	Not stated.	July 17
*Building Construction and Geometry Teacher	do.	15s. per evening	July 19
*Clerk of Works	Chesterfield Union	44s. per week	July 25
*Inspector of New Buildings and Private Drainage	Shaughat Municipal Council	210l., &c.	No date
*Superintendent of Cleaning and Scavenging	do.	210l., &c.	do.
*District Superintendents	do.	250l., &c.	do.
*Clerk of Works for Buildings	do.		do.

Those marked with an asterisk (*) are advertised in this Number. Competitions p. iv. Contracts pp. vi. vii. & x. Public Appointments, xix.

PRICES CURRENT (Continued).

OILS, &c.		£ s. d.
Raw Linseed Oil in pipes or barrels .. per gallon	0 2 11	
" " " " " " " " " " " " " " " "	0 3 8	
Bolled " " in pipes or barrels .. " "	0 3 1	
" " " " in drums .. " "	0 3 4	
Turpentine, in barrels .. " "	0 3 0	
" " " " in drums .. " "	0 3 2	
Genuine Ground English White Lead .. per ton	21 0	
Red Lead, Dry .. " "	20 0	
Best Linseed Oil Putty .. per cwt.	0 8 6	
Stockholm Tar .. per barrel	1 12 0	
VARNISHES, &c.		Per gallon.
Fine Elastic Copal Varnish for outside work ..	£ s. d.	
Best Elastic Copal Varnish for outside work ..	1 0 0	
Best Elastic Carriage Varnish for outside work ..	0 16 0	
Best Hard Copal Varnish for inside work ..	0 10 0	
Best Extra Hard Church Oak Varnish for inside work ..	0 10 0	
Fine Hard Copal Varnish for inside work ..	0 16 0	
Best Black Japan .. " "	0 10 0	
Best Hard Carriage Varnish for inside work ..	0 16 0	
Extra Pale Paper Varnish .. " "	0 12 0	
Best Japan Gold Size .. " "	0 10 0	
Best Black Japan .. " "	0 10 0	
Oak and Mahogany .. " "	0 9 0	
Brunswick Black .. " "	0 8 6	
Berlin Black .. " "	0 16 0	
Knocking .. " "	0 10 0	
Best French and Brush Polish .. " "	0 10 0	

NOTE.—TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR, those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100, unless in some exceptional cases and for special reasons.]

* Denotes accepted. † Denotes provisionally accepted.

ALLERTON BYWATER (Yorks).—For the erection of seven houses. Messrs. Garside & Pennington, architects, Pontefract. S. Mason, High-street, Castleford. £1,200

BRIGHTON.—For the erection of two pavilions and a mortuary at the Borough Sanatorium, Bear-road. Mr. F. J. C. May, C.E., Town Hall, Brighton. Rowland Bros. £25,280 Longley & Co., Crawley. 24,865 W. E. Noakes. 23,295

BURNHAM-ON-CROUCH (Essex).—For house and post-office. Mr. R. Mawhood, architect, Chelmsford. C. Read, sen. £675 Baker & Sons, Daur. J. Bishop. 675 bury† £575 F. J. Prior. 615

CIRENCESTER.—For rebuilding the Brewers Arms Inn, Cricklade-street, for Messrs. T. & J. Arkell. Messrs. William Drew & Sons, architects, Regent Circus, Swindon. Quantities by the architects. G. F. & E. New. Saunders & Sons, combe. £1,250 Ltd. £1,191 Drew Bros. 1,930 [All of Cirencester.]

Supplies for the London School Board:—

Contractors.	Large Attendance Boards.	Needlework Boards.	Long Arms.	Time Table Frames, No. 1.	Time Table Frames, No. 2.	Time Table Frames, No. 3.	Carving Benches.	Infants' Forms.	Hat and Coat Stands (complete).	6 ft. by 3 ft. 6 in. Tables.	Cutting-out Tables.
	each.	each.	per doz.	per doz.	per doz.	per doz.	each.	each.	each.	each.	each.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
H. Bouneau	0 18 3	0 10 0	3 12 0	2 7 6	2 0 0	3 10 0	1 14 6	0 12 6	1 10 0	3 6 0	3 7 0
W. A. Wauys	1 7 0	1 9 6	1 10 0	2 6 0	2 8 0	2 7 6	1 13 0	0 11 4	1 15 0	3 11 0	3 10 0
Fisher, Son & Weaver	1 0 11 6		2 2 0								
General Builders, Ltd.	1 2 6	2 1 0	2 2 0								
Godall, Lamb, & Highway, Ltd.	1 3 0	0 18 3	2 0 0	7 10 0	3 12 0	4 0 0					
Hammer & Co., Ltd.				4 4 0	3 8 0	3 7 0					
Lasselles & Co.							2 2 0	0 12 6	1 10 0	3 6 0	3 7 0
London School Furniture Co.	1 1 0	0 17 0	* 12 0	2 0 0	* 15 6	2 10 0	* 12 6	0 12 6	1 15 0	3 11 0	3 10 0
Marchant & Hirst			2 2 0	3 12 0	3 2 0	3 15 0	3 10 0	1 10 0	3 10 0	5 10 0	6 0 0
Richard Smith	1 10 0	0 14 6					2 8 0	0 18 6	4 4 9	4 10 0	4 4 0
Spencer & Co.			4 10 0	3 2 0	2 8 0	2 10 0				* 3 2 0	* 3 0 0
Wake & Dean, Ltd.	0 16 6	* 0 14 2									

[See also next page.]

CRICKLADE.—For erecting house, Fiddle Farm, Cricklade, for Mr. W. B. Heberden, C.B. Messrs. Wm. Drew & Sons, architects, Regent Circus, Swindon:— T. L. Franklin, Cricklade. £425

KIRKCALDY.—Accepted for the erection of new cookery and class rooms at Gallatoun Public School, for the Dysart Borough School Board. Mr. D. Forbes Smith, architect, Kirkcaldy. Quantities by the architect:—

Masonry.—Balfour Bros., Sinclairtown £317 7 0
Plumbing.—Blyth & Dingall, Sinclairtown. 304 1 7
Joinery.—D. Wishart, Pathhead. 722 3 7
Slating.—Robt. Page, Pathhead. 78 0 0
Plastering.—John Easton, Kirkcaldy. 308 2 0

LEEDS.—For the erection of public baths and library, York-road, for the Corporation. Mr. H. A. Chapman, architect, Prudential Buildings, Park-row, Leeds:—
Excavating, Bricklaying, and Me.
Sewery.—Paul Rhodes. £10,397 9 9
Joinery.—Banks Mawson. 3,295 0 0
Slating.—Pickles Bros. 350 0 0
Plastering.—T. Moore. 463 0 0
Plumbing.—G. Thompson. 1,350 0 0
Ironfoundry.—Perkins & Co., Ltd. 997 15 0
Painting.—Koyance & Horsfield. 248 10 0
[All of Leeds.]

NOTTINGHAM.—For the erection of Wesleyan Church, St. Ann's Well-road. Mr. A. E. Lambert, architect, 22, Park-row, Nottingham:—
J. G. Thomas. £4,150 T. Cuthbert. £3,732
Vickers & Son. 4,120 Wm. Maule. Not
J. Wright. 4,100 tingham. 3,685
T. Barlow. 3,880
[Architect's estimate. £3,700.]

NUNEATON.—For the construction of a brick culvert, Coventry-street and Mill-walk, for the District Council. Mr. J. S. Pickering, C.E., Council Offices, Nuneaton:—
J. Wilson. £2,227 H. Mason. £847
W. Cunliffe. 875 Thos. Smith, Nuneaton. 845
A. Jewell. 870

RUSHDEN (Northants).—For the erection of business premises, High-street, for the Co-operative Society, Messrs. Cooper & Williams, architects, Rushden and Kettering. Quantities by the architects:—
J. Buckley. £4,065 0 Co-operative
R. Marriott. 3,875 0 Builders. £3,594 0
Frank Henson. 3,840 0 T. Swindall. 3,588 0
T. Wilmot, jun. 3,769 0 T. & C. Berrill. 3,485 0
Geo. Henson. 3,745 0 Whittington. 3,485 0
H. Sparrow. 3,720 0 Tomlin. 3,477 0
Brown & Son. 3,716 0 Bayes & Son, Rushden. 3,443 0

SPRINGFIELD (near Chelmsford).—For the erection of a small detached residence, Queen's-road, Springfield, for Mr. Leech. Messrs. Clare & Ross, architects and surveyors, Chelmsford, and 1, West-street, Finsbury-circus, E.C.2.
F. Weight. £345 F. Johnson. £690
W. Fincham. 778 Moss & Co. 671

STOCKFIELD-ON-TYNE (near Newcastle).—For the erection of detached house on a new building estate. Messrs. Clare & Ross, architects and surveyors, Chelmsford, and 1, West-street, Finsbury-circus, E.C.2.
Geo. Watson & Son, Stockfield. £778

STRABANE (Ireland).—For the erection of eighteen cottages, for the Rural District Council. No. 1, Strabane. Mr. William Stuart, architect, Bowling Green, Strabane. Quantities by the architect:—
T. Allan, Dunamangaugh (one cottage). £155 0
D. Ward, Douglas-bridge (one cottage). 108 0
J. O'Brien, Gieble, Six Mile Cross (four cottages at £140 each). 560 0
D. M'Shane, Fyfin, Strabane (one cottage). 147 0
D. M'Shane, Fyfin, Strabane (two cottages at £123 10s. each). 247 0
T. Allen, Dunamangaugh (two cottages at £100 each). 240 0
T. Allen, Dunamangaugh (one cottage). 140 0
D. McCaffrey, Strabane (one cottage). 165 0
Donnell & Co., Strabane (two cottages). 256 0
Donnell & Co., Strabane (three cottages). 445 10

SWINDON.—For new stables at the King's Arms Hotel and Lord Raglan Inn, Swindon, for Messrs. T. & J. Arkell. Messrs. William Drew & Sons, architects, Regent Circus:—
Tydeman Bros. £390 J. Lay. £322
C. Williams. 330 A. J. Colborne. 305
[All of Swindon.]

SWINDON.—For the erection of new latrines, Even Swindon Schools, for the Swindon School Board. Messrs. William Drew & Sons, architects, Regent Circus, Swindon:—
Tydeman Bros., Swindon. £330
[Four tenders received.]

SWINDON.—For additions to No. 27, Curtis-street, for Mr. J. H. Carpenter. Messrs. Wm. Drew & Sons, architects, Regent Circus, Swindon:—
Tydeman Bros., Swindon. £214 12 6

WEST HAM.—For the erection of the Shipman-road schools, Custom House, for the West Ham School Board. Mr. William Jacques, architect, 2, Fen-court, E.C. Quantities by Messrs. R. L. Curtis & Sons:—
W. Gladding. £19,921 Simpson & Co. £26,894
G. Sharpe. 30,092 A. E. Symes. 26,620
B. Bailey, Sons, & A. Reed. 26,584
Holmes. 27,066 W. J. Maddison. 26,325
Holliday & Green-wood. 26,692 Gregar & Son. 25,763

WEST HAM.—For the erection of special schools for crippled and defective children on a site at Grange-road, Plaistow, for the West Ham School Board. Mr. William Jacques, architect, 2, Fen-court, E.C. Quantities by Messrs. R. L. Curtis & Sons:—
J. Noakes. £9,138 A. E. Symes. £7,177
Maple & Co. 7,370 Gregar & Son. 7,074
A. Reed. 7,200 North Bros. 6,881
G. J. Hosking. 7,200 W. J. Maddison. 6,703

WORTHING.—For the erection of a chimney-shaft at electric generating station, High-street, for the Corporation:—

	£ s. d.
Danton Lee	850 0 0
A. Vye-Parminter	1,240 0 0
The London Boiler & Setting Co.	1,440 0 0
Myles & Warner, Stalybridge	1,560 0 0
Neile & Co.	690 0 (1)
Alphons Custodis Chimney Construction Co.	650 0 (2)
W. Gilbert	679 0 (1)
The Universal Engineering Co.	604 0 (2)
Wilson Bros. & Lamplough	1,090 0 0
J. Pennington	1,000 0 0
Smith Bros.	1,411 12 6
Field & Co.	1,185 0 0 (1)
	825 0 0 (2)
	825 0 0
	680 0 0
	695 0 0
	950 0 0

YSTRAD RHONDDA (Wales).—For the erection of twelve houses, for the Tynllyd Building Club, Ystrad Rhondda. Mr. Jas. Jenkins, architect, 57, Gelligall-road, Ystrad Rhondda. Quantities by contractors tendering:—
John Rees. £235 W. E. Willis. £195
Thos. Reynolds. 203

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following lists of tenders. Mr. T. J. Bailey is the Board's Architect:—

* Recommended for acceptance.

BOUNDARY-LANE.—Improvements:—
Holliday & Green-wood, Ltd. £16,131 J. Appleby. £15,276
Garrett & Son. 16,026 J. & C. Bowyer. 14,778
F. & H. F. Higgins. 16,021 Smith & Sons, Ltd. 14,573
W. Downs. 15,673 Simpson & Co. 14,440
J. & M. Patrick. 15,620 Johnson & Co. 14,427
Treasure & Son. 15,588 T. L. Green. 14,287
Marsland & Sons. 15,575

Contractors.	Folding examination desks. Per 450.	Folding examination desks. Per 300.	Folding examination desks. Per 200.	Folding examination desks. Per 100.	Folding examination desks. Per 50.
Bennet Furnishing Co.	£ s. d. 382 10 0	£ s. d. 255 0 0	£ s. d. 178 10 0	£ s. d. 87 10 0	£ s. d. 45 0 0
T. Cruwys	450 0 0	300 0 0	200 0 0	100 0 0	50 0 0
Educational Supply Association, Limited.	365 0 0	250 0 0	167 10 0	84 5 0	42 3 9
Fisher, Son, & Weaver	*202 10 0	*195 0 0	*130 0 0	*55 0 0	*32 10 0
Hammer & Co., Ltd.	357 10 0	252 10 0	173 6 8	89 3 4	45 16 8
London School Furniture Co.	367 10 0	245 0 0	195 0 0	82 10 0	42 10 0
North of England School Furnishing Co., Ltd.	*309 7 6	*207 10 0	*140 0 0	*70 0 0	*35 0 0
Spencer & Co.	731 5 0	491 5 0	330 0 0	—	—

BRACKENBURY-ROAD.—Removing existing partition and providing two new partitions in order to re-divide classrooms D and E into three rooms, including reversing stepped flooring in these rooms in order to obtain left light; also altering position of doorway in connexion with same:—
S. Polden £236 0
H. Bouneau 313 12
General Builders, Chinchin & Co. 243 15
Ltd. 267 0
Galbraith Bros. 257 0

PLASSY-ROAD (all departments).—Sliding glazed partition to divide class-room B; including a new doorway to one of the divided rooms (infants' department):—
H. Bouneau £430 0
H. Groves 387 0
Laney & Son 373 10
G. Kemp 350 0
G. Bush 364 0

REDVERS-STREET (girls' department).—Providing a glazed partition to divide class-room D; also reversing stepped flooring in one of the divided rooms in order to obtain left light; including lengthening two windows and bricking up fireplace in connexion with same. (Infants' department).—Providing a glazed partition to divide the corresponding room in this department, together with reversing stepped flooring in both rooms; including widening three windows, forming new doorway, and bricking up fireplace in connexion with same:—
Johnson & Co. £620 0
Grover & Son 488 0

ALTERATIONS and repairs to adapt No. 37, Kentish Town-road for a workshop and store for own workmen for the Marylebone District and for a clerk of works' office:—
Wall & Co. £285 0
Chinchin & Co. 217 0
Marchant & Hirst 168 0
T. Cruwys 170 0

ALTERATIONS and repairs to adapt premises adjoining the Hatfield-street School, for a workshop and store for own workmen for the Southwark District and for a clerk of works' office:—
H. J. Williams £307 10
Marshall & Sons 298 0

CLEANING, painting, and repairing Nos. 31 and 33, Albion-street, Southwark:—
T. Wilson £276 10
J. F. Holliday 229 0
Margie & Son 213 0

B. NOWELL & CO.
STONE MERCHANTS & CONTRACTORS.
Chief Office.—Warwick Road, KENSINGTON.
Norway, Guernsey, and Leicestershire
Granite, Kerb, Pitching, and
Yorkshire Stone.

ESTIMATES GIVEN FOR EVERY DESCRIPTION OF ROAD MAKING.

SUPPLY of the following articles, &c., on running contracts:—

Contractors.	Letter Boxes, each	Shifting Spanners, each
Bird & Co.	*0 14 0	3 9
Davis & Co., Ltd.	1 3 6	*3 4
Rowland Hodges	0 17 8	—
Green Art colour sail cloth blinds, with spring rollers inclusive of all necessary fitting, fixing, &c. per ft. super.	0 17 8	Do. with single action roller. per ft. super.
Harriet Evans.	*0 78	*0 6
Gauron & Son 0 9	0 9	0 7
Janes & Son 1 0	1 0	1 0
Tidmarsh & Son *0 7	*0 7	*0 5 1

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Premises, Cannon-street, Birmingham.....	Messrs. Bateman & Bateman, Architects.
Printing Premises, Cornwall-street, Birmingham.....	Messrs. Bateman & Bateman, Architects.
A Street Front.....	Designed by Mr. W. Moss Settle
Office Buildings : 4, Coleman-street, E.C.....	Mr. E. Flint, F.R.I.B.A., Architect.
Three Cottages, Wolves Newton.....	Mr. A. Jessop Hardwick, Architect.
Club-room, Beefsteak Club New Premises.....	Mr. F. T. Verity, F.R.I.B.A., Architect.

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The Fallen Campanile.



I was with a sense of incredulity, of hardly believing our own eyes, that many of us must have read the announcement in the papers of Tuesday of the Fall of the Campanile of St. Mark. The catastrophe came upon the world so suddenly and without warning, for the signs of some instability of the tower, and the precautions which had just been taken to warn people away from its immediate vicinity, do not seem to have made their way to public notice much beyond Venice. It is a strange fate that this sudden collapse should be the end of an erection of which Fergusson rather harshly observed that "its size, its height, and its apparent solidity, are its only merits"; and on which only a few days ago the writer of an article on "Impressions Venetiennes" in the *Revue Générale* observed that "son énormité fruste avait, sous le baïser lumineux du matin, un air d'héroïque jeunesse."

From first to last the life of the tower counts almost 1000 years, for it was founded by Tiepolo in 902, but this only represents the life of the foundations and of the lower portion of the structure, not of the whole as we have been accustomed to see it. From some reason or other, very likely connected with intestine warfare and the consequent unsettled state of things, it took the Venetians two hundred and fifty years to carry it up to the then lantern or *cella* stage, and another quarter of a century to finish the *cella*. Fergusson, in his "History," suggests that at this period its general appearance was probably very similar to that of the tower of Piacenza Cathedral; a plain stalk with long pilaster-like features, an arcaded belfry stage, and a short circular spire planted on the top of this. But the

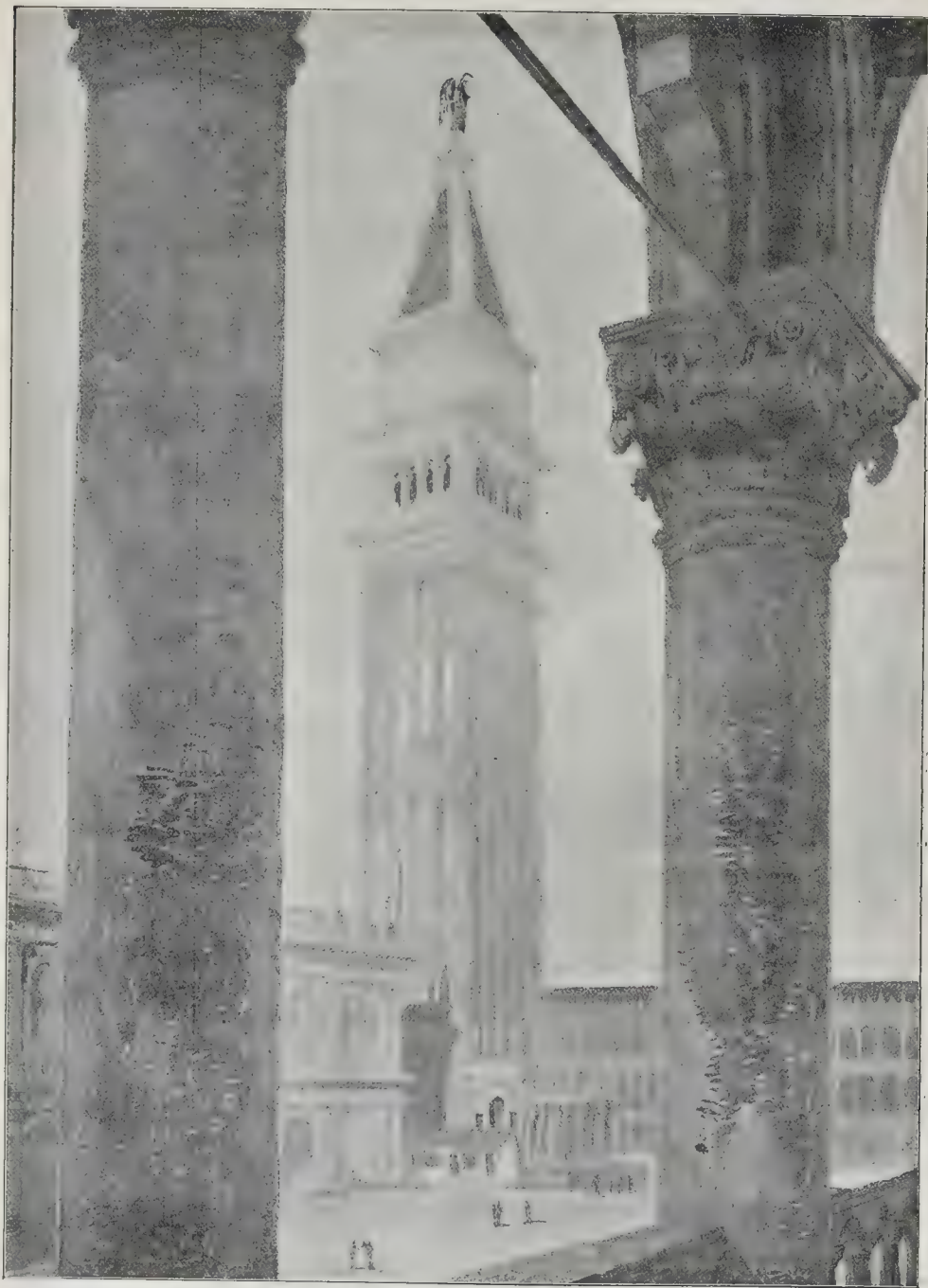
Campanile, though called in ordinary parlance the Campanile of St. Marks, has really no connexion with the basilica, and is not so much a church tower as a civic tower, an emblem of the power of Venice. Hence it was thought, in after time, that it was not large or resplendent enough for the occasion, and the whole of the arcaded story was rebuilt, probably the cornice below much increased in scale and dignity, and the awkward-looking square box stage was built over it, apparently simply as a means of gaining height, for it has no architectural significance and certainly no architectural beauty. The existence of this box story seems sufficient to show that the stalk of the tower was not raised, and that the arcaded story was at the same height as the original one; for if they had commenced raising the stalk higher, they would surely have continued that much better and more architectural method of gaining increased height. But the tale told by the structure seems to us to be, that the arcade story was first rebuilt at its old height, merely to give it a more ornate and sumptuous appearance, and afterwards came the conviction—"It is not high enough; we must raise it further"; and so followed the interposition of what we call the box story between that and the square spire which was to be the ultimate crown of the edifice. All this was done about 1510 by Maestro Buono, who decorated it with marbles brought from Greece and from other parts of Italy, in accordance with the long-entertained covetous habit of the Venetian Doges in regard to the rich materials owned by other states.

The æsthetic judgment of Fergusson on the tower, though as observed, it sounds harsh to minds full of the spell of Venice, is we think correct. The Campanile had gained a kind of glamour from its association with the wonderful city, and its proximity and nominal association with a building of such romantic beauty as St. Mark's, not to speak of the other structures of world-wide fame contiguous. Taken by itself, and apart from these associations, it was unquestionably a

somewhat ugly and clumsy erection, its chief architectural merit lying in the stern and rugged simplicity of the lofty stalk with its long vertical striations of pilasters. But we do not mean to imply that its loss to Venice is any the less. It had become so inseparably associated with the finest and most monumental portion of the "triumphant city" that one cannot feel that Venice can ever be the same without it; and to those who lived there and had seen it as a daily object of their lives we can well understand that the catastrophe must be almost heart-breaking. No attempt can be made to rebuild it; that would merely be a mockery.

Whether we shall ever have positive evidence as to the cause of the disaster is doubtful, as the fall has destroyed the evidence, unless the deep foundation may have any evidence to give of recent disturbance. In the Institute library is a paper in Italian by Signor Boni on the foundations of the tower, with a section, from which it appears that there was a carefully prepared foundation of stone blocks on the top of the inevitable piling, and we see that doubts are expressed in some quarters as to whether the mischief really lay with the foundations. Our own impression, however, is that the ground had probably moved below or with the piling, and that the state of the substratum of the soil of Venice is a matter for very serious consideration, in view of the safety of buildings even more precious than the Campanile. Considering what a thickness of soft and easily disturbed material must exist at Venice, between the ground surface and the uppermost firm stratum that can be arrived at, one can easily imagine how operations in dredging, and other disturbances of the ground, might cause a lateral movement of the subsoil, which would naturally make itself first felt under the heaviest structure. We may have some more information at a later date.

On the next page we give a view of the Campanile from the arcade of the Ducal Palace, from a water-colour sketch kindly lent to us by Mr. T. H. Watson.



*The Campanile at Venice: from the Arcade of the Ducal Palace. From a Sketch made in 1864 by Mr. T. H. Watson, F.R.I.B.A.
(See preceding page.)*

LIGHTNING CONDUCTORS.

SINCE Sir Oliver Lodge read his paper on "Lightning Conductors" to the Institution of Electrical Engineers, fourteen years ago, it may be questioned whether any considerable advance has been made in the theory of the methods of protecting buildings from damage by lightning. There has, however, been considerable progress made in applying the theoretical principles which he first clearly enunciated to the practical design of lightning conductors. The methodical measurements also of the electricity in the atmosphere, which have been made by careful observers for many years, are at last giving us some useful data. It has been proved, for example, that the earth's surface has a permanent negative charge, and that the upper regions of the atmosphere have a permanent positive charge. It has been observed that strong winds favour the dispersion of the electric charge, and also that a rise of temperature, a rise in the barometric pressure, or a rise in the humidity of the air, are all effective in dissipating differences of electric pressure. Sunlight accelerates the dispersion of a negative charge of electricity, and hence it also prevents electric storms. The invention of the coherer gives us a means of detecting storms at considerable distances, and M. Tommasina has invented an ingenious instrument founded on the properties of the newly-discovered element, radium, by means of which he has listened to storms taking place hundreds of miles away. It is thus possible, nowadays, to predict electric storms, and in the future it may be customary to take special precautions when a thunderstorm is threatening. This is already done in many towns of America to protect the plant in tramway stations from possible damage by lightning, the arresters which consume a considerable amount of power being put in the circuit only when a storm is threatening.

We have received from the General Electric Co., of Queen Victoria-street, a catalogue describing the air-to-earth system of lightning conductors devised by Mr. Killingworth Hedges, and it will be useful to consider how far this system is in accordance with theory, and to suggest possible developments in appliances for protecting buildings from lightning which may take place in the immediate future.

It will be remembered that in Lodge's paper great stress was laid on the difference of the action of lightning conductors when the difference of pressure between the cloud and earth was gradually established and when it was instantaneously attained. The latter was caused by a lightning discharge between two clouds suddenly altering the potential of one of them, so that it overflowed to earth; and in this case we have what Lodge calls an impulsive rush of electricity which severely tests the protective power of any system of lightning conductors. In the former case he proved that the silent brush discharge from points was energetic in equalising the electrical pressures, and so tending to prevent a lightning flash altogether. When a flash does happen under these circumstances, then it invariably strikes one of the points on the conductor, as the brush discharge produces electrified air in

the neighbourhood of these points, which is a good conductor of electricity. Lodge, however, gives reasons for supposing that this kind of lightning flash is very rare, at least, in this country. Thunderstorms are nearly always accompanied by rain, and lightning flashes in the rain must be caused by a difference of pressure instantaneously established.

The functions which a lightning rod constructed according to modern theory has to fulfil are thus twofold—namely, producing an action which tends to prevent a lightning flash at all; and, secondly, it must be able to carry off an impulsive rush of electricity to earth. Many attempts have been made to measure the current produced in a lightning rod struck by a flash. It has been proved that the average current is something of the nature of 10,000 amperes, and that it attains its maximum value in something less than the ten-thousandth part of a second. It will be seen, then, that the inductive resistance of a lightning rod is of far greater importance than its ohmic resistance.

In Mr. Hedges's system we have horizontal conductors carrying points or clusters of points (aigrettes) at short distances apart, and they are all in electrical connexion with the vertical conductors. These points must be fairly effectual in preventing the differences of pressure ever becoming so great as to cause a lightning flash.

German statistics seem to prove that the erection of numerous lightning conductors in a town diminishes the annual number of lightning flashes, and it is well known that the cutting down of forests in certain districts has increased the number of thunderstorms in these districts. It seems natural to suppose that the pointed branches and leaves were active in preventing lightning flashes. The comparative immunity of districts thickly covered with fir-trees from damage by lightning could be explained in a similar way, the cones and needle-like leaves preventing large accumulations of electricity on the earth's surface.

It seems to us that in some cases it might be desirable to increase this electric discharge from the earth. It has been proved recently that the discharge from points in motion is very much greater than when they are at rest. Hence a small metallic windmill with points at the ends of its vanes on the roof of a building would be very effective in preventing dangerous differences of pressures. If necessary the vanes could be rotated mechanically or electrically on the approach of a storm.

Another method which seems to us quite feasible is to put some strongly radio-active body in contact with the lightning conductor. The effect would be to make all the air round the radio-active substance a conductor for electricity, and hence, not only produce rapid electrical discharges from the earth, but also, if there was a flash, it would naturally take place through the conducting air to the lightning conductor. The extraordinary effects produced by uranium, thorium, polonium, and especially radium, are now fairly well known to physicists; there seems to us to be no reason why inventors should not apply these properties to lightning conductors. There seems to be a wide field open for experiment in this direction.

We mentioned last year, when describing the lightning conductors designed by Mr.

Hedges for Westminster Abbey, that it was an open question whether it was really advantageous to have them detached from the building or not. The holdfasts or clamps for keeping the conductor from the wall are of metal, and we suppose that they must be firmly fixed into the masonry. Might not the impulsive rush of electricity proceed along one of these clamps to some narrow metal strip in the neighbourhood? The more we consider the problem the more we think that it is unnecessary to support the conductor at some distance away from the building. If we had long electric wires or gas-pipes inside the building parallel to the lightning-rod, then it would be advisable not to have them too close together, owing to the danger of side flash, but we think that the requisite distance apart could always be got without the necessity of holding the conductor away from the wall.

The General Electric Co. point out that there are no screw threads or removable metal parts in the Hedges's system of lightning conductors. This is stated to be an advantage, as there is no danger of oxidation being set up by the loosening of the screws, and hence there is no danger of the resistance of the joint becoming so great that the lightning flash is diverted to some neighbouring conductor like a rain-water gutter or pipe and doing damage. It seems to us that this would be an infinitesimal advantage. The oxidation would only alter the ohmic resistance of the joint, the inductance would remain practically the same, and this latter factor is the all-important one.

Mr. Hedges's "tubular earth" is a very great improvement on the old-fashioned earth plates. The latter, when properly fixed, are quite satisfactory, but it is impossible to tell whether they are properly fixed or not without digging them up. We have measured the ohmic resistance between a lightning-conductor and a water-pipe, and found that it was only a few ohms, and yet the end of the lightning-conductor was only buried 3 ft. in dry soil and tied to a brick. It is only fair to add that it had protected a chimney shaft for many years quite satisfactorily. However, it does not do to leave anything to chance, and so we welcome the "tubular earth."

If a system of lightning conductors could be designed which would dissipate the earth charge so rapidly that it would be practically impossible for a lightning flash ever to occur between the building they protect and the clouds, it seems to us that this system would be by far the most desirable. With our present systems it seems impossible to absolutely protect any building from an impulsive discharge. We hope, therefore, that some physicist will suggest a method of utilising the power that radio-active substances possess of dissipating electric charges, to the protection of buildings from lightning strokes.

THE NEW DICTIONARY OF ARCHITECTURE.

THE new Dictionary of Architecture from across the Atlantic, to the first two volumes of which we have already referred, has been completed within a much shorter period than is usual in the case of publications of this kind, a fact which testifies to the business-like manner in which it has been con-

ducted. The third and concluding volume is now before us.* In the preface to the third volume the editor specially expresses his recognition of the manner in which the contributors have seconded him, observing that "The scheme of the Dictionary has never been disturbed or made difficult by any unwillingness on their part to conform to it." The Dictionary in itself is evidence of this, in the due proportion kept between the length of articles in comparison with the relative importance of their subjects. This, in too many cases, is one of the difficulties in the arrangement of a Dictionary, that many contributors on special subjects are so much interested in their subject, and have so much to say about it, that they are desirous of amplifying the article to a length and fulness of detail quite out of proportion to the general scope of the publication. We could name Dictionaries—Grove's "Dictionary of Music" for one—in which some subjects are treated at ten times the length accorded to others of equal or even more importance, showing plainly that some of the contributors had got quite out of hand. It needs, in fact, some firmness and personal power on the part of a Dictionary editor to prevent this; and while Mr. Sturgis thanks his contributors for their reasonableness, we may probably think that something of the result has been due also to his own firmness and decision.

Among the longer articles in the final volume of the Dictionary "Persian Architecture" is treated, for two out of the three sections into which it is divided, by Mr. Phené Spiers, than whom no one could be found more competent to deal with the subject. The third section, treating of Moslem architecture in Persia, is by an American contributor, Mr. A. D. F. Hamlin. "Romanesque Architecture" is in the competent hands of Mr. W. P. P. Longfellow, who gives a good definition of the subject, with a sufficient historical sketch and some typical illustrations of Romanesque detail. The important subject of "Roman Architecture" is again in the hands of Mr. Spiers. In the course of it he observes that the appliqué character of the decoration of the great Roman *Thermae* was a necessity owing to the nature of the structural materials employed, and draws attention to the contrast which is to be found in comparing the palaces, temples, and baths of Rome with those in Syria, where quarries of excellent stone existed, and the core and face of the walls were homogeneous and constructed of the same materials. He rightly remarks that "to works of a purely utilitarian character, such as the great aqueducts which still exist across the Campagna of Rome, in the North of Africa, in Syria, and in Asia Minor, the Romans probably attached but little architectural importance." These aqueducts, which appear so picturesque to us now, were in fact, to those who built them, as purely engineering works as a railway viaduct is to a modern engineer. There are, he adds, a few instances, particularly in Rome where the aqueduct crosses a thoroughfare, in which the engineer has attempted to make a display by an application of the Orders, "and this as usual is unsatisfactory." In fact, the remains of the

Roman aqueducts are among the best architectural object lessons as to the effect of a broad and simple treatment of construction without applied ornament.

"Russian Architecture" is briefly treated by the editor, and "Scotland" by Mr. Hamlin, whose aim is to illustrate the special characteristics of Scottish architecture in the Mediæval and Early Renaissance period, rightly concluding that "architecture as now practised in Scotland is in no essential different from that of England." "Sculpture" is treated at some length by the editor, from a point of view which includes such things as the carving of crockets and decorative ornament in mouldings, &c. It is perhaps rather a question whether work of this class is properly included under the term "sculpture," a word which, in common acceptance at all events, refers to a higher class of work. In regard to the state of sculpture in connexion with architecture at the present Mr. Sturgis, while saying that there has been no real progress in the way of architectural sculpture since the return of peace after the Napoleonic wars, seems nevertheless to imply that the English more than any other nation have produced work of new interest in architectural sculpture, but that "as there is but a feeble school of representative and expressional sculpture in England, this excellent work of their architectural sculptors has not obtained the influence over other nations that might well be desired." We should surmise that Mr. Sturgis is not much acquainted with the best English sculpture of the last ten years or so, or he would hardly have spoken of the school as being so feeble. French sculpture, at its best, is no doubt still at the head of all, and there is more of it than there is of English, owing in part to the far greater encouragement, public and private, which the art receives in France; but the best English sculpture of the present day is little behind the best of the French. As he says, however, of the French, their really great work in modern times has been in sculpture which, even if attached to buildings, has no necessary architectural connexion with them, but is merely, as it were, exhibited on brackets, &c., attached to the building. Some few, however, of the Paris mairies which have been occasionally illustrated in our pages during the last twenty years or so, have shown very fine examples of strictly architectural sculpture in the way of decorative figures on gables or pediments. At the present time the passion of the French in architectural sculpture seems to be for figures seated, as if accidentally, on the angles of cornices, &c., with their feet kicking over the edge; looking as if they were blown there by the wind, and might as easily be blown off again. There is a feeling of unrest about all this which is not in the true spirit of architectural sculpture.

"Stone" is treated in a good and full article by Mr. G. P. Merrill; "Temple," "Tower," and "Tomb" receive as adequate treatment as can be attained with the limits of a dictionary, "Vault" is an exceedingly good article by Mr. Charles Babcock, with a great number of diagrams of vaulting; and among other important articles are those on "Ventilation," by Mr. W. J. Baldwin; "Window," by the Editor and by Mr. La Farge—the latter treating of window glass at a length rather disproportionate to the archi-

tectural section of the article; and "Wood," by the Editor, from whom we get the information that "in the United States wood is hardly seasoned at all," with the natural results, which are referred to in the same sentence. This seems very characteristic of the American nature, which cannot wait, but must have everything in a hurry.

While however we welcome this as a very good and useful Dictionary of Architecture, which has been carried out with great ability and rapidity, there are some articles in it which appear to us to be out of the proper scope of a dictionary, and to have been inserted for the opportunity of expressing some opinions on various points of aesthetic criticism. "Preliminary Studies" is one of these. The meaning of the words is obvious to every one acquainted with the English language, and it is not the business of a dictionary to cover seven and a half columns with reflections on the proper value and use of preliminary studies in artistic work. A dictionary is to give information; this is not information, but art-criticism. "Refinements in Design" is another doubtful subject; it is not a technical term, and the article is here made use of to recommend the very doubtful views of some American critics in regard to the supposed variation from parallel and symmetry in mediæval and Renaissance buildings, for the sake of aesthetic effect. This idea, to the extent to which it is now pushed by its supporters, is a "hobby"; and hobbies have no proper place in a dictionary. "Restoration" has come to have such a technical meaning that perhaps its inclusion was justified, but a brief explanation of its general meaning was alone required, not an essay (even a short one) on the rights and wrongs of restoration. We can hardly agree, by the way, with Mr. Sturgis, that the influence of the French *Commission des Monuments Historiques* has been very beneficial. Some French artists, we know, are very strongly of the opposite opinion. The *Commission* has done valuable work in records and in a splendid series of illustrative drawings, but it has done great and irreparable injury to the archaeological verity of many buildings. "Truth in Architecture" is another essay, by Mr. Marshall (the author of the one on "Preliminary Studies"), well written and thoughtful, but quite out of place in a dictionary.

Among small matters we may notice that under the head of "Porte-Cochère" a correction is made, which the Editor considers of sufficient importance for special reference in the Preface, as to the really incorrect use of this word in its application to a projecting carriage porch, originally made in England, but which it appears is copied in the States. "Porte-Cochère," as is rightly pointed out, is the name for the gateway through which the carriage drives into the central court-yard of a French house. The carriage porch, as used in England, is not a "porte," or doorway, but only an erection in front of the doorway. The word has been wrested from its original proper meaning, and the correction in the Dictionary is quite called for.

Taking it as a whole, in spite of our objection to some of the articles included, we may sincerely congratulate Mr. Russell Sturgis and his collaborators on the completion of what is in the main an admirable work.

* A Dictionary of Architecture and Building. By Russell Sturgis, A.M., Ph.D., and others. Vol. III. O-Z. London; Macmillan & Co.; New York; The Macmillan Co. 1902.

NOTES.

Proposed Cape Town Exhibition.
A SCHEME for holding a British and Colonial Exhibition at Cape Town, for a period of four months from November, 1903, is, we hear, making good progress, and has the support of Lord Milner and other leading men in the Colony, as well as of the Cape Town Chamber. A site has been selected near the Botanical Gardens; the contract for the necessary buildings has been signed, and a very large number of applications for space have already been made. It is to be hoped that Home manufactures and Industries will be well represented. It will be to the interest of English firms to put in a good appearance, as they will now probably be able to find a considerable market in South Africa. The Cape Town management office is at 30, George-street, Cape Town; and the English address is Seymour-grove, Manchester.

Sculpture for the Scotsman Building.
MR. F. E. A. SCHENCK has had on view in his studio for a few days the finished clay models for some of the sculpture decoration for the new offices of the *Scotsman* newspaper at Edinburgh. The central crowning feature of the front is a *fronton* with a large niche, in which are grouped three draped female figures symbolising Peace, the centre one standing and filling nearly the height of the niche, the curve of which makes a kind of aureole round the head; the two others seated in such a position as to give them considerable projection from the wall plane. Having to occupy a position more than 90 ft. from the ground, they are necessarily treated in a very simple and bold manner. The *fronton* is finished by an obelisk, with which are grouped two very graceful nude figures of youths. Over two of the pediments of the windows in a lower portion of the elevation there are back-to-back nude female figures, one on each slope of the pediment; these are modelled on very bold lines, admirably designed for the space they are to occupy, but at the same time kept slightly flattened in section and undercut behind. As decorative architectural sculpture these pediment figures are most effective, and are among the best things of the kind which Mr. Schenck has produced.

The Bristol Electric Tramways.
THE paper on "The Bristol Tramways Electrical Installation," read to the Incorporated Association of Municipal and County Engineers by Mr. J. Clifton Robinson last week, gives a clear account of the main features of a thoroughly up-to-date traction power station. Owing to the rapid extension of the system, large plant had to be installed in a building on a very limited site. The unusual course was adopted of putting the boilers and furnaces in the floor above the engine-room, as it was desirable that the engines and dynamos should be on the ground floor. The handling of the coal, the stoking, and the removal of the ashes are practically all done automatically, the grab-bucket being capable of raising 60 tons per hour from the barges. The dynamos have been constructed by the General Electric Co. of America, and they are direct-driven by American engines. As the speed of the engines is only ninety revolutions per minute, very heavy flywheels are necessary in order to secure steady

running. These flywheels are 16 ft. in diameter and weigh 40 tons each, hence even a heavy variation in the load makes very little difference in the speed of the engines. The people of Bristol evidently appreciate the transit facilities offered by the tramways. In 1900, when only parts of the system were worked electrically, 27 million passengers were carried, whilst in 1901, when the system was completed, 37 million passengers were carried.

Chartley Castle, Staffordshire.
THIS estate, which extends over some 8,000 acres, yielding a rental computed at about 11,000l. per annum, is offered for sale by private treaty. It comprises a natural park of 1,000 acres, famed for its indigenous breed of wild white cattle—a stock that is descended from the primeval herds of Needwood Forest—the ruins of Chartley Castle, and Chartley Hall, a seat of the Shirleys, Earls Ferrers. The Hall, a moated house after the Domestic Gothic style, contains a room which had been a prison-lodging of Mary Queen of Scots, but much of the house has been consumed by fire on two occasions since that time. On an eminence close by stand the remains, consisting of two ivy-covered round towers surrounded by yew trees, of the Castle, which Randolph de Blundeville, fourth Earl of Chester, built in 1229 upon his return from the Holy Land. Earl Randolph died s.p., his sister brought the Staffordshire estates in marriage to William de Ferrers, Earl of Derby, ancestor of John, who was summoned to Parliament as Baron Ferrers of Chartley in 1299, of Sir Walter Devereux, K.G., who fell on Bosworth Field, and of Sir Robert Shirley, Baron Ferrers, who in 1711 was advanced Viscount Tamworth and Earl Ferrers. The Castle, which Robert de Ferrers, eighth and last Earl of Derby, forfeited on his attainder in the reign of King John, was subsequently restored to that family. It was replaced, as a residence, by a house constructed mainly of wood and destroyed by fire in 1781, which formed the home of the Earls of Essex (Devereux). In 1615, Dorothy, daughter of Robert, Queen Elizabeth's unfortunate favourite, married Sir Henry Shirley. In the parish church of Stowe is the altar tomb with effigies of himself and the two wives of a later Walter Devereux, K.G., tenth Baron Ferrers and first Viscount Hereford, *obit* 1558, who greatly distinguished himself in the wars with France.

ARCHITECTURE AT THE ROYAL ACADEMY:

FINAL NOTES.

THERE are comparatively few examples in the present Academy of designs for public buildings and competition drawings.

No. 1,365, "Shoreditch Town Hall," Old-street, by Mr. William G. Hunt, shows the additions which are being carried out in consonance with the older building, from the designs of the architect, who was successful in the open competition.

No. 1,367, "Club House for Halifax Golf Club," by Messrs. J. F. Walsh and G. Nicholas, is a picturesque design shown in a clever drawing of a building raised on a terrace, with a pleasant and not extravagant formal garden treatment.

No. 1,368, "New Police Station in Hyde Park," by Mr. John D. Butler, is almost domestic in treatment, following what one may call the old Kensington type, and is one of the most successful of the many police stations which are being erected in London from this architect's designs.

No. 1,371, "Public Library, Holbeck, Leeds," First premiated design by Mr. William Bakewell, is a good modern type of design in which utility is combined with art without extravagance.

No. 1,372, "New Gaiety Theatre and Restaurant," Strand, by Messrs. Ernest Runtz & Co., differs considerably from the design submitted by the authors in the abortive competition promoted by the London County Council, and evidently owes much of its difference from the former design to the influence of Mr. Norman Shaw. Some good points of the original design have vanished, and which is the better of the two is a matter of taste on which there is room for a legitimate difference of opinion.

No. 1,373, "New Banking Premises," Sunderland, by Mr. Walter H. Brierley, is an example of the usually accepted mode in bank design, solid and respectable in its classicity.

No. 1,378, "Design for Font and Decoration," by Mr. George J. J. Lacy, is one of the lesser examples of ecclesiastical design shown in a coloured drawing, in which the feeling of fifteenth century Gothic work is cleverly amalgamated with that of the new art.

No. 1,385, "New Head Offices for Elder, Dempster, & Co., Liverpool," by Messrs. Briggs & Wolstenholme, is an example of commercial architecture, ornate and somewhat pretentious.

No. 1,404, "The Shannon Factory, Dalston," by Mr. Edwin O. Sachs, is a good example of the successful artistic treatment of a factory which, without extravagance, elevates a purely utilitarian structure from the domain of mere building to the level of architecture.

No. 1,420, "Design for a Public School," by Mr. Horace C. Hide, is the Royal Academy Gold Medal and Travelling Studentship design for 1899, which, though in sympathy with the work of an architect R.A., cannot be said to be so successful as bygone treatments of a similar subject in the annals of the R.A. Gold Medal.

No. 1,423, "St. Paul's School for Girls—the Central Hall," by Mr. Gerald C. Horsley, is an interior view of which the chief feature is a large elliptical ceiling, richly decorated.

No. 1,427, "Design for Manchester Fire Station," by Messrs. Lanchester, Stewart, & Rickards, is one of the few competition designs exhibited, and cannot be said to be one of the most successful which these architects have produced.

No. 1,437, "Business Premises, Bombay," by Messrs. John Cash & M. S. Hack, is a somewhat original design with a clearly indicated Spanish feeling in the detail, and gains much in effect from the deep arcades and loggia which the climate justifies, and we might say necessitates.

No. 1,448, "Detail of the Central Electric Supply Company's Power Station, Grove-road," by Mr. Charles S. Peach, is another example of artistic factory treatment with a bold attempt at a solution of the problem of tall chimney design sought in this instance by dressing up with architectural detail of a purely extraneous character.

No. 1,462, "Liberal Club, New Ferry, Cheshire," by Mr. John J. Talbot, is a simple and quite satisfactory instance of eighteenth century treatment—picture-que without extravagance.

No. 1,476, "School of Domestic Training, Colwall," by Mr. Frederick W. Catterall, is remarkable for its picturesque grouping, and also, in common with other victims, for its position as a delicate drawing on the skirting.

No. 1,482, "A Design for the Hereford Municipal Buildings," by Mr. E. J. Milner Allen, is refined, dignified, and scholarly.

No. 1,484, "Clare House, Beckenham, Kent," by Messrs. Karslake & Forrester, appears to be a school house of the private-public kind, noticeable in design for its picturesque and quaintly irregular grouping.

No. 1,502, "Electric Station, &c., on the Severn," by Mr. George Hornblower, is another example of an artistic factory in which advantage is taken of a situation on the rocky banks of the stream, by which, combined with clever grouping and good proportion, an architectural effect is produced, without the employment of other than strictly utilitarian detail.

No. 1,505, "The 'Lord Nelson,' Ewell," by Mr. J. Hatcher Smith, is a clever resuscitation of the old world wayside country public-house.

No. 1,510, "Queen's Memorial, Spring-gardens Approach," by Sir Thomas Drew, is a good drawing of one of the best parts of this architect's design.

No. 1,527. "Extension of the Stock Exchange, London," by Mr. Robert L. Cole, is an interior view showing maintenance of the character to be seen in the detail of the former work.

No. 1,530. "Reformed Church, Rorschach, Switzerland," by Mr. Alex. Koch, is an ornate example of modern Continental Gothic.

No. 1,548. "West Riding Union Bank, Park-road, Leeds," by Messrs. Oliver & Dodgshun, departs from the usual treatment of bank buildings, certainly without success, owing to over-ornamentation and unhappy proportion.

No. 1,555. "New Offices at Newcastle-on-Tyne," by Messrs. Joseph Oswald & Sons, is an extravagantly florid design, which would very probably look better in execution than in the drawing.

No. 1,556. "Consumption Sanatorium, Delamere Forest, Cheshire: View of Main Building," by Mr. W. Cecil Hardisty, is a successful attempt to avoid the monotonous usual in hospital buildings and to produce an artistic effect.

No. 1,559. "Four Houses and Shops, High-street, Oxford," by Mr. E. P. Warren, is a clever effort to deal with the problem of shop design.

No. 1,567. "Covered Market and Corn Exchange, Hull," by Mr. Joseph H. Hirst, is modern, sensible, and admirable, good in proportion, and free from extravagance in detail.

No. 1,568. "Restaurant and Club, Stratford," by Mr. S. B. Russell, is a clever design for a street frontage, full of originality and interest.

No. 1,572. "Design for Hereford Municipal Buildings," by Messrs. Cranfield & Potter, is a good design for a front elevation.

No. 1,576. "Design for Burnley Technical Institute," by Mr. William H. Thorp, is an admirable design, well grouped and proportioned, with good detail.

No. 1,578. "Keighley Library, Main Entrance," by Messrs. A. E. McKewan & F. Swan, is a clever piece of detail based on seventeenth-century work, and with many quaint conceits justified by the particular period selected.

No. 1,579. "Mount Vernon Hospital for Consumption, country branch, Northwood, south block," by Mr. Frederick Wheeler, is another capital hospital design, showing two wings placed at an obtuse angle with a central tower.

No. 1,582. "St. Felix Schools, Southwood," by Mr. Arnold Mitchell, is a large school on the house system, the design of which, although following a simple type of eighteenth-century work, has some eccentric bits of detail which are not admirable.

Interspersed amongst the architectural drawings are, as usual, a number of designs of stained glass, as to which one can never be quite sure that the coloured drawing represents with even an approximate accuracy the effect of the finished work.

Nos. 1,393 and 1,400 are designs for respectively the east window and the west window of Christ Church, Waterloo, Liverpool, by Messrs. Shrigley & Hunt, and are large and rich examples, containing many figures and canopy work in which is much white glass in perpendicular tracery windows.

No. 1,397. "Design for Stained Glass," by Mr. George Parby, is an instance of a distinctly different treatment of pictorial character in one semicircular headed light, and is hung next to

No. 1,395. "Design for a Child's Memorial Window," by Mr. Wm. Aikman, in a three-light decorated tracery window, which is filled with glass of a modern type, in which much is made of the forms enclosed by the lead came. The examples of stained glass design seem, indeed, to have been chosen with a view to illustrating the varied standpoints from which a window can be treated. Thus, in

No. 1,455. "Design for Stained Glass," by Mr. William Glasby, we have an example of a mosaic type of treatment, whilst in

No. 1,404. "Design for Window, Morley Town Hall, Yorks," by Mr. E. Stanley Watkins, we are shown an instance of the grisaille method of treatment.

No. 1,487. "St. Lawrence: Design for Stained Glass," by Mr. Robert Hancock, shows the figure of the saint with canopy work around, and is noticeable for the fine colour in the figure, combined with much white glass in the canopy. Quite near to this is

No. 1,494. "Design for Painted Glass Window," by Mr. Alexander Gascoyne, an example of painted glass commemorating the legend of

Perseus, quite an antithesis both in subject and treatment to the last.

No. 1,496. Another "Design for Stained Glass," by Mr. Alexander Gascoyne, shows a figure of St. Hugh treated in the fifteenth-century manner.

No. 1,520. Another of Mr. Gascoyne's works is a "Design for Memorial Window," which has the "Ecce Homo" for the subject, and

No. 1,521. Design for leaded glass mosaic, also by Mr. Gascoyne, is a secular subject, "Gather Ye Rosebuds"; both of these last may be correctly described as examples of glass mosaic of modern type.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

THE annual meeting of the Association of Municipal and County Engineers was held in the Lecture Theatre of the Museum, Bristol, on Thursday, July 10, Mr. T. H. Yabbicom, C.E., of Bristol, President, in the chair

Tramways.

Following the Presidential address, and a paper by Mr. Yabbicom on "Twenty-five Years of Municipal work in Bristol," reported in the last issue of the *Builder*,

Mr. C. F. Wike, C.E., City Engineer of Sheffield, contributed a paper on "The Wear and Maintenance of Tramways." He said that for some time observations had been made of the wear of the permanent way of the Sheffield tramways, and the broad results were as follows:—Length of tramways authorised was eighty-nine miles of single track, of which, up to March 25 last, fifty miles had been constructed. The rails were of girder type, $\frac{7}{8}$ in. wide on the flange, and 7 in. deep. The weight was 108 lbs. to the yard. Up to the present the rails had been rolled in 30-ft. lengths, but the most recent order provided for a length of 45 ft. The width of tread was $1\frac{1}{4}$ in., and the depth of groove was $\frac{1}{4}$ in. There was a clearance of $\frac{1}{8}$ in. between the lowest point of the wheel-flange and the bottom of the groove, and it was considered that when the rails had worn sufficiently to enable the flange to touch the bottom of the groove then their life would be at an end. Before this could happen a sectional area of 0.706 in. of steel must be worn away. Observations had from time to time been taken to ascertain the rate of wear upon the rails, and the results showed that the wear was regulated more by the gradient than by the number of journeys, the reason for this being that the action of the brakes was far more destructive than the uphill traction. The reduction of depth of groove varied from 0.03 in. to 0.25 in.

So far as permanent way was concerned, the points and crossings appeared to be one of the matters most in need of improvement. Several types had been put down in Sheffield, mostly of British make, but as an experiment some American points had also been tried. In these a special metal was introduced for the parts subject to the greatest wear. It was more difficult to give data as to the wear of points and crossings than as to the wear of rails, because the conditions under which the points were used vary in nearly every case. Various forms of pavement had been laid, including granite, wood and gritstone setts, a Scotch Basalt or Whinstone, and also tar macadam with a single row of setts adjoining each rail. Several miles of the latter paving were laid, largely as an experiment, and the experience has been such that a repetition was improbable; in fact, a long length of track on one of the main suburban roads had worn so rapidly that it was now proposed to replace the tar macadam track with setts. Records had been kept of the cost of maintenance and renewals, and these have been reduced to an average cost per mile per year for each type of paving. The figures for average cost of maintenance (not renewal) per mile per annum, single track, were: granite, 19l. 13s. 6d.; granite paved tracks, macadam sides, 47l. 9s. 6d.; gritstone, 49l. 11s.; wood paving, 54l. 8s. 3d.; tar macadam, hit-and-miss setts against rails, 64l. 13s. 3d.

Mr. Paton, Plymouth, moved a vote of thanks to Mr. Wike. He said electric traction was comparatively new, and he doubted very much if in any town sufficient experience had been obtained to guide local authorities as to the exact amount to be put aside for depreciation.

Mr. Brodie, Liverpool, in seconding the vote

of thanks, warned engineers against skimping maintenance and depreciation charges. In Liverpool they put in everything done every year as maintenance, and a minimum of 30,000l. a year over and above that for depreciation.

Mr. Mawbey (Leicester), Mr. White (Hull), Mr. Yates (Waterloo), and Mr. Collins (Norwich), took part in a short discussion, and the vote of thanks was passed.

Underground Conveniences.

Mr. J. Rush Dixon, A.M.Inst.C.E., Engineer and Surveyor, Shoreditch, then read a paper on "Underground Conveniences." He said it would be generally admitted that these underground structures were a great sanitary acquisition and improvement over the older-fashioned wood or cast-iron above-ground kiosks, which were more or less unbecoming, and were such an obstruction in busy thoroughfares, besides having proved themselves to be favourite resorts of pickpockets when not under the immediate surveillance of an attendant. The proportionate requirements of the female sex were hardly recognised hitherto, as evidenced by their reticence when provision was first made for them, but that had now given way to such appreciable usage that the women's sections were now almost as largely patronised as the portions arranged for men. In his opinion, a perfectly ventilated convenience was something which had yet to be attained. Their position underground accounted principally for this, of course, and the condition was not assisted by the ever-varying humours of our climate. A humid outside atmosphere had such an effect inside many of the conveniences in London that they become positively offensive, and no amount of swilling-out with scented deodorants could keep down the bad smell. The usual methods of inducing a constant current were by arranging for wall-openings to be left where possible all round the interior just under the roof, which space was continued in the form of a grated duct to communicate with the surface above. Given a proper disposition of the stairways this arrangement was about the best that had yet been devised. Fair results were in some cases got by ventilating columns with large perforated bases being placed on the roof. Automatic water-driven fans were also largely used, and these certainly displaced the air surrounding them and assist in establishing a current. The water was further utilised by connexion to flushing cisterns. That the provisions of these structures would, in the true sense of the word, be a convenience for the general public was sometimes made a subservient factor by their representative Councillors, the question they mainly consider being whether such a place would be a source of profit over and above the cost of maintenance, administration, and annual charge of repayment and interest where a loan had to be taken up. But even allowing for these and losing sight of the fact that a valuable property was gradually being redeemed, the receipts from conveniences in an average busy district sometimes prove them to be fairly remunerative institutions; indeed, some of the best-known sanitary engineering firms were disposed to construct and undertake their up-keep and working in certain selected places, and to pay to the respective Local Authorities an annual sum for the privilege, thus ensuring no loss for the rates to bear. The practice was, of course, to be deprecated, and in any case they should try to impress on their employers that these structures were conveniences for the public rather than mere profit-earning institutions.

Mr. Nettleton, Weston-super-Mare, said the lavatory accommodation at Weston was inadequate, but with underground conveniences they had the difficulty of having the surface water within 3 ft. or 4 ft. of the surface, and not having sewers sufficiently deep. One firm had offered to supply an apparatus for raising the sewage of one of these conveniences about 5 ft. for 200l.

Mr. W. Weaver, Kensington, in moving a vote of thanks, considered that these underground conveniences, like most sanitary works, were likely to be overdone. Underground conveniences were started as an economical and paying venture, and in many busy thoroughfares of London they formed a profitable item to the ratepayers. But suburban districts, imitative of their brethren in the more central districts, had gone in lavishly for these conveniences in districts where the revenue could not recoup the outlay, and it behaved the

authorities to see that in their enthusiasm for these conveniences they did not put 2d. or 3d. on the rates.

Mr. Winter, Hampstead, said he did not agree that thirty years was an unreasonable period for the Local Government Board to sanction a loan for such purposes. He had provided a free water-closet for poor persons, and there had been little trouble with them, and very little abuse. In small districts, where expense was a consideration, considerable saving might be effected by using more concrete and less brickwork. In fact, concrete altogether, faced with Doulton concrete tile, was fairly pleasing to look at, and much cheaper than a construction of 14 in. or 18 in. of brickwork.

Mr. A. E. Collins, Norwich, said there seemed to be a charm in these underground conveniences to some people. He thought that an overground convenience, architecturally treated, need not be an eyesore, and could be provided at a much smaller cost.

Mr. J. Lemon, Southampton, entered his protest against the Council of Shore-ditch and other places in London charging a poor woman a halfpenny for the use of a uricette, when no charge was made to a man. Was it not time that they had ladies on Town and District Councils to enable them to legislate against that sort of thing?

Mr. W. Nisbet Blair, St. Pancras, mentioned that in St. Pancras he had proved that it was more economical to rent a small shop than to build one of these underground conveniences. On the one side there was an entrance for men with a small tobacco store, and on the other side an entrance for women to a small store of women's fancy articles or sweets. He admitted that the system of underground conveniences was being ridiculously overdone. An abuse of the free closet which he might mention was the use of the water spray by women selling flowers in the streets to revive their blooms.

Mr. Lacey, Oswestry, said there was no doubt that conveniences constructed above ground were much cheaper than below ground. He had just constructed a convenience with stone outside and bricks inside, containing five circular backed urinals and three water-closets, which worked out at a cost per cube foot of 3d.

Mr. W. Harpur, Cardiff, thought there was good deal in the suggestion of Mr. Blair, and he had started to look out for suitable premises in Cardiff. He thought with a tobacco-store on one side and a sweet shop on the other, ladies would have less objection to entering than they had the present underground conveniences.

Mr. E. G. Mawbey, Leicester, mentioned that they had put up a small place opposite the Town Hall which had proved a great boon to females.

Mr. Brodie, Liverpool, said they had tried a similar thing in Liverpool and it had not proved a success. Then there was such a thing as paying away in rent what they were saving in capital expenditure.

Mr. Dixon, in replying to the discussion, said they had not built conveniences in Shore-ditch until they had received petitions asking for such conveniences to be provided. The cost was something like 3s. per cube foot.

Continuous Sewage Filters.

Mr. F. Wallis Stoddart, F.I.C., F.C.S., then read a paper entitled "Some Points in the Construction of the Continuous Sewage Filter." He said that during the past two years a considerable number of continuous filters had been erected, and as the actual construction had in all cases been left in the hands of the several engineers concerned, a large body of experience had accumulated with regard to the original form of the filter, and to such modifications as had suggested themselves in practice. The main principle underlying this type of filter was the preservation of the interstices of the filter as air spaces in the freest possible communication with the external atmosphere. There was evidence of some weight to show that the ventilating currents essential for providing the necessary supply of oxygen follow closely the course of the liquid applied to the filter, and that the vertical continuity of the air spaces was of more importance than the horizontal, from which it followed that there must be no hindrance to the access of air to the surface and base of the filter. Experience proved, indeed, that whilst no appreciable difference

could be detected in practice between a filter wholly open at the sides, and one so enclosed as to leave the base only in communication with the air, complete closure of the sides and base of the filter (with the exception, of course, of an outlet for the effluent) resulted in a total cessation of its oxidising action. This apparatus was fully described by their President at last year's conference, but in order to correct a widespread error in its mode of application, it was necessary to recall that it consisted of a number of narrow gutters inserted at both ends into specially designed channels which both feed and supply them. The whole of this system must be laid perfectly level, no fall whatever in the supply channels being required. The escape of liquid from the distributors was so free and unimpeded that with the maximum flow along the channels no measurable rise in level was apparent. There were two matters connected with the use rather than the construction of this filter which might be usefully mentioned. It was surprisingly rare to find sewage works with an efficient means of gauging the flow, and the trifling display made by the drops of liquid falling from the points of the distributor was so deceptive that these filters were commonly, though unintentionally, much overworked. It should be remembered that one drop per second from each point was equivalent to a flow of twenty-two gallons per hour per square yard, the full dose for a 3-ft. filter; and that, assuming that only one-fourth of the points was working, each should deliver only four drops per second. It was almost impossible without direct measurement to persuade the inexperienced observer that the total flow was so considerable. Secondly, it had been pointed out elsewhere that a dilute tank effluent was more amenable to treatment than a strong one, because the additional water provided means of applying more dissolved oxygen to the oxidisable impurities. In many localities there must be a considerable quantity of more or less polluted and useless subsoil water, the removal of which from the neighbourhood of dwellings would add to their healthiness, and which at small expense could be brought into the works and there added to the tank effluent before its application to the filter. By thus increasing the total volume to about fifty gallons per head of population, the oxidation of the organic impurities would be greatly facilitated.

Mr. E. J. Silcock, Leeds, moved a vote of thanks to Mr. Stoddart for his paper. He was glad to find that Mr. Stoddart was so impressed with the proper aeration of the bottom portion of the filter. The method of filtration adopted in some places was to have a perforated bottom. It appeared to him in that way a more perfect aeration was obtained than in the construction shown in this filter. Mr. Stoddart gave a flow of 2½ million gallons of sewage per acre in twenty-four hours for a 3-ft. filter. He had never seen a filter working at that rate which was only 3 ft. deep. Mr. Stoddart had told him that the cost of the filter varied from 10s. to 20s. per square yard, according to the size of the filter. The cost was a very important item, and could only be justified by obtaining results superior to results obtained in other ways. If, however, Mr. Stoddart could guarantee an efficiency of 2 to 2½ million gallons of sewage per acre, they would not quarrel about the price.

Mr. Lacey, Oswestry, seconded the vote of thanks. He said every one who had to do with bacterial treatment would welcome any light on the subject, because there were many difficulties to be faced. He did not agree with Mr. Stoddart that a filter composed of 3-in. clinker became ineffective in seven months. His beds were composed of cinders of from ½ in. to 1½ in., and they did not find them become ineffective in so short a time as seven months. There was no doubt with this type of filter there must be plenty of aeration. Mr. MacBrair, Lincoln, said he had seen the filter at work that morning, and must confess that the effluent was hardly of that purity they had hoped and expected to see.

Mr. Hall, Cheltenham, said he found with somewhat similar treatment they had to put the effluent over land. He should not consider any effluent he had seen from a continuous filter fit to go into a stream.

Mr. Cotterell, Bristol, said he could bear testimony to the amount of attention to detail given by Mr. Stoddart to the production of a better form of filter than what formerly existed. The form of distributor used made the filter work over its whole area and depth, and the

method of passing the liquid drop by drop gave a larger amount of purification per square yard by this method than by any other means he knew of.

Mr. Stoddart, in reply, said the only objection to the perforated bottom suggested by Mr. Silcock was the expense of construction. With regard to the rate of flow there was no difficulty in dealing with the quantity he had stated. As regarded the closing up of a continuous filter as compared with a contact bed, he thought the advantage lay with the filter, because the constant and copious flow tended to clear away the intercepting solids.

Mr. Lacey asked the average chemical purification.

Mr. Stoddart said it was 70 per cent. on the tank effluent. In reply to Mr. MacBrair, he might say that the effluent from any continuous filter always contained suspended solids, otherwise the filter was not sufficiently open to effect aeration; but they were readily separated by a catch-pit. In reply to Mr. Hall, he might say he preferred a catch-pit to passing the effluent over land, though the effect of vegetation was exceptionally good.

The meeting then adjourned.

The proceedings were resumed in the Lecture Theatre of the Museum on Friday, Mr. T. H. Yabbicom, C.E., in the chair.

Motor Vehicles.

Mr. E. Manville, M.Inst.C.E., said that there were great possibilities for the self-propelled vehicle in connexion with borough and county work few would deny, but it was doubtful whether the full extent of the numerous purposes to which it could be put was fully realised at the present moment, for, unfortunately, but few really serious attempts had so far been made to utilise the new form of locomotion in this direction. Up to the present some of the more enlightened local authorities had organised services for street watering and dust collection by means of motor vehicles, and, moreover, some attempt had been made in one or two cities to employ the motor in connexion with fire-brigade work. The scope of the automobile was so far-reaching that these experiments were comparatively insignificant and give but the slightest idea as to the great results eventually to be secured. The design and construction of the self-propelled vehicle had to-day reached a standard of excellence which rendered it eminently suited to all classes of work, and serious consideration should be given to the claims put forward on its behalf. The main questions were economy and reliability of running, and, perfected as it now was, the motor vehicle embodied both qualities to a very marked degree. Cars such as the Daimler—one of the best known existing types—for years past had been running week after week and month after month at a cost of fuel of 3d. per mile. Good results, however, were only to be secured by the employment of a thoroughly capable mechanic. No greater mistake could be made than to commit to an inexperienced man the charge of a motor vehicle, and no doubt many had false impressions as to the cost of maintenance of motor vehicles owing to the repairs that had been necessitated by the absence of intelligent care on the part of the individual whose duty it was to clean and adjust the somewhat delicate mechanism of the car.

Mr. E. G. Mawbey, Leicester, moved a vote of thanks to the author. He warned engineers against purchasing a cheap car. To have anything less than 8 h.p., and costing less than 400l., was a mistake.

Mr. W. Weaver, Kensington, said he had a Thorneycroft steam-propelled car for street work for five months. It consisted of a tank of 600 gallons with two water distributors—one for flooding a road and the other for fine distribution. In addition, it could be fitted with a rotary brush or spiral india-rubber squeegee for cleansing purposes. It worked all right in washing and cleansing road pavement, and would do 140,000 sq. yds. an hour. With two of these vehicles he hoped to save his entire staff of night horses and men.

Mr. Winter, Hampstead, said he had had two Thorneycroft steam-motors at work for nine months. They were obtained for dust collection, but so much time was lost in collection that they were not economical. He had since used them for watering and haulage purposes, and even allowing liberally for repairs and depreciation there was a saving compared to horses.

Flooding in Bristol.

Mr. W. J. Steele, Assoc. M. Inst. C.E., Deputy City Engineer, said the prevention of flooding in Bristol had been a source of anxious thought to the City Council for several years, and whilst much had been done to alleviate the danger, it could not, perhaps, be claimed that the task was completed. The Corporation were Conservators to the Port and Harbour of Bristol, extending from Hanham Mills on the River Avon to the mouth of such river at King's Road, a distance of about fourteen miles, and thence down the River Severn and the Bristol Channel, from King's Road westward to the islands called the Sleep Holmes and the Flat Holmes, an additional distance of about twenty miles. They were also Conservators of the rivers and brooks within the port, which were under the control of the Docks Engineer, Mr. W. W. Squire, M. Inst. C.E. During the last fourteen years the Council had spent over 132,000*l.* in works of flood prevention, so that it would be seen the question had been treated in an earnest manner and with considerable success, since the former disastrous effects of heavy rainfalls had been very greatly reduced, as shown by the fact that in 1894 and 1900 very small areas were flooded—and these by the Cutlers Mills brook and Boiling Wells stream—although the rainfall was nearly equal to that in 1882 and 1889, when large and densely populated areas were submerged, causing widespread loss and suffering.

Mr. Smith, Dartmouth, speaking as an old Bristolian, congratulated the city upon the success of the floods prevention works.

Hospital, Ham Green, Bristol.

Mr. Herbert W. Harding, chief architectural and engineering assistant to the City Engineer, said that three years ago the Corporation of Bristol opened their hospital at Ham Green, but it was soon found that the accommodation provided was inadequate to meet the requirements of the extended city, and it was resolved to erect additional buildings on the same site. The accommodation to be provided included a double-decker pavilion, observation pavilion, discharging block, additional wing to the original administration building, water storage tank and tower. The double-decker pavilion had been designed to accommodate fifty beds, and was to be erected upon a piece of ground to the west of the present pavilions. The observation pavilion accommodated eight beds and was divided into two sections, for males and females respectively, each section being isolated from the other with separate entrances facing east and west, and containing two one-bed wards, 13 ft. by 12 ft. by 13 ft., and one two-bed ward, 24 ft. by 12 ft. by 13 ft. The pavilion was intended for the reception of cases requiring special observation to enable the medical officer properly to diagnose a case before drafting it into the fever pavilion.

Mr. Harpur, Cardiff, moved a vote of thanks to the author of the paper, which was carried.

Sea Mills Sewage Disposal Works.

Mr. A. P. I. Cotterell gave a description of the Sea Mills sewage disposal works. He said the works were designed to replace a sewage farm in another part of the district that had become insufficient, and was badly situated. They were also constructed to treat the sewage from Stoke Bishop that formerly ran direct into the River Avon. The works were placed about a quarter of a mile from the River Avon in a narrow valley cut through the dolomitic conglomerate, portions of the tanks being founded upon the solid rock, and portions upon the alluvial soil with which the bottom of the valley was filled. They were designed to accommodate a population of 10,000, the present population being nearly 7,000, and were so arranged that extensions upon the same lines might be made up to a population of 30,000. The effluent discharges by a brick culvert 3 ft. 6 in. by 2 ft. 4 in. internal dimensions into the tidal portion of the River Avon at a point below low-water; but the Local Government Board, in giving their sanction, required the Barton Regis Rural District Council to discharge only at certain states of the tide, viz., between high-water and an hour and a half before low-water. They stipulated that the sewage should be capable of being treated with chemicals, and after such treatment, together with subsidence in tanks, should be stored, except during the hours above-stated. The works partake in many particulars of the usual features common

to such installations, but there were two points of interest to which attention might be drawn. The first was the automatic discharge controlled by a clock. This clock was the joint invention of Mr. A. M. Hunt and Messrs. Kemp Brothers, on suggestions made by himself. It was designed upon the alarm principle, with five faces, and was so arranged that it actuated the penstock both for opening and closing twice in every day. The hydraulic accumulator contained sufficient water for four actions of the penstock. It was charged each day by the attendant, who, at the same time, set the clock for the two tide-discharges of the day, and who need not trouble any more about this part of the works. The periods of discharge were adjusted to correspond as closely as possible with the periods of the tide table.

The other point of interest was the scraper placed in each septic tank. It ran upon iron guides and was drawn to and fro by a wire rope passing, by means of sheaves at the ends and top of the tank, round a drum driven by belting from the gas-engine. The speed of the scraper was a little under 2 ft. per minute, and the gearing of the drum was so arranged that the scraper could overwind, but immediately it reached the end of the tank, a weight, working on a horizontal screw, threw the gearing out and the scraper remained stationary until the attendant reversed the apparatus.

The visits of the members included the Sea Mills sewage works, the electric power stations, the destructors, the water company's reservoirs at Blagdon, and the new docks at Avonmouth. The meeting was in every respect a complete success.

ARCHITECTURAL ASSOCIATION SUMMER VISITS.

The third summer visit of the Architectural Association took place on Saturday last, July 12, to Haslemere, to inspect the very picturesque and artistic house, New Place, the residence of Mr. and Mrs. A. M. Methuen, as a typical specimen of the work of Mr. C. F. A. Voysey.

The site of the house, built on an extremely steep hillside, is of many levels, and had to be made by excavation, and filling up, the result being the formation of a series of very beautiful gardens and enclosures, designed, in conjunction with the house, to form a complete scheme. Certainly the result is entirely successful, possessing in its environment of rich Surrey scenery much similarity to an Italian garden.

The house is planned to give a large entrance hall on what may be termed the upper ground floor, the dining-room, drawing-room, library, and other apartments leading directly from it, whilst the billiard-room and offices are below; and on the first floor are a series of extremely well designed and decorated bedrooms, carried out very characteristically by Mr. Voysey, who throughout the house seems to have designed not only the great majority of the articles of furniture, but the carpets and hangings also, even to the cast-iron ventilating grates. Certainly it has seldom fallen to the lot of the members to inspect a building that has been designed and detailed in such a thorough manner. The interior is so very full of simple well-studied designs and properly-placed ornament that there is not sufficient space here to describe them all. The principal staircase, with its long, slender, square balusters and delicate details in mouldings, &c., was much admired; the fireplaces throughout, often of very large size, with polished brass and copper grates and fenders, and with displays of colour made either by fire tiles, bricks, or choice marbles, formed a remarkable series of designs; many extremely useful ideas in planning, and the using up of odd spaces, were carefully noticed.

The exterior of the house is finished in rough cast, either thinly plastered in the North country manner, or thickly lime-white, and has for roof coverings small green slates graduated from the ridge downwards. Stone is used for mullions without mouldings, and for the door canopy, a very charming feature of the garden front, are the boldly-projecting masses of the building, and the rich effect of the light and shade consequent upon them. Lead glass is used for the glazing throughout. The members were entertained to tea in a large garden above, by the kind courtesy of the owners, and at leaving the general opinion expressed was that the entire place showed the admirable result of a building, with its decorations,

furniture, gardens, &c., all dominated by the individuality of one designer.

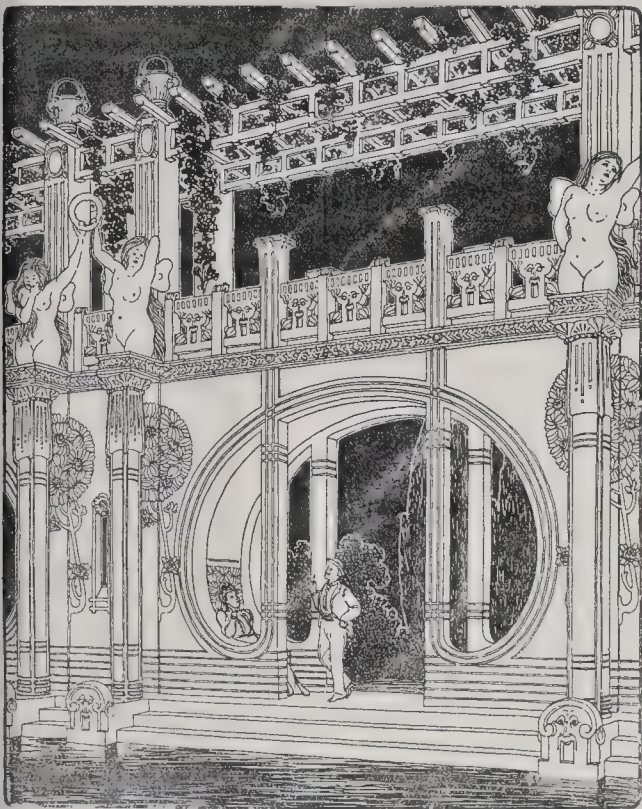
A little distance away was inspected Stooly Hall, a very large residence by Messrs. Read & Macdonald, based as a design upon the smaller types of Sussex and Surrey manor-houses. The hall, with its gallery and lofty traceried windows and large bay, is a very fine apartment. There was much to interest the visitors throughout, particularly the elaborate arrangements of the bathrooms and sanitary fittings, also the very large arrangements for heating the building by hot water. The entrance lodge was particularly picturesque. The building commands very fine views from all its southern windows, but the idea impressed upon the visitor was that it was much too large for its site. The dressings have been carried out in Monks Park Bath stone, and the walling in Bargate stone, from near Godalming. The internal woodwork is entirely in walnut. Leaving here, Mr. Macdonald showed his own residence to the members, together with the drawing-room and hall, two very charming apartments, and afterwards some more specimens of his houses in the neighbourhood.

ARCHITECTURAL SOCIETIES.

DEVON AND EXETER ARCHITECTURAL SOCIETY.—The annual Report of this Society states that the membership has increased during the past year, but does not give the numbers. The Report mentions that the Council had conducted preliminary examinations in June and November (we presume this means in connexion with the Institute system of examination, though it is not so stated), and it congratulates one of their Associate members, Mr. Sydney Greenslade, on having obtained the Godwin Bursary of the Institute of Architects. Attached to the report are condensed reports of papers read during the session—by Mr. C. J. Tait, on "The Development of the Dwelling-house;" Mr. Ranson Pickard, on "Bacteria in Relation to Sanitation;" Mr. Arthur S. Parker, on "Building By-laws;" and Mr. F. W. Meyer, on "Garden Design."

ARCHÆOLOGICAL SOCIETIES.

NORTHUMBERLAND AND DURHAM ARCHÆOLOGICAL AND ARCHITECTURAL ASSOCIATION.—The Northumberland and Durham Archæological and Architectural Association visited on the 11th inst. the fine old Abbey Church, St. Mary's, Old Malton. Here Canon Greenwell acted as cicero, and gave a description of the edifice. The church is really a fragment of a once glorious minster, and in ecclesiastical history it stands alone as the only church in the country founded by a purely English order—the Gilbertines—in which public worship continues to be offered. The Priory was founded by Eustace FitzJohn in 1150, and it was the most magnificent of all the Gilbertine houses. The Order was a hermaphrodite one, consisting of canons and ministers, but it has always been a much-disputed point amongst archæologists whether the Priory at Old Malton ever accommodated nuns or not. The church and monastic buildings went to partial decay after the Dissolution, and in 1630 the main central tower was taken down. The present remains are most interesting and beautiful, and, thanks to the generosity of Earl Fitzwilliam, the patron of the living and lay rector, are in excellent preservation. Canon Greenwell did not fail to point out the fine features of the great western doorway—said to be one of the most beautiful specimens of Norman work extant—the remarkable carvings and "inverted" inscriptions of the columns in the church, and the remains of old Norman work in the remaining aisle. A passing look at the adjacent Abbey residence, and the visitors then drove off to Appleton-le-Street, where the ancient church of All Saints was examined. Here are some rare old carvings and monumental figures, and also a fine late pre-Conquest tower. From Appleton to Barton, where the restored Norman church and ancient font (in the churchyard, by the way) were examined. Slingsby Castle ruins (the old home of the De Mowbrays), dating from the time of Charles I.; the village green and maypole (one of only five remaining in Yorkshire); and then on to Hovingham, where a halt for luncheon was called. Sir Wm. Worsley's fine old mansion, Hovingham Hall, with its re-



"A Seaside Promenade." By Herr A. Fritzsche, Dresden.
(From the "Architektonische Rundschau.")

markable riding school, the church, the spa, and the park were in turn inspected, and then the party returned to Malton, dined together, and at 5.20 entrained for Newcastle again. *Newcastle Chronicle.*

DESIGN FOR A SEASIDE PROMENADE.

THIS is reduced from a design published in the last issue of the *Architektonische Rundschau*. We give it as an example of one of the creations in which German taste seems to be developing. Comment is unnecessary.

COMPETITIONS.

REMODELLING OF A SHEFFIELD MARKET.—At the last meeting of the Sheffield Corporation the Markets Committee reported that they had advertised for and received competitive plans for the improvement of the Norfolk Market Hall. The award of Sir William Emerson, the Assessor in such competition, had been presented, and a report by the Markets Superintendent on the schemes indicated by the three sets of designs selected by the Assessor considered. The Committee recommended that the question of the improvement of the Norfolk Market Hall be deferred until such time as the proposed extension of the Sheaf Market has been completed and is ready for occupation, and that, in the meantime, increased lighting facilities be afforded in the market, and that the Markets Superintendent be instructed to obtain tenders from the Electric Supply Department and the Gas Co. for such increased lighting and the maintenance thereof; also that the roof be repaired where necessary, and that the Markets Superintendent be instructed to report on the advisability of increasing the rents,

and to what extent. The committee also recommended that the premiums of 100*l.*, 50*l.*, and 25*l.* respectively be paid to the three successful competitors in this competition, subject to each giving an undertaking to the effect that, if his scheme, or any unimportant modification thereof, be carried out within, say, five years from March 25 last, the premium so paid to him shall be taken as in part payment of the commission of 5 per cent., which would become due to him as architect for the improvement. The first premium has been awarded to Messrs. Holmes & Watson; the second to Mr. H. I. Potter; and the third to Mr. Joseph Smith. The competition was confined to Sheffield architects.

BUILDERS' BENEVOLENT INSTITUTION.

THE annual general meeting of the subscribers and donors of this charity was held at the offices, 31 and 32, Bedford-street, Strand, W.C., on Wednesday, the 16th inst., the President, Mr. J. Carmichael, occupying the chair. The minutes of the last annual general meeting having been read and confirmed, the fifty-fifth Annual Report was read. The Report stated that, notwithstanding the many calls that have been made during the year upon the generosity of the charitably inclined, the Committee are gratified to be able to report a continuance of the steady financial support which they have been fortunate enough to receive in the past. They hope, however, to be able to celebrate the Coronation by extending their benefactions, and as to do so will require a larger income, the Committee appeal with confidence to their present supporters to increase their subscriptions and to enlist the practical sympathy of their friends. During the past year six men and five women were added to the pensioners'

list. Every claimant's application was most carefully investigated by individual members of the Committee, the result being that all the eligible candidates were made annuitants, thus saving them the expense and trouble incidental to a contested election. There are now twenty-one men and twenty-seven women in receipt of pensions of 30*l.* and 27*l.* per annum respectively. Since the last Report five men and two women were removed by death. "Major Bruton, after acting as Secretary for twenty-seven years, was obliged to resign his appointment in consequence of bad health. He took with him into his retirement the respect and best wishes of all connected with the Institution. The Committee appointed Mr. T. Costigan to be his successor, and by changes made in the office and management, they have been able to reduce the expenses of administration. The offices are now under the same roof as other institutions connected with the building trade. . . . The annual dinner will be held in the Carpenters' Hall. . . ."

On the motion of the Chairman, seconded by Mr. C. W. Patten, the Report was adopted.

Mr. J. T. Bolding, one of the auditors, then explained the income and expenditure account for the year, and showed that the Institution is in a satisfactory financial condition. On his motion, seconded by Mr. C. Russell, the financial statement was agreed to.

On the motion of the Chairman, seconded by Mr. Russell, it was agreed that Mr. W. Higgs (Messrs. Higgs & Hill, Ltd.) be President of the Institution for the ensuing year.

The new President then took the chair, and briefly thanked the meeting for electing him. He then proposed a hearty vote of thanks to Mr. Carmichael for the excellent manner in which that gentleman had acted as President.

Mr. A. Ritchie, J.P., seconded the vote of thanks, remarking that he hoped the time would come when they would be able to call on Mr. Carmichael to serve them for a second time as President.

The vote of thanks having been carried, Mr. Carmichael replied, and referred to the many acts of kindness he had received from the Committee and others during his year of office.

On the motion of Mr. Russell, seconded by Mr. Ritchie, it was resolved: "That the thanks of the meeting be given to the Hon. Treasurer, Mr. J. Howard Colls, and to the Trustees, Sir Arthur C. Lucas, Bart., Mr. F. J. Dove, Mr. T. F. Rider, Mr. J. Howard Colls, Mr. T. Stirling, and Mr. J. T. Bolding."

The following gentlemen were then elected to form the Committee, with power to add to the number: Messrs. S. J. Thacker, T. F. Rider, G. N. Watts, J.P., E. S. Rider, T. Stirling, jun., J. Mowlem Burt, J.P., E. V. New, J. Carmichael, and E. Casselton.

On the motion of Mr. Stirling, seconded by Mr. Ritchie, it was resolved "That the thanks of the meeting be given to the Hon. Auditors, Mr. R. J. Ward and Mr. J. T. Bolding." These gentlemen were then re-elected Auditors for the ensuing year.

Votes of thanks were then passed to the Executive Committee, and the Vice-President.

The meeting then terminated.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir J. M'Dougall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend the Lewisham Borough Council 2,835*l.* for erection of a caretaker's cottage and convenience at Home Park, Sydenham, and for paving works, &c.; the Camberwell Borough Council, 580*l.* for the purchase of a building for the enlargement of the Council's depot at Grove Vale; the Fulham Borough Council, 25,000*l.* for electric light installation; the Camberwell Borough Council, 750*l.* for erection of conveniences; the Metropolitan Asylums Board, 350,080*l.* for various building operations; and the Fulham Guardians, 11,110*l.* for works at the workhouse and infirmary.

Tramways.—The Finance Committee, reporting with regard to the proposed purchase of the South London Tramway Company's undertaking for 205,000*l.*, pointed out that the profits of the company in the year ended June 30, 1901, amounted to 11,400*l.*. That would be about sufficient to meet interest and sinking fund on the cost of acquisition, but would leave little or no margin for the increase in the bill

of wages, and it was therefore probable that the immediate result of the purchase would be a deficiency. It must, however, be borne in mind that full advantage could not be obtained from these tramways until they had been converted to electric traction.

The Highways Committee recommended that the estimate of 205,000l. be approved, and that they be authorised to settle the precise terms of the agreement with the vendor company.

The Council adopted the recommendation. The Highways Committee also recommended, and it was agreed, that the estimate for 59,000l. on capital account, submitted by the Finance Committee, be approved; and that the Highways Committee be authorised to issue an advertisement inviting tenders for the electrical cars required for the Streatham portion of the London County Council tramways.

The same Committee recommended that application be made in the next Session of Parliament for powers to enable the Council to enter into arrangements with any company reconstructing a bridge, for paying the extra cost involved in strengthening such bridges, so as to permit of the placing of electrical conduits in the carriage-way, or of the laying of a double line of tramway.

The recommendation was agreed to.

It was also agreed, after discussion and the rejection of an amendment to the effect that tenders be invited for the work:—

(a) That the expenditure on capital account of a sum not exceeding 430,000 be approved, in respect of the first portion of the building and other works in connexion with the car-shed accommodation to be provided on the site of the Clapham depot of the London County Council Tramways and Land adjoinings.

(b) That the Works Committee be authorised to carry out the work specified in the above resolution.

Improvement, Woolwich.—The Improvements Committee recommended, and it was agreed, that the estimate of 7,000l. submitted by the Finance Committee be approved, that the Improvements Committee be authorised to secure the widening of Mill-lane, Woolwich, to not less than 40 ft.

Proposed Railway Station at Essex-road.—On the recommendation of the Building Act Committee it was agreed:—

"That the Council, in the exercise of its powers under Sections 45 and 53 of the Great Northern and City Railway Act, 1892, but in no way otherwise than under such sections, do consent to the erection of a station building on the north-west side of Essex-road, Islington, to abut also upon Canonbury-road, in accordance with the plan dated July 1, 1902, submitted with the application of Messrs. Douglas, Young & Co. for the G.R. and City Railway Co. . . ."

The Building Line.—Mr. Shepherd drew attention to a letter by Dr. Little which had appeared in the public Press stating that there was one building line for the rich and one for the poor.

Dr. Little rose to further emphasise his point, and said that he was prepared to take the responsibility of and to prove every statement in that letter. He alleged that the Council was acting in this matter without full knowledge, and that they were doing an injustice to the public.

Tenders.—The following recommendations of the Highways Committee were agreed to:—

(a) That the tender of the Sir Hiram Maxim Electrical and Engineering Co., Ltd., for the supply, delivery, and erection, for the sum of 2,268l. 7s. of the steam, exhaust, feed and other piping, valves, &c., required in connexion with the temporary electricity generating-station to be established by the Council at Loughborough Junction, be accepted.

(b) That the Sir Hiram Maxim Electrical and Engineering Co., Ltd., be allowed to sublet parts of the work, included in the contract, as follows:—To Messrs. A. J. Stewart & Menzies, the steam-pipes; to Messrs. Clay, Henriques & Co., Ltd., the exhaust-pipes; to Messrs. J. Hopkinson & Co., Ltd., the steam and feed valves; to Messrs. Hamilton, Woods & Co., Ltd., the exhaust-valves; to Messrs. Suffield & Brown, the expansion-joint; to Messrs. Newton & Nicholson, the joint-rings; and to Messrs. Jones & Horsfield, the non-conducting material.

The following recommendations of the Main Drainage Committee were also agreed to:—

"That the tender of Messrs. Clay, Henriques & Co., Ltd., amounting to 640l. 12s., for the supply and erection of two cast-iron feed-water tanks, with all accessories complete, at the Crossness outfall, be accepted.

That the offer of Messrs. Clay, Henriques & Co., Ltd., to supply the sludge-loading pipes, &c., required at the Crossness outfall for the sum of 157l. be accepted, and that the work of laying the pipes be executed by men directly employed by the Superintendent.

That the offer of Messrs. W. C. Rendle & Co. to provide and fix a new glazed roof on the auxiliary engine-house at the Crossness outfall for the sum of 180l. 9s. 2d. be accepted."

Appointment of Assistant Engineer.—On the recommendation of the Main Drainage Committee, it was agreed to appoint Mr. R. M. Gloyne, Borough Engineer of Eastbourne, as assistant engineer for main drainage works on the south side of the River Thames.

The Barbican Fire.—The Fire Brigade Committee submitted a long report on the serious fire which occurred on the night of April 21 last in the Barbican. They shared the Chief Officer's opinion that the existence in the City of so many *culs-de-sac*, of which New Zealand-avenue was by no means the worst example, constituted a grave source of danger. As was shown by the Barbican fire, such a building arrangement prevented the brigade stopping a huge conflagration, and, moreover, the rescue of people from premises in a *cul-de-sac* might prove an exceedingly difficult undertaking. The Committee proposed to communicate with the City Corporation and the Building Act Committee on the subject. The Report also referred to the recommendations of the jury, which had not been carried out, with regard to water supply and fire-alarms.

The Report was received.

The Housing Question.—The Housing of the Working Classes Committee submitted the accounts of the working-class dwellings for the year ending March 31. The dwellings mentioned in the accounts included 2,591 tenements, 358 cottages, and 324 cubicles, providing accommodation for 15,052 persons. During the year new dwellings had been opened giving accommodation to 2,856 persons, while since the accounts had been made up further dwellings, giving accommodation for 1,214 persons, had been opened. The total gross income for the year amounted to 58,058l. 15s. 6d., and of this 53,315l. 14s. 4d., or 91.83 per cent., was required for outgoings during the year, as against 94.76 per cent. required during the year 1900-1. There is thus a surplus balance on the year's working of 4,743l. 1s. 2d. The accounts show that, taking one year with another up to date, there is, as a whole, no deficiency on income account as a result of the Council deciding itself to erect and manage dwellings. The total expenditure on capital account on all the dwellings up to March 31 amounted to 931,459l. 3s. 1d.

Mr. Cousins remarked that the Report would be very satisfactory if they could feel that their tenants were the persons who had been dislodged. It was stated that there was no charge upon the rates, but it must be remembered that they were in the habit of writing down the commercial value of the land for housing. Up to the present the actual cost of the land for housing purposes was 780,000l., but the value charged against the housing schemes was only 162,000l.

Lord Welby, as Chairman of the Finance Committee, congratulated the Chairman of the Housing Committee on the result of the Committee's work.

Mr. Beachcroft said the accounts were apparently satisfactory, but the fact that the land had been written down should be stated to the public.

Sir Wm. Collins (Chairman of the Committee) agreed that the fact of the writing down in value of sites should be known to the public, but under the Act under which they had to carry out their work, no other course was open to them. In every case they accepted the site at the housing value fixed by the valuer.

The report was adopted, and the Council was counted out at twenty minutes past seven.

MEANS OF ESCAPE IN CASE OF FIRE.

At the meeting of the London County Council on Tuesday the Building Act Committee submitted the following Report, the consideration of which was adjourned for a week:—

"By the provisions of the Factory and Workshop Acts, 1891 and 1895, the duty was imposed upon the Council of seeing that each factory or workshop situated within the Administrative County of London, in which

more than forty persons were employed, was provided on the stories above the ground floor with such means of escape in case of fire for the persons employed therein as could reasonably be required in the circumstances of each case. With a view to assisting owners of new buildings in making applications for the Council's certificate that their premises were provided with proper means of escape in case of fire; (2) of old buildings in submitting proposals to comply with the requirements of the Council, it was found desirable to draw up a statement as to the means of escape that would in general be required. Such a statement was adopted by the Council on June 13, 1899, but, in consequence of the passing of the Factory and Workshop Act, 1901, it is necessary to make certain alterations in it, the principal one being that means of escape are now required to be provided from all floors instead of from all floors above the ground floor. The other alterations are in the main rendered necessary by the substitution of the Act of 1901 for the earlier Acts. We recommend—That the Council do approve the following statement with reference to its requirements in respect of the means of escape in case of fire from factories, workshops, &c., in accordance with the provision of the Factory and Workshop Act, 1901:—

By the provisions of Sections 14, 103 (1) (d), and 153 (1) of the Factory and Workshop Act, 1901, the duty is imposed upon the London County Council of seeing that each factory, workshop, &c., situated within the Administrative County of London in which more than forty persons are employed, is provided with such means of escape in case of fire for the persons employed therein, as can reasonably be required in the circumstances of each case.

The Council, on the . . . approved the following statement with reference to the requirements in respect of the means of escape in case of fire to be provided in accordance with the provisions of the above Act, with a view to assisting factory owners and others in making application for the Council's certificate, or in submitting proposals to comply with the Council's requirements in respect thereof. This statement must not, however, be taken as binding upon the Council, but only as a general guide or indication, since each case is, after full consideration of the varying circumstances, dealt with upon its merits; and nothing herein contained must be taken as in any way interfering with or derogating from the powers of the Home Office, the Council, the District Surveyors, or of any other Authority whatsoever under the Factory Act, the London Building Acts, or any other Act, or under any by-laws that may be made under Section 15, Section 153, Sub-Section 3, of the Factory and Workshop Act, 1901, or under any by-laws or regulations relating to the construction of buildings or otherwise, or as constituting any consent, sanction, allowance, or permission under any such Act, by-law, or regulation, but all such Acts, by-laws, and regulations must be fully observed and complied with, notwithstanding anything herein contained.

Applications.—1. Applications for the Council's certificate in respect of the means of escape from new buildings, and applications with proposals to meet the Council's requirements in respect of the means of escape from old buildings should state—

(a) The number of persons employed or to be employed on the premises, specifying the number of males and females employed or to be employed on each floor.

(b) The trade carried on or to be carried on on each floor, with particulars of machinery, power, &c.

(c) In the case of existing buildings used as factories, whether the premises were erected before January, 1892, and in the case of workshops and laundries, whether erected before January, 1896.

(d) The name and address of the owner.

(e) Particulars of the occupation of the building if existing, and if any part is used otherwise than as a factory or workshop or laundry, particulars of the tenancy of such part should be furnished.

Applications should be accompanied by complete plans and sections drawn on the unglazed side of tracing linen to 4-in. or 2-in. scale (3-in. scale preferred), and by a block plan to a small scale showing the premises and the surrounding buildings and thoroughfares, such block plan to have the north point indicated.

Means of Escape.—3. The number of staircases required depends, *inter alia*, upon the following circumstances:—

(a) The area of the building.

(b) The number of persons employed, or which could be employed.

(c) The disposal of the workpeople.

(d) The alternative means of escape which may be available.

4. It may, however, be laid down as a general principle (subject to the exceptions hereinafter mentioned) that distinct and separate alternative means of escape, exclusive of windows, loophole doors, &c., are required from each floor, by one of the following means:—

(a) A second staircase in the same block;

(b) A proper staircase in another block, to which access is available on all the floors by proper openings in the party or division walls, or by external communication;

(c) Open iron bridges where the blocks are not adjoining each other.

5. The means of escape from each of the floor levels should be placed as far apart as possible.

6. In all cases where practicable, some means of escape from the roof of the building to the roof of adjoining premises should be provided.

7. In small and inexpensive premises where not more than thirty persons are employed above the ground floor, and in some cases where it is possible to provide a staircase in a central position, one properly enclosed staircase, constructed of incombustible materials, may be accepted; but in all cases where only one staircase is provided, some means of escape from the roof to the roof of adjoining premises, must be provided.

8. *Internal Staircases.*—Staircases should be placed next to an outer wall, and must be so arranged as to deliver by means of a doorway, not less than 3 ft. 6 in. wide in the clear when the doors are open, direct into the outer air at the ground level into a public way or thoroughfare or some large open space. Staircases must also be so arranged that persons enter them from any floor level in the same direction as persons descending the staircases.

9. Staircases must be properly lighted and ventilated by windows.

10. Staircases, including landings and passages from one flight to another, must be inclosed with level and inclosing walls, not less than 9 in. thick, carried up above the roof and ceiled with iron and concrete.

11. Staircases must be constructed of incombustible materials, with solid square or spandril steps, arranged in straight flights, without winders; each flight must consist of not more than fifteen steps, which must be supported at both ends on brickwork, and landings must be provided at the top and bottom of each flight and between the flights. The steps and landings must be of the same width as the staircase (see No. 14) and not less than 3 ft. 6 in. thick. In the case of spandril steps, however, the thickness at the smallest part may be as set out in No. 16.

12. The treads of the staircases must be not less than 10 in. wide clear of nosings, and the risers not more than 7½ in. high.

13. Staircases must be provided with handrails fixed upon both sides thereof and continued round the landings and chased into the ends of the newel walls.

14. The width of staircases is to be regulated as follows:—

(a) Where the premises are adapted for the employment of less than 200 persons on the floors above the ground floor, the staircases must be not less than 3 ft. 6 in. wide.

(b) Where the premises are adapted for more than 200 persons on the floors above the ground floor, or where more than 200 persons are employed on any one floor above the ground floor, the staircases must be not less than 4 ft. 6 in. wide.

15. Staircases must in all cases be connected with all floors above the roof by means of doorways of the same width in the clear when the doors are open, as the staircases.

16. Spandril steps, where used, must be of the following thickness:—

(a) For 3 ft. 6 in. staircases, not less than 3 in. thick in the smallest part.

(b) For 4 ft. 6 in. staircases, not less than 4½ in. thick in the smallest part.

17. All doorways to staircases must be fitted with doors of fire-resisting materials (solid teak or oak 12 in. thick or other approved material) in two folds, hinged so as to open in the direction of exit or to swing both ways clear of steps, landings, passages and footways; such doors must be fitted with springs, weights, or other approved appliances to close them after use, and, if required to be fastened during the time the workpeople are upon the premises, be fitted during such time with automatic bolts only, so that the doors open by pressure from the inside.

18. In the case of old buildings* (in respect of which the Council is not required to issue a certificate) where there is a distinct and separate alternative means of escape provided to the satisfaction of the Council, from each of the upper floors, the inclosed staircase may be constructed of teak or oak, not less than 2 in. thick, including the treads, strings, carriages, bearers, landings, joists, and floors, the risers to be not less than 1 in. thick, but no fire or iron must be used; and the inclosure to the staircase may be a solid partition of incombustible material at least 3 in. thick; but such staircase must, in all other respects, be formed and arranged as required for a staircase for a new building as regards width, going, treads, risers, doors, handrails, &c. (see Nos. 8-17).

External Staircases.—19. In cases in which external iron staircases are required by the Council as means

of escape, they must be constructed with dead bearings and without cantilever work.

20. They must comply with the requirements Nos. 8-17 as regards width, going, width of treads, height of risers, doors, handrails, &c.

21. They must deliver into the outer air at the ground level into a public way or thoroughfare, or some large open space.

22. Where an iron staircase is in general use the treads must be of approved non-slippery material as distinguished from perforated iron or chequered iron plates.

23. All windows and similar openings by, or near, any such staircases must be protected with kill wire, or glazed with a combination of glass and wire or other approved fire-resisting glazing.

General.—24. Proper guard rails must be provided to the routes of escape on roofs, &c., where necessary, to the satisfaction of the Council.

25. Clear gangways, at least 3 ft. 6 in. wide, must be kept up to, and between, all staircases, bridges, and exits on all floors.

26. All doorways, and all passages, must, where of a less width than 3 ft. 6 in., be increased to that width.

27. All doors usable as means of exit must be made so as to open in the direction of exit, or to swing both ways clear of steps, landings, passages, &c.

28. All such doors must, if required to be fastened during the time the workpeople are upon the premises, be fitted during such time with automatic bolts only.

29. Lifts should be inclosed all up with brickwork 9 in. thick, or with incombustible material of approved quality and thickness, and fitted with iron or other fire-resisting doors, unless, with the approval of the Council, such lifts be inclosed with fire-resisting materials to a height of 4 ft. above each floor level, and above this with stout wire-mesh guard.

30. Lifts must be kept at some distance from staircases, and must in no case be connected directly therewith by means of openings or otherwise.

31. All windows on the floors above the ground floor, facing the public-way, street, thoroughfare, or open space, must be made to open easily at sill level to a sufficient height and width to allow a full-grown person to pass through in case of need.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Norwood.—The erection of houses on the northern side of St. Louis-road, Auckland-hill, West Norwood, between St. Bernard's-road and St. Gothard's-road (Mr. R. Pipette).—Consent.

Lines of Frontage and Projections.

Woolwich.—Projecting lamp at the Director General public-house, Wellington-street, Woolwich (Mr. B. W. Adkin for Messrs. T. Norfolk & Sons).—Consent.

Leamsham.—Four houses on the east side of Bromley-road, Catford, opposite Berlin-road (Messrs. Norfolk & Prior for Messrs. Kennard Brothers).—Consent.

Marylebone, East.—A projecting iron sign in front of No. 28, Berners-street, St. Marylebone (Messrs. Teale & Somers).—Consent.

Dulwich.—Two-story houses in proposed new streets, to be named Copleston-road (in continuation), Oglander-road (in continuation), Bellen-den-road (in continuation), Placquet-terrace (in continuation), and Oxenford-street (Mr. W. Ostoby for the Council of the Metropolitan Borough of Camberwell).—Consent.

Finsbury, Central.—Two one-story shops on part of the forecourts of Nos. 140 and 142, Pentonville-road, Finsbury (Mr. H. H. Tasker for Mr. J. King).—Consent.

Finsbury, Central.—An one-story bay-window at the first floor level and an oriel window at the first and second floor levels in front of the Angel Hotel, at the corner of Islington High-street and Pentonville-road, Clerkenwell (Messrs. F. J. Eedle & Meyers for Messrs. Truman, Hanbury, Buxton, & Co., Ltd.).—Consent.

Finsbury, East.—An iron and glass shelter in front of the porch at the entrance to Cook's Hotel, Nos. 18 & 21, Charterhouse-square, Finsbury (Mr. E. Haslehurst for Messrs. Wheeler & Warren).—Consent.

Hackney, North.—A mission-hall on the west side of Wordsworth-road, Stoke Newington (Messrs. J. E. K. & J. P. Cutts for the Rev. W. A. Buck).—Consent.

Hammersmith.—Buildings with shops on the ground floor, on land between Nos. 142 and 146, Uxbridge-road, Hammersmith (Mr. P. G. May for E. J. Clayton).—Consent.

Lewisham.—Barge boards and wood-framed pents to Nos. 2, 4, 6, 8, and 10, Stillness-road, Lewisham (Mr. G. M. Webb).—Consent.

Lewisham.—An iron and glass shelter in front of

St. Cyprian's Hall, Brockley-road, Lewisham (Mr. J. J. Downes for the Rev. W. V. Mason).—Consent.

St. George, Hanover-square.—A stone balcony, with iron railing, at the first floor level in front of No. 11, Clarges-street, Piccadilly (Mr. M. E. Collins for Mr. A. Frankau).—Consent.

Wandsworth.—Extension of the period within which the erection of houses with one-story shops on the site of The Hawthorns and grounds on the west side of Balham High-road, Wandsworth, at the corner of Marius-road, was required to be completed, be granted (Mr. F. Perks for Mr. R. Simpson).—Consent.

Wandsworth.—Six-story bay windows to two blocks of residential flats known as Kenilworth-court, Lower Richmond-road, Putney (Mr. R. C. Overton for Messrs. R. Emerson and J. Coleman).—Consent.

Wandsworth.—A four-story building on the site of No. 308, Brixton Hill, Brixton, at the corner of Streatham-place (Messrs. Dale & Gadsdon for Messrs. Herring, Son, & Daw).—Consent.

Islington, West.—Retention of a wooden signboard on the south-west side of Holloway-road, Islington, at the corner of Parkhurst-road (Mr. F. Matcham for Mr. F. W. Purcell).—Consent.

Chelsea.—Three projecting windows in front of the Swan Tavern, Sloane-street, Chelsea (Mr. L. A. Withall for Messrs. Roberts & Gilling).—Refused.

Clapham.—One-story shops on part of the forecourts of Nos. 55 to 69 (odd numbers only inclusive), Northcote-road, Battersea (Mr. A. Boon for the Executors of the late J. Boon).—Refused.

Dulwich.—The erection of steel, wood, and glass roofs over the forecourts of Nos. 1 and 3, North Cross-road, East Dulwich (Mr. H. G. Tarrant for Mr. F. C. Worman).—Refused.

Hampstead.—Buildings on the south side of Lynton-road, Hampstead, near Finchley-road (Mr. O. E. Winter for the Council of the Metropolitan Borough of Hampstead).—Refused.

Lewisham.—The retention of a pigeon-house in the garden at the rear of No. 53, Vancouver-road, Forest Hill, abutting on Elsinore-road (Mr. T. J. Ambrose).—Refused.

Lewisham.—One-story shops in front of proposed houses on the east side of Ardgowan-road, Lewisham, southward of Downhill-road (Mr. A. C. Baker for Mr. F. Horwood).—Refused.

Marylebone, East.—Enclosure to the entrance portico of No. 21, Portland-place, St. Marylebone (Messrs. Ray & Murrell for Sir Archibald Edmondstone, Bart.).—Refused.

Norwood.—One-story shops on the forecourts of Nos. 16 and 18, Tulse Hill (Messrs. Peacock Brothers for Messrs. H. G. Englefield and W. Sayer).—Refused.

Woolwich.—A vicarage room on the south side of Upper Ripon-road, Plumstead (Mr. V. E. Young for the Rev. S. Warner).—Refused.

Hammersmith.—A one-story addition in front of No. 26, Glenthorne-road, Hammersmith (Mr. T. W. Biggs for Mr. R. Dean).—Refused.

Width of Way.

Limehouse.—Buildings to be used as casual wards, with the forecourt boundaries and the external walls of two water-closets at less than the prescribed distance from the centres of the roadways of Maroon-street and Eastfield-street, Limehouse (Mr. F. Baggallay for the Guardians of the Stepney Union).—Consent.

Poplar.—A one-story addition to the mission church on the west side of Hale-street, East India Dock-road, Poplar (Sir A. Blomfield & Sons for the Rev. E. E. Sinker).—Consent.

Whitechapel.—A warehouse building on the south side of Corbel's-court, Little Pearl-street, Whitechapel (Messrs. Hammack, Lambert, & Son for Messrs. Godfrey Phillips & Sons).—Consent.

Bethnal Green, South-west.—That the request of Mr. G. H. Lovegrove, in reply to a penal notice served on Mr. R. Button, for permission to complete a building commenced to be erected on the south side of Princes-court, Bethnal Green, and offering in connexion with the development of the west side of Gibraltar-walk to widen that street on certain conditions, be not acceded to.—Agreed.

Bermondsey.—A building on the east side of Larnmosey-street, Bermondsey, to abut also upon Crucifix-lane (Mr. E. J. W. Hider for Mr. W. H. Hazard).—Refused.

Hackney, South.—Two dwelling-houses on the west side of St. Thomas's-place, Well-street, Hackney (Mr. A. Martin for Mr. F. Byford).—Refused.

Limehouse.—The retention of a forecourt fence in front of Haileybury House, at less than the prescribed distance from the centre of the roadway of Durham-row, Limehouse (Mr. O. F. Stenning for the trustees of the Haileybury Guild).—Refused.

Westminster.—Office buildings on the site of Nos. 10, 11, and 12, Great College-street, Westminster, at the corner of Little College-street (Mr. H. Sheldermine for the Lancashire and Yorkshire Railway Company).—Refused.

Space at Rear.

Southwark, West.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of an addition at the rear of the Grammar School House, Sumner-street, Southwark

* By the term "old buildings" is meant those of which the construction was begun before—
In the case of factories, January 1, 1892.
In the case of workshops and laundries, January 1, 1896.

(Mr. A. H. Ryan-Tenison for the Rev. A. W. Corbett)—Consent.

St George, Hanover-square.—Deviations from the plans certified by the District Surveyor, so far as relates to the erection of an addition to No. 13, Upper Brook-street, St. George, Hanover-square, and also the erection of a porch at the premises Mr. P. A. Todd for Mr. W. Tebbi).—Refused.

Lines of Frontage and Width of Way.

Hammer-smith.—The retention of a wooden shed at the rear of No. 103, Askew-road, Hammer-smith, with the external walls at less than the prescribed distance from the centre of the roadway of Landor-road, and in advance of the general line of buildings in that street (Mr. W. Smith).—Consent.

Formation of Streets.

Dulwich.—That an order be issued to Mr. W. Oxtoby sanctioning the formation or laying out of new streets for carriage traffic in continuation of Copleston-road, Bellen-den-road, Oglander-road, and Placquet-terrace, and to connect the proposed continuations of Copleston-road and Oglander-road (for the Council of the Metropolitan Borough of Camberwell). That the names Copleston-road (in continuation), Oglander-road (in continuation), Bellen-den-road (in continuation), Placquet-terrace (in continuation), and Orenford-street, be approved for the new streets.—Agreed.

Islington, South.—That an order be issued to Mr. R. Nevill sanctioning the formation or laying out of a new street for carriage traffic to lead from Pleasant-place to Canonbury-villas, Canonbury, and in connexion therewith the widening of a portion of Canonbury-villas (Mr. H. A. Horton and Mrs. C. H. Tufnell).—Consent.

Greenwich.—That an order be issued to Messrs. J. T. Bressey & Son, refusing to sanction the formation or laying-out of a new street for carriage traffic to lead from Toddman's-lane to Woodlands-park-road, Greenwich.—Agreed.

Norwood.—That an order be issued to Messrs. J. T. Bressey & Son, refusing to sanction the formation or laying-out of streets for carriage traffic to lead out of Herne Hill-road and Poplar Walk, Herne Hill, and in connexion therewith the widening of Poplar Walk (for Mr. R. A. Sanders).—Agreed.

Cubical Extent.

Bethnal Green, South-west.—The erection on the south side of Bath-street, Bethnal Green, at the corner of Lisbon-street, of a building to exceed in extent 250,000, but not 450,000 cubic feet, and to be used only for the purposes of the trade of a brewer (Messrs. W. Bradford & Sons for Messrs. Mann, Crossman & Paulin, Ltd.).—Consent.

Height of Buildings.

Islington, South.—Five houses on the west side of a proposed extension of Pleasant-place, Canonbury, to exceed in height the width of such proposed street (Mr. R. Nevill).—Consent.

Means of Escape from the Top of High Buildings.

Kensington, South.—Means of escape in case of fire on the fifth and sixth floors of a building to be erected on the north side of High-street, Kensington, at the corner of Brown's-buildings (Mr. P. E. Pilditch for Messrs. J. Barker & Co., Ltd.).—Consent.

* * * The recommendations marked † are contrary to the views of the Local Authorities.

Illustrations.

MONUMENT TO GOUNOD.

THE illustration represents the monument to Gounod which is shortly to be erected in the Parc Monceau, Paris.

The sculpture is the work of M. Antonin Mercié, the architectural accessories are designed by M. Formigé. The figures symbolise some of the composer's principal operatic works—the Marguerite of "Faust," the Juliette of "Roméo et Juliette," &c.

The monument was exhibited in this year's Salon, but not in a quite complete state. The illustration shows the complete work as it will be erected.

DESIGNS FOR BUSINESS PREMISES, BIRMINGHAM.

THESE two designs for warehouses in Birmingham, the one in Cannon-street the other in Cornwell-street, are both by Messrs. Bateman & Bateman, architects, of Birmingham, and were both exhibited at the Royal Academy of 1900. That for Cornwell-street was designed for printing works, that for Cannon-street as a warehouse for Manchester goods.

Unfortunately we hear from the architects that both of these schemes fell through after working drawings had been prepared; unfor-

tunately, for they appear to us to be very good examples of the treatment of warehouse buildings in a characteristic and picturesque manner.

Both buildings were to be of steel and concrete construction, the concrete surface being finished with roughcast. The iron-railed balconies were provided for the purpose of window-cleaning.

A STREET FRONT.

This is a design of some originality, for the treatment of a narrow street front, made by Mr. W. Moss Settle, of Ulverston (Lancashire). It is, we understand, merely a study of a street front, and not a building on any actual site.

The bold treatment of the ground story is the best point in the design. The author would have done better to have avoided the segmental arch line in the second stage of the design, as it clashes with the line of the circular arch of the ground story. A straight line would have worked better into the composition.

OFFICES, 4, COLEMAN-STREET, E.C.

THIS building has recently been erected by Messrs. Colls & Sons, of Coleman-street E.C. It occupies the site of a City merchant's



house which contained some interesting cedar panelling and two chimney-pieces which have been preserved. The construction is fire-resisting throughout, and the front to Coleman-street shown in our illustration is of Portland stone.

Mr. Ernest Flint is the architect.

COTTAGES AT WOLVES NEWTON.

THESE cottages are in course of erection at Wolves Newton, near Chepstow, South Wales, for Mr. H. J. Simpson. The walls are built up with local stone, the porous quality of which has necessitated the extra thicknesses of the external walls.

These walls will be externally covered with white rough cast, and the roofs covered with dull red Bridgewater tiles. The external woodwork and porch to single cottage will be oak.

In the pair of cottages the copings to dormers, porch, and tops of chimneys will be in grey Forest stone.

The builders are Messrs. E. Turner & Sons, of Cardiff. The architect is Mr. A. J. Hardwick, of Kingston-on-Thames.

CLUB-ROOM, BEEFSTEAK CLUB.

THIS represents a room built from the designs of Mr. F. T. Verity for this historic club.

We are unable to give any structural or other details about it, in consequence of the absence of the architect from town.

BOOKS RECEIVED.

GARDEN CITIES OF TO-MORROW.—By Ebenezer Howard. (Swan Sonnenschein & Co. 1s.)

Correspondence.

CEMENT INLAY.

SIR.—Would you oblige by assisting me with the following—

I recently used a composition—Parian cement, lampblack, and alum—as a cement inlay in statuary marble to take a polish. This composition has not been a success, as not only no polished surface is obtainable, but the alum or some other ingredient has come to the surface.

Could you inform me how this rough and whitened surface could be made black, and if you could suggest a suitable composition for future use?

JOSEPH WHITEHEAD.

** We are afraid that there is no efficient remedy, as the cement employed is unsuitable for the purpose, and nothing short of picking it out and substituting a better one will do any permanent good. The following will, we believe, be found to answer for the stopping:—Yellow wax, resin, and Burgundy pitch mixed with lamp-black, and made into a thick paste with a little sulphur and finely-sifted plaster. The proportions of wax and resin should be about equal, and the pitch and lamp-black should be added until the whole mixture is quite black. Another stopping may be made of six parts of sulphate of iron to one of rough saltpetre. This is exposed for twenty-four hours, then reduced to a powder, washed several times, and rolled into sticks for use. A little of this mixed with some lamp-black has been found useful. Of course, such stoppings are unsuitable for outdoor work.

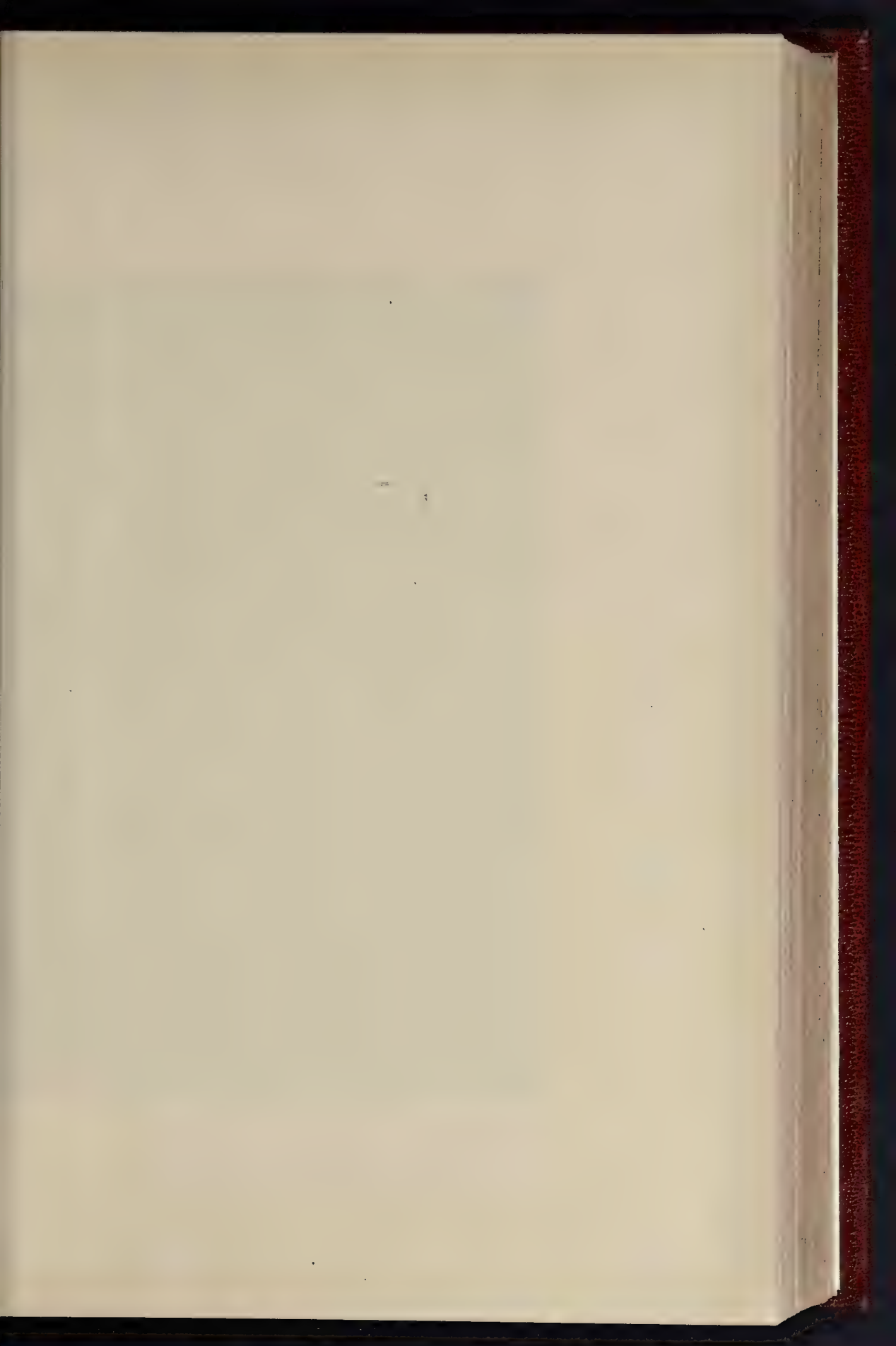
The Student's Column.

3.—ARTIFICIAL BUILDING STONE; THE PRESERVATION OF STONE.

ARTIFICIAL stone has been used for building purposes from time immemorial. The ancient Egyptians used it in the form of concrete blocks composed of pebbles, broken stone, and lime. Concrete blocks were also extensively used by the Romans. The modern production of building stones of a finer grade, closely resembling those of natural origin, may be regarded as a natural development of the industry which commenced with the manufacture of concrete masses of various shapes and sizes for use as a substitute for blocks of natural stone.

The introduction of greatly improved crushing and grinding machinery, the progress in scientific knowledge, and the production of chemicals and high-grade cement at comparatively low cost has already resulted in the manufacture of building stones which compare favourably in many respects with some of the best stones from the quarries. The cost of producing good artificial stone until recently prevented its extensive use in mass; but for paving, for steps, for copings, and for the stone facings of brick buildings, it has long been successfully employed.

A natural prejudice against artificial stone has in the past prevented it from being gene-



THE BUILDER, JULY 19, 1902.

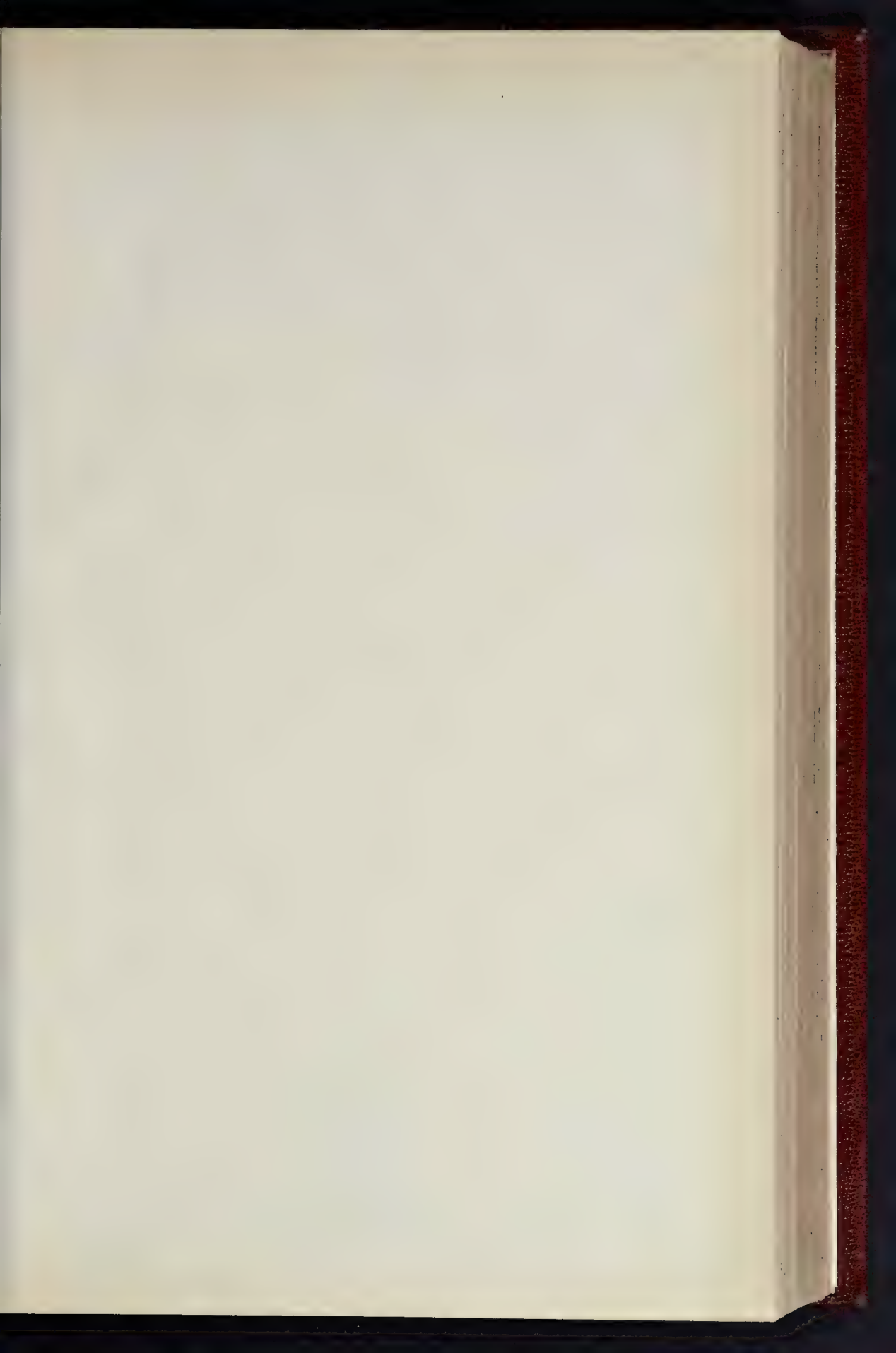




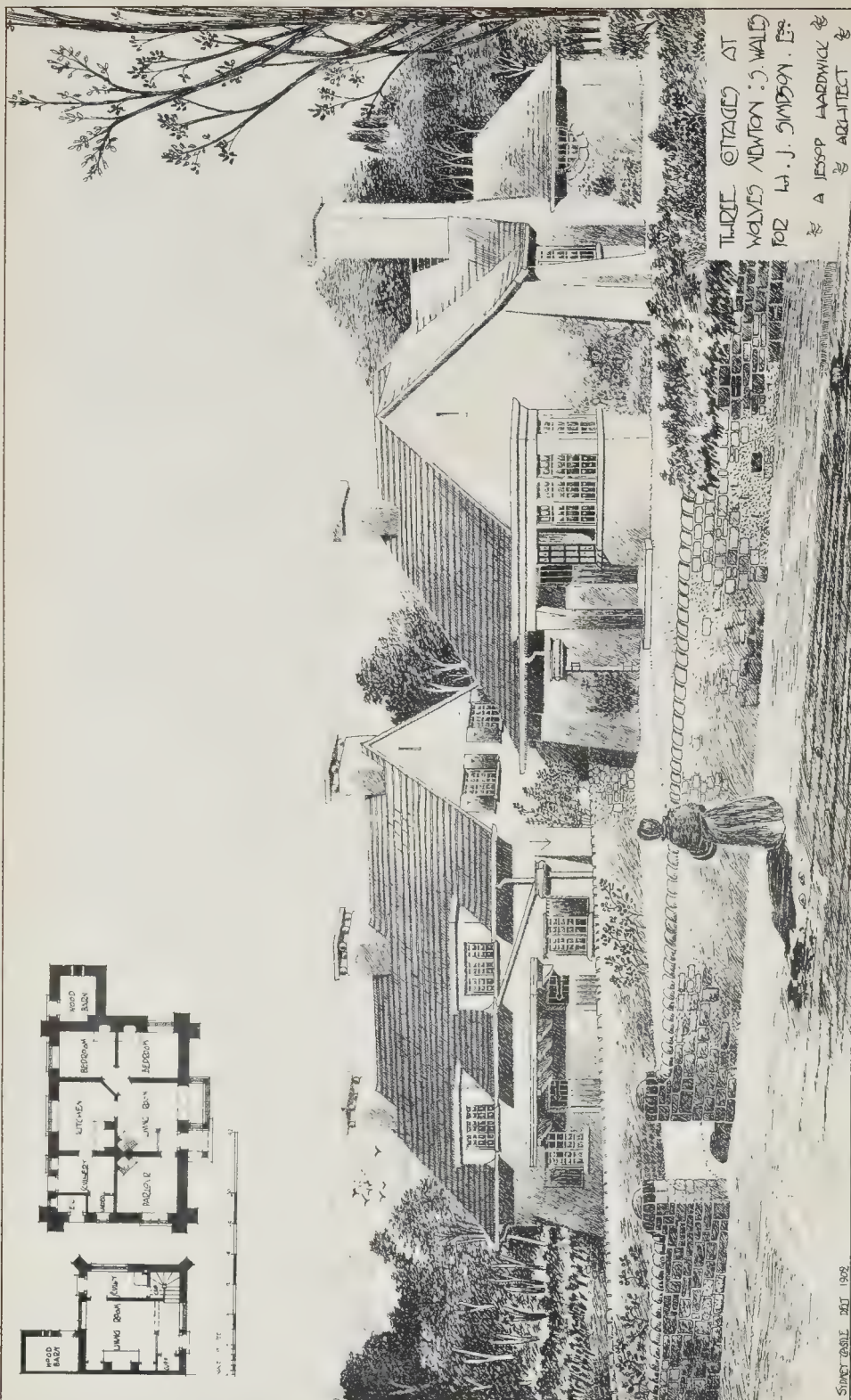
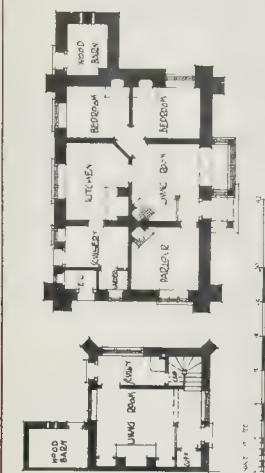
SPRINGUE & Co., Ltd., STAMPS, 100, RAIL JUNCTION ST., E.C.2.

MONUMENT TO GOUNOD: TO BE ERECTED IN THE PARC MONCEAU, PARIS.

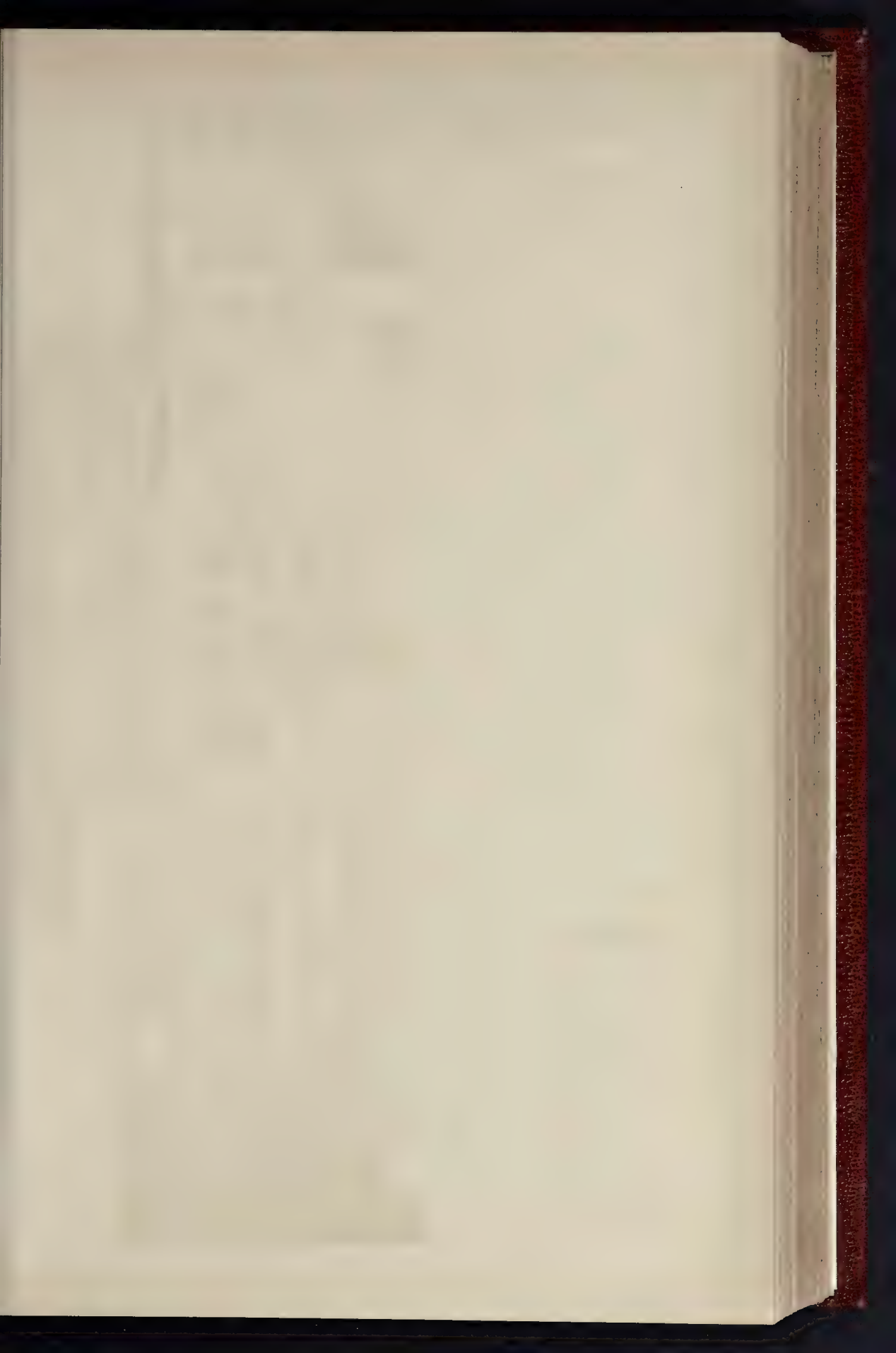
M. MERCIÉ, SCULPTOR: M. FORMIGÉ, ARCHITECT.



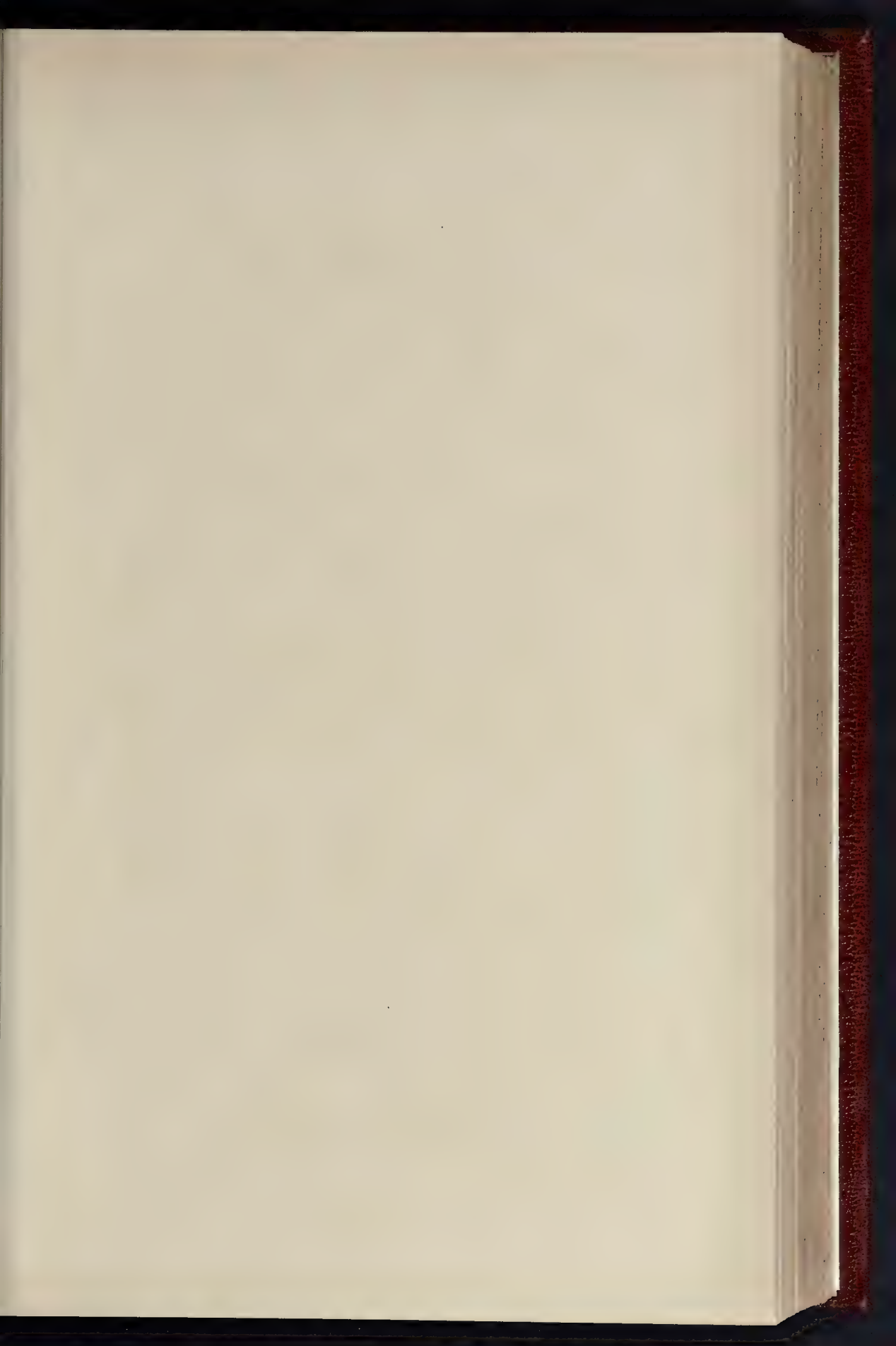
THE BUILDER, JULY 19, 1902.



THE HOUSE AT
WOLVES NEWTON, S. WALES
FOR W. J. SIMMONS, ESQ.
BY A. JESSOP, ARCHITECT &
BY ARCHITECT &







New Premises for S. CLARKINS & SON¹
Cannon Street Birmingham

*Salomon & Salomon.
Archts. Birmingham.
March 1900.*





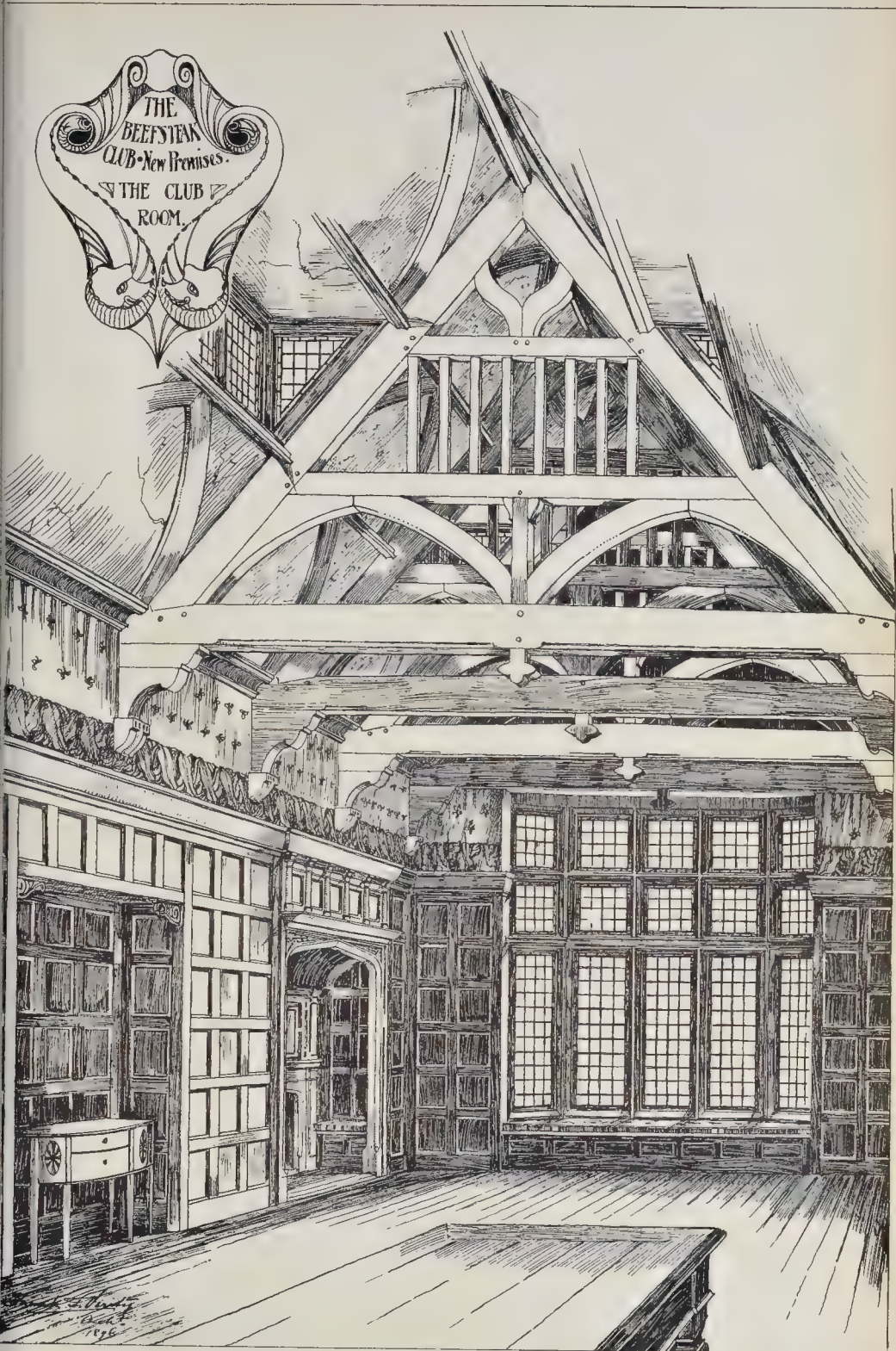
GEO. JONES & SON
Printers - Cornwall St
BIRMINGHAM Nov. 1899
Printed on Robins and Frost's Birmingham





INK-PHOTO SPRAGUE & CO. LTD. 4 & 5, EAST HARDING STREET FETTER LANE E.C.

OFFICE BUILDINGS: 4 COLEMAN STREET, E.C.—MR. E. FLINT, F.R.I.B.A., ARCHITECT.



ally used for important work, for builders have rightly preferred to employ stone which has been in good repute for centuries in preference to an artificial product of unknown value. The rapidly increasing production of the best forms of artificial stone proves, however, that this prejudice is being overcome.

A description of all the artificial stones invented during the last century cannot be given in these columns. The endless list of patentees of artificial stone affords evidence that the possibility of preparing an artificial product to compete with natural stone has been very widely recognised by many successive generations. Only a very small proportion of the inventions can, however, claim to have been of practical utility.

Victoria Stone.—The artificial product known as "Victoria Stone" is one of the stones most extensively used at the present time. It has been in use for some thirty years, and its production has gradually increased to an annual rate of about 15,000 tons, of which some 6,000 tons are used for architectural work, and the remainder mostly for paving.

Victoria stone is a mixture of crushed granite and Portland cement, which, after being moulded into blocks and hardened, is steeped in a solution of sodium silicate. Sodium silicate for stone manufacture is usually made by dissolving flint or a siliceous rock, such as Farnham stone, in caustic soda solution. Farnham stone is a natural rock containing about 40 per cent. of soluble silica, 15 per cent. alumina, and 45 per cent. quartz sand.

The granite employed is obtained from Groby, in Leicestershire, and, after being crushed to the required size, is carefully washed. Portland cement of the best quality is then mixed in the dry state with the crushed granite, and water is subsequently added until the mixture has assumed a suitable plastic condition. The mixture is then placed in moulds and allowed to set. The blocks, when sufficiently hard, are removed from the moulds and immersed for a number of days in a silicate bath. Finally, the blocks are taken out of the bath and exposed to the air for some time before they are permitted to leave the factory. During the process of manufacture the mixture can, of course, be treated with oxide of iron or any other suitable colouring matter to give the finished stone any desired tint.

According to Mr. Henry Reid, the composition of the granite employed, and of the finished artificial stone, is as follows:—

	Groby Granite.	Victoria Stone.
Silica (soluble) ...	0.55 ...	50.35
" (insoluble) ...	65.20 ...	11.87
Alumina ...	13.06 ...	18.33
Lime ...	4.55 ...	2.03
Magnesia ...	1.01 ...	7.73
Oxide of iron ...	0.81 ...	1.80
Carbonic acid ...	0.03 ...	3.81
Soda ...	2.34 ...	1.78
Potash ...	2.85 ...	2.70
Water, &c. ...	0.54 ...	
	100.00	100.00

The practical success of the stone is no doubt largely due to the care taken in its manufacture and in the testing of the raw materials, which result in practical uniformity of the finished stone in both chemical composition and physical properties.

Except in situations where the stone is subjected to severe concussion, as in yards where the unloading of vans is performed, the artificial stone is found to be as good a paving material as natural York stone, and is less costly.

Indurated Slabs are a cheaper form of artificial stone also made by the Victoria Stone Co. These slabs are, like Victoria Stone, made with crushed granite and Portland cement. They are, however, merely steeped in water instead of in a siliceous bath before being air-dried. The output of this stone is about the same as that of the more expensive Victoria Stone, viz., 15,000 tons per annum.

Ransome's Artificial Stone.—Ransome's siliceous stone was one of the first of the modern types of artificial stone to be extensively adopted for building purposes. It is said to have been used in St. Thomas's Hospital, the India Office, the London Docks, and other important buildings; but, so far as we are aware, it is not now manufactured. The stone was produced by mixing sand with sodium silicate and a small proportion of powdered flint or chalk. The sodium silicate was at first made by boiling flints in caustic soda solution, but

afterwards Farnham stone was used instead of flint. When the different substances had been thoroughly mixed in suitable proportions, the mixture was placed in moulds. The blocks thus formed were then treated with a cold solution of calcium chloride and were subsequently immersed in a boiling solution of the same salt. Chemical reaction took place between the soluble silicate of soda and the soluble calcium chloride, and soluble sodium chloride and insoluble calcium silicate were formed. The calcium silicate formed in the interstices of the blocks rendered the blocks as hard and durable as natural stone of the best quality, and the soluble sodium chloride was subsequently removed by treatment with water.

"Non-slip" Stone.—The artificial product known as "non-slip" stone is made with cement and crushed York natural stone. The mixture is made plastic by the addition of water and is then placed in moulds and subjected to powerful hydraulic pressure. The slabs of stone thus manufactured are more uniform in size and are more durable than slabs of natural York stone. They are also less liable to assume a polished surface and to become slippery than stone made with granite. This stone is now used very extensively.

Stuart's Granolithic Stone.—This is a mixture of crushed granite and cement. It is frequently made *in situ*, that is to say, the mixture is prepared and laid in plastic condition on the spot where the stone is required, being used, in fact, like concrete. For paving, for tanks, and for dock work it has proved exceedingly successful.

Other Artificial Stones.—There are a number of other artificial stones in the market. They mostly consist, like those already mentioned, of a good hard natural stone crushed to a granular condition and cemented with Portland cement of the best quality. The hardening of the more expensive descriptions is usually completed by treating them with sodium silicate solution, but with the aid of pressure in the production of the stone very good building material can be manufactured without the use of the soluble silicate.

Moreau's Imitation Marble.—The term "marble" should be applied only to limestones having a crystalline form resembling that of loaf sugar, i.e., to limestones having a "saccharoid" structure. Moreau marble is merely ordinary amorphous limestone, such as Portland stone, so treated that its surface appears like that of polished marble. The stone is not converted from amorphous into crystalline limestone, and it is not therefore converted into marble. The Moreau process, as described in the patents granted in 1892, consists in the following treatment of stone:—

Masses of any white porous limestone are treated either in plain blocks, or after being carved to any desired form. First, varnish is applied to the surface of the stone in spots or streaks, the varnish consisting of "a mixture of turpentine gum thus, and sesquioxide of iron or rouge de Prusse." Next, the stone is immersed in baths of sulphate of iron, sulphate of copper, and sulphate of zinc, the order of sequence and the time of immersion varying with the nature of the stone to be treated and the effect to be produced. The salts of iron and copper impart colour to the stone except where it is protected by the varnish. The stone is then placed in a bath of hot water, and subsequently in a bath of sulphate of zinc to harden it. Finally, the stone is dried and polished. In appearance and polish this substitute for marble compares favourably with the genuine material.

The hardening effect of the sulphate of zinc requires explanation. It is stated that a reaction occurs between the lime and zinc salts, carbonate of zinc and sulphate of lime being formed; but this information does not explain the physical result, for zinc carbonate is not harder or more durable than calcium carbonate, nor sulphate of lime than carbonate of lime.

Artificial Marbles.—The so-called artificial marbles, such as "Sagliola" and "Marezzo," contain no marble, but are merely masses of white plaster treated with suitable colours. The plaster is polished by rubbing it with a hard fine-grained stone and with snake-stone, and finally with linen rag moistened with linseed oil. The plaster employed may be either plaster of Paris or Keene's cement. Keene's cement is made by mixing plaster of Paris with a solution of alum and heating the

mixture to a suitable temperature. Keene's cement can be made to assume a very high polish, and is now most commonly used. Exposure to rain would, of course, soon cause disintegration of these plaster imitations of marble.

The Preservation of Stone.—In 1839 was issued the Report of the Commissioners charged with the selection of stone for building the new Houses of Parliament. In 1861 was issued the Report of a Committee appointed to report upon the cause of the decay of the new Houses. The Commissioners recommended that magnesian limestone, from Bolsover Moor and its neighbourhood, should be employed, and it was commonly thought when the Houses were being built that this stone was being used. When, therefore, the new Houses showed alarming signs of decay soon after their erection, scepticism was naturally aroused regarding the utility of science as set forth in the Commissioners' Report. The Committee of 1861 found, however, that although Bolsover stone had been specified in the contract for building the Houses, the stone actually used was, for the most part, an inferior stone from the Anston quarries, and that proper precautions had not been taken to ensure that only the best stone from the quarries should be used. It is now known that the greater portion of the stone is not so bad as was at one time feared, but the information collected by the Committee with reference to the best means of preserving stone renders the Report a document of great value, and those desiring to study the subject thoroughly will find a considerable number of proposed processes therein discussed.

It would serve no useful purpose to describe in these columns all the schemes, some ingenious and many foolish, which have been proposed for the preservation of stone, but the following brief summary of the prevailing ideas on the subject may be serviceable:—

1. It would probably be possible to treat individual blocks of an inferior stone with such success that they would resist atmospheric influences as well as any good natural stone, but no stone can be satisfactorily treated in a large building after the blocks have been fixed in position. The cost of the treatment would also materially increase the cost of the stone.

2. A solution of silicate of soda will harden most limestones owing to the formation of silicate of lime in the pores of the stone. The soda which is left in the stone after the silica of the sodium silicate has entered into combination with the lime appears as an efflorescence of sodium carbonate or sulphate on the surface of the stone, and is objectionable.

3. A solution of suitable gum resins in petroleum is to some extent serviceable when the stone can be first thoroughly cleaned and then treated until the stone has absorbed as much solution as possible.

4. Treatment with linewater is mere waste of time and money. The absurdity of linewashing was recently pointed out by Prof. Church in a discussion on a paper by Mr. Carde before the Architectural Association (see *The Builder*, April 19, 1902).

5. Treatment with barium hydrate solution is preferable to treatment with lime water because sulphate of barium is insoluble in water, whereas sulphate of lime is soluble. It has been repeatedly proved that the action of the atmosphere is to convert carbonate of lime into sulphate of lime, and in the same way carbonate of barium, which is formed as soon as barium hydrate solution is exposed to the atmosphere, would be converted into sulphate of barium. It is only during recent years that barium hydrate has been produced at a sufficiently low price to render its use practicable, and it is still doubtful whether it is of much value as a preservative.

6. Processes involving the use of barium hydrate, followed by treatment with superphosphate of lime, are of little practical value.

LOCAL IMPROVEMENTS AT ASTON.—A site at Aston Cross for the proposed free library has been presented to the town by Messrs. Ansell, brewers. The building will cost an estimated sum of 2,000l., with 150l. for its equipment. The Town Council propose, with the sanction of the Local Government Board, to borrow a capital sum of 52,436l. for the carrying out of their electrical lighting scheme, and have already, under a Tramways Order, begun the foundations of the generating station. An application has been made by the Council for a charter of incorporation.

OBITUARY.

MR. JOSEPH TALBOT.—We have to announce the death, on June 20, of Mr. John Joseph Talbot, a member of the firm of Messrs. Wilson & Talbot, of Commerce-court, Lord-street, Liverpool. Amongst the more recent architectural works carried out by him and his senior partner, Mr. W. G. Wilson, we may mention cottages at Port Sunlight, for Messrs. Lever Brothers, of which we published an illustration, with a plan, in our number of February 24, 1900; the residence, Plymyard Park, Bromborough, in Cheshire, 1897 (Mr. J. J. Talbot); the gate, lodge, and stabling, Selkirk, on the Bridglands Estate, for Mr. George Rodger, Mr. W. G. Wilson; cottages at Woodchurch, Cheshire, and the new Unitarian Church, which has lately been erected in Bessborough-road, Oxtou, to replace the former, and now demolished, Unitarian Church at Charing Cross, Birkenhead, 1901 (Mr. J. J. Talbot); the Liberal Club at New Ferry; a bungalow at Heswall; the Six Jolly Cockerets at Adlington; and houses at Preston, and Alderley Edge, Cheshire. A drawing of the entrance front of the house at Bromborough is exhibited at the Royal Academy rooms this year.

GENERAL BUILDING NEWS.

CHURCH OF ST. LUKE, HORNSEY.—The foundation-stone has just been laid for a new church, Mayfield-road, Hornsey. The present effort is to build the first portion of the church, comprising the nave and aisle, with vestries underneath. Seating accommodation will be provided for 750 persons. The scheme will not be finished until a vicarage and church hall have been erected alongside the new building. The architects are Messrs. J. E. K. & J. P. Catta, Southampton-street, Strand. The building contract is in the hands of Mr. S. J. Scott, of Walthamstow.

CONGREGATIONAL CHURCH SCHOOLS, BIRKENHEAD.—The memorial stone of the new school in connection with Oulton-road Congregational Church, Birkenhead, was laid on the 10th inst. The architect is Mr. J. H. Cook. The plans provide for a hall (to be used as the general schoolroom), nine classrooms, church parlour, and minister's vestry. A contract had been entered into for the erection of the building for the sum of £2,650.

CHURCH, MORECAMBE.—New church and Sunday school buildings in connection with the United Methodist Free Church at Sandylands were opened at Morecambe a few days ago. Mr. W. H. Dinsley, of Chorley, was the architect, and his plans were accepted in competition. The plan of the church is cruciform, with a sitting accommodation for 370 on the ground floor, and for 330 in the gallery and orchestra. The schools are in two stories, and there is a church parlour, infant-room, and classrooms on the ground floor, and assembly-room above. Inclusive of the site the outlay has been £7,500.

BETHEL NEW CHURCH, BRADFORD.—The memorial-stones were laid recently of Bethel new church and Sunday school, which are being erected on the site of the old iron church at the junction of Ryan-street and St. Stephen's-road, Bradford. The church will provide accommodation for 420 persons. The work is being carried out by Messrs. J. Moulson & Sons, Mr. J. Bolton, Mr. T. Bolton, Mr. G. Wilkinson, and Mr. J. H. Sharp. Mr. W. S. Braithwaite, of Leeds, is the architect.

SCHOOLS, ST. HELENS.—The foundation-stone of new schools for the parish of Sutton, St. Helens, was laid recently on a site at Marshall's Cross. The new building when completed will accommodate about 120 children, and is being erected by Mr. V. Leicester, builder, Sutton, from plans prepared by Mr. F. Biram, architect, St. Helens. The site will allow an extension of the school premises when occasion requires.

MUNICIPAL BATHS, LIVERPOOL.—On the 7th inst. the Baths Committee of the Liverpool City Council opened a "People's Bath," in Beacon-street, in the north-end of the city, and laid the foundation-stone of new baths in Lister-drive, West Derby. At Beacon-street a shower and spray bath may be had for 1d., and a slipper bath for 2d. In September, 1899, the Engineer and Chief Superintendent (Mr. W. R. Court) prepared and submitted a report on the provision of "people's baths" as baths for the poor, and the Baths Committee approved of the report. The building as completed stands on an area of 450 square yards, and comprises seventeen shower and spray baths, and two ordinary slipper baths. The baths are arranged in sections, so that they may be used for males and females. Separate entrances are provided for both sexes, together with waiting-rooms, lavatories, and conveniences. The shower and spray baths are formed in cubicles in the bath hall, and constructed in slate. Each cubicle covers an area of 7 ft. by 3 ft. 6 in. It consists of a dressing-box at the shower and spray cabin; the dressing-box is provided with a seat, clothes-hooks, and foot-board. It is separated from the shower and spray cabin by a slate division, with passage opening having a waterproof curtain; the entrance from bath hall to dressing-box is also protected or screened by means of a curtain. The shower and spray cabin has a portion of its floor depressed, so as to form a foot-bath, the overflow of which is

fixed at such a height as to allow the water to cover the bather's ankles. This allows the bather to soap himself and to wash his feet before using the warm spray bath shower. The shower is placed overhead, and is formed in a circular ring, so that the water does not strike the bather's head, but falls on his shoulders. A small steam boiler is provided in the basement, which will supply the steam for calorifiers to maintain the warm water at a temperature of 95 deg. Fahr. It will also provide the steam for steam coils to drying-houses in laundry, and to the radiators for heating the bathing halls and waiting-rooms. There is a dwelling-house for the caretaker and his wife. A laundry is provided for towel washing. Messrs. Tomkinson & Sons were the contractors for the building work, Mr. Vankinson for the baths fittings, Messrs. Bradford & Co., for the engineering and laundry fittings, and Messrs. John Gibbs & Son for the atmospheric heating; the total cost being 3,500l., not including the cost of the site. The site in Lister-drive contains 6,500 sq. yds.; it has a frontage to Lister-drive of 225 ft. The buildings are set back 100 ft. from the line of the street, provision being made for one swimming bath 60 ft. by 30 ft., one swimming bath 75 ft. by 35 ft., and twenty-seven private baths. Space is also reserved for an additional swimming bath when required. The estimated cost of the establishment is 24,000l. The plans, &c., were prepared by the Baths Engineer, Mr. W. R. Court, Mr. Isaac Dilworth, of Wavertree, being the contractor.

TRURO CATHEDRAL.—Gratifying progress has been made with the vaulting of the nave of Truro Cathedral, which will probably be opened some time next summer. The fractures in the bases of the piers have not extended, and at their new support considerably more weight than was the case twelve months ago, it is believed that they have found their bearings. Much of the scaffolding has been removed from the west side, revealing a handsome façade, in which there are a great rose window and lancet windows. On the south side near the western end is a fine porch, now almost finished. There are eighty-eight niches and panels for figures and other sculptures on the west front and the south-west porch, and a scheme for filling these is being drawn up by a committee. Three or four panels or figures have been promised. Before the new portion of the building is dedicated, four of the lancet windows of the nave will be filled with stained glass already given. The main body of the workmen are just now engaged on the nave, and comparatively few are at work on the central tower. But shortly the tower will be crowned by a parapet, and the erection of the spire will then be commenced.—*Cornish Telegraph*.

INSTITUTE, NEWPORT, MON.—At the Technical Instruction Committee's meeting at Newport, recently, it was decided to proceed forthwith with the erection of the new Technical Institute, the site of which has already been secured and cleared in Clarence-place, and a committee was appointed to superintend the erection of the building, the plans for which have been prepared by Mr. Norman Brown, architect.

ASSEMBLY HALL, LIBRARY, BATHS, & C., BOOTLE.—The new Corporation buildings, which were opened at Bootle on the 27th ult., are situated on the north side of the new railway station, with Sandfield-place. The buildings comprise the following, viz., free public baths, gymnasium, North-end library, reading-room, and public assembly hall, the remainder of the site being laid out as a public garden. The bath block stands on the north and eastern boundaries of the site, and contains an open-air plunge bath 88 ft. 6 in. long by 30 ft. wide, surrounded by a continuous covered-in shed with seats for bathers. There is a soap bath in conjunction with the plunge, wherein children can be thoroughly cleansed before using the same. The gymnasium is situated on the north-east angle of the site, being 22 ft. long and 21 ft. 6 in. wide, furnished with gymnastic appliances, and is in close proximity to the plunge bath, having an entrance from the same and an exit door to the outside. Another feature of this block is the bathing-halls for males and females, in which a number of spray and slipper baths are being fitted up. There are separate entrances from the gymnasium, and through turnstiles on either side of the ticket hall to the respective waiting-rooms. The attendant's house is placed in a central position and immediately in front of the ticket hall. In the basement of this portion is fixed the steam-boiler necessary for the supply of patent heaters for the different baths. There are also cellars for fuel and stores. The public library, reading-room, and assembly hall block faces the front at the angle formed with Sandfield-place, the former rooms being placed on the ground floor. The library and reading-room are 40 ft. by 39 ft. 6 in., and the social room is 22 ft. 6 in. by 24 ft., having a large bay window overlooking Sandfield-place. All the rooms on the ground floor are 15 ft. 6 in. high, and are entered from the Marsh-lane front. The public assembly hall forms the first floor of the above block, and occupies the whole area. The room is 62 ft. long by 40 ft. wide and 25 ft. high. It has a platform at the east end, 13 ft. 6 in. in depth, with suitable retiring-room and conveniences. From the public entrance the hall is approached by a stone staircase

5 ft. wide, which is lined with glazed brick to a height of 4 ft. 6 in., the balustrade being of wrought iron of an ornamental character. There is also provided, at the platform end, an emergency staircase 3 ft. 6 in. wide, constructed of stone and made fireproof. The retaining walls and floor of the plunge bath have been executed with Portland cement concrete. All the other walls are built of brick, having dressings of red pressed brick and terra cotta. The whole of the principal fronts are faced with Rusbon pressed brick and have cotta the boundary walls being carried out with similar material. The principal joiner's work has been executed in selected pitch pine, the roofs being covered with slates. The roofs of the two towers are covered with zinc. Mr. Thomas Cox is the architect, and Mr. Peter Tyson, Liverpool, the contractor.

BUSINESS AND FACTORY PREMISES, HEANOR, DERBYSHIRE.—New premises for Messrs. I. & R. Morley are being erected at Heanor, in the High-street, opposite the present premises. The building will have a frontage to High-street of 30 ft., and will also be continued at the back of the present factory power station. The first room will be the receiving and stocking-room, and will be 70 ft. by 30 ft. The next room is the mill, the dimensions of which will be 112 ft. by 40 ft. Following this is the drying apparatus. The last room of the block is the sorting-room, which fronts to High-street. Messrs. R. & E. R. Sutton, Nottingham, are the architects, and Messrs. Hopeswell & Sons, of Basford, are building the premises.—Alongside the Great Northern Company's station excavations are proceeding for a new factory for Messrs. J. Fletcher & Sons, lace manufacturers, of Heanor. The factory will have a frontage to Derby-road of 141 ft., and will be 75 ft. in length. The outside walls will be 18 in. thick, with a 6 in. bed of concrete. There are three shops, two 50 ft. across, and one 36 ft. Mr. Arthur Marshall, of Nottingham, is the architect, and Messrs. Williamson & Co., of Nottingham, are the contractors.

PAROCHIAL HALL AND INSTITUTE, ST. MARTIN'S, POTTERNEWTON, CONSUMHAM.—An addition is about to be made to the parochial institutions of St. Martin's, Potternewton, by the erection of a hall and institute, at a cost of between 3,000l. and 4,000l., from the plans of Mr. Percy Robinson, selected in a limited competition. Of Morley stone, the building will front into North-croft, immediately opposite the church. The accommodation on the ground floor will comprise five classrooms, and lecture-room or gymnasium, 36 ft. by 26 ft. On the first floor there will be a hall, 80 ft. by 36 ft., which may be used for meetings, entertainments, and other purposes. The hall will be fitted up with a stage and dressing-rooms. A house for the caretaker also forms part of the main building.

MASONIC HALL, RIPON.—The foundation-stone of a new masonic hall to be built at Ripon was laid on the 11th inst. The new premises will occupy a position in Water Skellgate, and the plans of Mr. T. Wall, the architect, provide for a two-story brick building. The main entrance will be in stone-work. A staircase hall, 16 ft. 6 in. long and 9 ft. 6 in. wide, will be divided from the vestibule by a glazed screen. The hall will be fitted up with lavatory and cloak accommodation, and it will have a mosaic tiled floor. On the first floor, which will be reached by a pitch-pine staircase, there will be an assembly room 20 ft. by 11 ft., provided with a small private door from the Tyler's lobby, which will shut off the landing from the lodgeroom. The latter room will be 33 ft. long by 21 ft. wide and 19 ft. high, and will have a domed ceiling. Boyle's air-pump ventilator will be used in the roof. The floor will be in maple, and at the east end of the room will be a raised dais, having as a background a high dado, with circular cornice. Adjoining the lodgeroom will be the Tyler's storeroom, 11 ft. long by 4 ft. wide. There will be another room, 17 ft. by 15 ft., entered from the landing. On the ground floor there will be a dining-room, 22 ft. by 21 ft. This will be entered from the vestibule through a lounge. Attached to the dining-room will be a service-room and kitchen, and between the dining-room and the hall will be a smokers-room, 16 ft. by 11 ft. The woodwork throughout, except the lodgeroom, will be in pitch-pine and varnished. The lodgeroom chairs upon the site. Little is known, but it is on record that the fifteenth century tower was damaged, and the upper portion totally destroyed, by an explosion of some gunpowder stored therein during the 1549 rebellion. St. Sidwell's was first mentioned in a deed of 1119, and was rebuilt in 1437. The Romulists in the tower built a prison. It was during the religious troubles preceding the Reformation that Walter Raleigh, father of the

TOWER, ST. SIDWELL'S, EXETER.—The Bishop of Exeter (Dr. Ryle) re-dedicated on the 15th inst. the tower of St. Sidwell's, Exeter. Of the earlier churches upon the site little is known, but it is on record that the fifteenth century tower was damaged, and the upper portion totally destroyed, by an explosion of some gunpowder stored therein during the 1549 rebellion. St. Sidwell's was first mentioned in a deed of 1119, and was rebuilt in 1437. The Romulists in the tower built a prison. It was during the religious troubles preceding the Reformation that Walter Raleigh, father of the

great Raleigh, was confined within the tower previous to its destruction by the explosion of the tower and the exterior church were of red sandstone, perhaps better known as Heavitree stone. The ruined portions of the tower were repaired in 1606, local bricks being used. At a later period the unsightly brick was plastered with cement. Having fallen into decay, the general fabric of the church was rebuilt, but the north and south early fifteenth century arcades of Beere stone and the tower were preserved. To the tower was added a spire of an unusual construction. It was framed of deal, boarded and covered by sheet copper, removed from the bottom of one of Nelson's men-of-war, which had been broken up at Devonport Dockyard. There were also small pinnacles, and with the monarch spire rearing its head above, bore "the battle of the breeze" for many a year. Mr. E. H. Harbottle, architect, condemned the spire and pinnacles as unsafe, and their removal was effected without the aid of scaffolding within seven days. Mr. Harbottle prepared a design in which he preserved the fifteenth century style, and now the tower of St. Sidwell's stands in all its glory as of old. The addition to the tower has cost nearly £3,000, and has been effected by the gift of the parish lands, under the sanction of the Charity Commissioners. The west window and entrance have been enlarged and beautified. Perhaps the great interesting relic of the tower is the vase—"a rare and fine bird," presented the patrons of St. Sidwell's by the Dean and Chapter of Exeter, as a terminal for the spire when its erection sprung up from the tower. This ancient vase and its chandelier once formed the cathedral's weathercock. It was first erected on the cathedral spire in 1834, and served for 268 years. Then it crowned St. Sidwell's tower for eighty-seven years. It has been replaced on the tower.—*Western Morning News.*

SANITARY AND ENGINEERING NEWS.

WATER WORKS, MERTHYR.—The Upper Neaudd reservoir of the Merthyr Urban District Council was opened recently. The new reservoir has cost £38,000. It has a top water surface of 59 acres, and contains when full 350,000,000 gallons of water. Mr. G. F. Deacon was the consulting engineer.

PROPOSED TUNNEL UNDER THE RIVER ST. LAWRENCE.—According to the Canadian papers, Mr. C. W. Emerson, of Boston, Chief Engineer of the Montreal Subway Company, arrived in Montreal recently to start borings and surveys for the proposed tunnel under the St. Lawrence, from the south shore at Longueuil, under St. Helen's Island, and into Montreal. In the course of an interview, Mr. Emerson said that the new tunnel will be larger than any in the United States, as its dimensions are to be 27 ft. wide and 21 ft. high. It is expected that it will be necessary to tunnel 4,000 ft. under water and 5,000 ft. inland. The structure will be concrete and masonry lined with enameled brick. The shafts will be lighted by electricity. The provisional directors of the company believe that the tunnel can be constructed for 2,000,000 dol.

FOREIGN.

FRANCE.—The drawings sent in by the students of the Villa Medici have been exhibited at the Ecole des Beaux-Arts. In architecture M. Bigot, a first-year pupil, sends a drawing of an ancient capital in the church of St. Maria in Trastevere; M. Garnier, a second-year pupil, sends a drawing of the arch of Titus and the church of St. Maria at Rome; M. Chiffaut, a third-year man, sends a restoration of a Pompeian house; and M. Dufresne, in this fourth year of residence, sends a complete restoration of the Thermae of Caracalla. M. Moncel, the sculptor, has been commissioned by the Government to execute a bust of Madame Albani, to be placed in the Opera House.—The Municipality of Caen has voted a sum of more than 3,000,000 fr. for extensive public works, especially the reconstruction of the on the canal between Caen and the sea, and the improvement of the port of Ouistreham.—A statue of General Hoche is to be inaugurated at Quiberon on the 20th.—The Department of Fine Arts has voted a special fund for the restoration of two monuments of interest at Autun, the Porte St. André and the Porte d'Arrou.—The Conseil-General of the Seine has decided on the establishment of a school of "Arts et Métiers" at Paris, on a site facing the Boulevard de l'Hôpital, for which 1,600,000 fr. has been paid, independent of the cost of the building.—The Académie des Beaux-Arts has awarded the Nicolas Bailly prize to M. Guadet, the eminent architect.—MM. Chaussemiche, Gerhardt, and Ballu have been elected members of the Jury of Architecture of the Ecoles des Beaux-Arts for this year. In place of MM. Tournier, Eustache, and Coudray, the jury has elected a prominent member of the same jury. M. Formigé is carrying out at present the construction of terraces and balustrades on the Esplanade des Invalides, to right and left of the central avenue, over the two spaces which give light to the railway station. The cost will be about 600,000 francs.—The Municipal Council of Paris has recognised the necessity of rebuilding, as soon as possible, the hospitals named Saint Louis,

Cochin, and La Pitié. The scheme will mean an expenditure of about 70,000,000 francs.

M. Maurice Delarue has left to the Société Centrale des Architectes the sum to found a biennial prize to be awarded to the author (not being a Prix de Rome man) of the best work in civil, domestic, or religious architecture executed during the five years previous to the award of the prize.—The new mairie of the XVIIIth Arrondissement, commenced many years ago from the designs of M. Varcollier, is now to be completed.—The Government has authorised the construction of two viaducts over the Seine for the Metropolitan Railway, one at Passy, the other by the side of the Pont d'Austerlitz. The first named, the design of which is to be by M. Formigé, will be of steel and in two stages, like the Pont du Jour viaduct.—M. Denys Fouché has completed the monument to Gavarni to be erected on the Place St. Georges. It will occupy the centre of the existing circular basin, and will consist of a gilt bronze bust of Gavarni on a marble pedestal, around which are figures in relief symbolising the principal works of the celebrated caricaturist.

NEW BUILDINGS IN HAVANA.—The Academia de Ciencias, Havana, has been opened after important additions, to improve the library accommodation for a school of architecture, engineering, and the kindred sciences. The new parts consist of an entrance hall; on either side are libraries on the first floor, one for study, one for reference, and one for general reading of scientific periodicals, &c. On the second floor are a large meeting-room, laboratories, open galleries, &c. The new buildings are furnished with electric light. The contractors were Messrs. James B. Clay & Sons, of Havana, New York, and Chicago. The architect is Mr. James S. Angus Mercer.—In the same town and by the same architect the Escuela de Artes y Oficios has also been completed. This building is two stories of 20 ft. to each floor, and is fireproof, and arched with brick arches, concrete, and finished with tile floor. The exterior is in a phase of French Renaissance and there is a clock tower on the principal façade.

RUSSIA.—Russian art has sustained a heavy loss by the death of the sculptor, Autobolsky, a member of the St. Petersburg Academy. His most important works were "Peter the Great," "The Dying Socrates," and "The Fettered Christ before the People."

GERMANY.—The German Admiralty has purchased a site in the Bellevue-strasse, close to the Potsdamer-platz, in Berlin, for six million marks, with a view of building a new Admiralty office, so that all the Navy bureaux—which are at present scattered—can be accommodated under one roof.

AUSTRALASIA.—The Tivoli Hotel, Sydney, is about to be greatly enlarged. Messrs. Backhouse & Backhouse, of that city, are the architects.—Municipal buildings are about to be erected at Moree from designs by Mr. G. L. Grant, of Pitt-street, Sydney.—As a result of the recent convention of the Federated Master Builders' Association of Australasia, held in Sydney, technical education is to be more rigidly insisted upon in the building trades, and examinations are contemplated. It is stated that the apprenticeship system has practically died out in the colony.—A beautiful red marble has recently been found and opened up at Boreenore, near Molong, in New South Wales. Blocks up to four tons are obtainable.—A large hotel is to be erected at Christchurch, New Zealand, at a cost of 25,000.—Mr. E. S. Lattrell, of that city, is the architect.—The Wellington (New Zealand) City Council has decided to erect a new town hall.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.

Messrs. John King, Limited, warming and ventilating engineers, Liverpool, have opened London offices at 7, Quality-court, Chancery-lane.—Messrs. Archibald Dawney & Sons, engineers (London and Cardiff), have appointed Mr. Hilliard Stephens, of 39, Victoria-street, Westminster, as their agent for the Metropolitan district.

FIRE TESTS WITH DOORS.—The British Fire Prevention Committee, again, under two test with fire-resisting doors on the 6th inst. at their Testing Station, Bayswater, when wood doors, protected with uraltite slabs, were under investigation. There was a large attendance of visitors, who were received by Mr. Edwin O. Sachs, Chairman, and Mr. Ellis Marsland, Hon. Secretary, and among the party were the official representatives from the War Office, Admiralty, several Government Departments, and the leading Insurance, Railway, and Shipping Companies. In the one case, the door was protected by uraltite slabs alone, and in the other case, by uraltite slabs and light metal sheeting. The duration of the test was one hour and a half, at temperatures rising to 1,800 deg. Fahr, and although the smoke passed through the joint, between the doors and the frames, and the fire side of the doors was badly injured, the fire did not pass through the doors. The official report will be issued in due course.

PUBLIC PARK, VALE OF LEVEN.—The new public park given by Mr. John Christie, of Gallan-gall, to the inhabitants of the Vale of Leven, has just been formally opened. The park, which is about

74 acres in area, is situate at the north end of Alexandria, with a front entrance from Main-street and a side entrance from Middleton-street. A white stone lodge, which comprises keeper's house and public rooms, from designs of Mr. J. Miller, architect, Glasgow, has been erected at the main entrance. There is also a bandstand and fountain. The ground has been laid out by Mr. Leitch, Rothesay, from designs by Mr. Whitton, Superintendent of Parks, Glasgow.

REGISTRATION OF PLUMBERS.—Nineteen master and operative plumbers, applying for registration under the National Registration of Plumbers, attended at King's College for examination a few days since by the Worshipful Company of Plumbers. The candidates were from various parts of London, and also from Bedford, Egham, Redhill, Rochester, and Saffron Walden. The practical test included lead-bossing and the making of plumbers' joints, &c. The examination questions included the subject of contamination of drinking water from faulty connexions, roof-covering, arrangement of bath, sink, and closet waste, drainage of town houses, and disconnection with sewers. The examiners were Mr. Charles Hudson, master plumber, Chairman of Board of Examiners; Mr. J. Knight, master plumber; and Messrs. F. Oakes and G. Wilson, representing the United Operative Plumbers' Association of Great Britain and Ireland. Nine candidates succeeded in passing the examination.

NELSON-SQUARE, BLACKFRIARS-ROAD.—The owners and tenants of Nelson-square have under their consideration the ratification of a scheme for the permanent acquisition and up-keep of the garden of the square as an open space for public recreation and enjoyment. The conditions are that Lord Halifax shall effect a conveyance in favour of the Southwark Borough Council, and that the owners and occupiers shall relinquish their rights in the square and its garden, and contribute one half of the estimated cost, which amounts to 2,800l., of making-up and paving the roadway and footpaths. Their several contributions are to be assessed at so much per foot-frontage of their respective premises, and the footpaths and roadway will be made-up and maintained at the public expense.

CEMENT IN THE CANARY ISLES.—Mr. Croker, British Consul in the Canary Islands, reports that the increasing demand there for cement was met last year chiefly by Belgian shippers. The imports from Belgium rose from 1,113 tons in 1900 to 2,120 tons in 1901. British shippers, however, secured a share of the business, sending some 500 tons, and if they could keep down the price, even were it only to the level of that asked by their neighbours, more of it would fall to their share. Shipments from France fell away to some extent, but she sent more than the United Kingdom.

METROPOLITAN ASYLUM BOARD.—At a meeting of the Metropolitan Asylum Board on Saturday last week, the Works Committee reported that in view of the adjournment of the Board, and the desirability of obtaining tenders for works at the earliest possible date, they had appointed the following firms of quantity surveyors to take out the quantities of the undermentioned works at a commission, in each instance, at the rate of 1 per cent. upon the amounts of the accepted tenders, viz.:—Messrs. John Leaning & Sons, John-street, Bedford-row, W.C., additional accommodation for female staff and sanitary annexes at Caterham Asylum (estimated cost, 5,000l.); Messrs. W. H. Barber & Son, Buckingham-street, Adelphi, W.C., cottages for married attendants at Levensden Asylum (estimated cost, 5,500l.); Messrs. Fowler & Hugman, Crane-court, Charing Cross, W.C., receiving home for children and stable buildings at the Tooting Bec Asylum (estimated cost, 15,465l.).

QUEEN VICTORIA STATUE, CARLISLE.—A monument erected by the citizens of Carlisle to the memory of Queen Victoria in their Public Park has just been unveiled by His Royal Highness Prince Christian of Schleswig-Holstein. A short time after the death of the late Queen the Town Council resolved to perpetuate the memory of her Majesty by erecting a bronze statue upon some suitable site within the city. They arranged with Mr. Thomas Brock to provide a replica of the statue which he had just executed for Hove, Brighton, as a Diamond Jubilee monument. The site in the Public Park was approved by Mr. Brock and adopted by the Corporation. The statue, which is 13 ft. high and cast in bronze, represents her Majesty in Imperial robes over bodice and skirt, wearing an Imperial crown. In one hand she holds an orb surmounted by a figure of Victory, and in the other a sceptre. The panels on the die of the pedestal, which are in bronze, represent Empire, Education, Science and Art, and Commerce. The statue stands on a pedestal of Aberdeen grey granite, and the pedestal itself has been placed on three steps of the same stone. The pedestal, which is 15 ft. high, was supplied by Mr. Taylor, of Aberdeen. The concrete foundations were laid by the Corporation workmen under the direction of Mr. Marks, the City Surveyor.

ADMIRALTY BUILDINGS ARBITRATION.—The dispute between the contractors and the Office of Works with respect to certain extras incurred by the contractors in the erection of the new Admiralty buildings, was the subject of an arbitration inquiry opened before Mr. E. A. Gruning on the 10th inst. at the Surveyors' Institution. The contractors, Messrs. Chessum & Sons, were represented by Mr.

Cripps, K.C., and Mr. Hudson, and the Office of Works by Sir Robert Finlay (the Attorney-General) and Mr. Askwith. Mr. Cripps, in opening the case for the contractors, pointed out that the difficulties between the parties had reference to the shoring-up of the old Admiralty buildings, and to questions of foundations and underpinning. The contract was a lump sum contract, and there were certain provisions for ascertaining what should be paid to the contractors if they incurred extra cost in carrying out the works. It was for the arbitrator to say what sum should thus be allowed. The shoring-up of the old building had to be carried to a greater depth than was shown on the contract plans, and owing to the extra depth to which the foundations of the new buildings had to be taken, the character of the timber from top to bottom had to be altogether altered. With regard to the underpinning of the old buildings, Messrs. Chessum were called on to do the work on the principle of short lengths, and therefore the lump sum price applicable to short length work was not applicable to the work which had actually been done. Owing to the extra depth of the foundations, very difficult excavation and piling was rendered necessary. Mr. R. Chessum, of the contracting firm, stated that the tender for the execution of the work amounted to £5,596. At one point witness explained they had to carry the foundations to an extra depth of between 10 ft. and 11 ft., and this was due entirely to war, which had to be pumped away. The whole of the soil below the contract depth was water-bearing. After detailing the extra work done, witness informed the arbitrator that he was instructed to do it by the clerk of works and by Messrs. Leeming & Leeming. The hearing was adjourned.

THE SANITARY INSTITUTE CONGRESS.—The preliminary programme of the nineteenth Congress, to be held in Manchester, from September 9 to 13, has now been issued. Earl Egerton of Tatton is the President. Mr. W. N. Shaw, F.R.S., will deliver the lecture to the Congress, and Sir W. J. Collins, M.D., Member of the London County Council, will deliver the popular lecture. Excursions to places of interest in connexion with sanitation, and a conversation, will be arranged for those attending the Congress. Over 300 authorities, including several County Councils, have already appointed delegates to the Congress, and, as there are also over 2,500 members and associates in the Institute, there will probably be a large attendance in addition to the local members of the Congress. In connexion with the Congress, a Health Exhibition of Apparatus and Appliances relating to health and domestic use will be held, as a practical illustration of the application and carrying out of the principles and methods discussed at the meetings. The Congress will include three general addresses and lectures; three sections meeting for two days each, dealing with (1) Sanitary Science and Preventive Medicine, presided over by Sir James Crichton-Browne; (2) Engineering and Architecture, presided over by Sir Alexander Binnie; (3) Physics, Chemistry, and Biology, presided over by Professor A. Sheridan Delepine. Eight special conferences as follows:—"Municipal Representatives," presided over by Alderman Alex. McDougall, Vice-Chairman of the Health Committee, Manchester; "Port Sanitary Authorities" (Alderman Walton Smith, Chairman of Manchester Port S.A.); "Medical Officers of Health" (Mr. James Niven, Engineer and Surveyor to County and other Sanitary Authorities" (Mr. Charles Jones); "Veterinary Inspectors" (Mr. W. Augustus Taylor); "Sanitary Inspectors" (Mr. W. Bland, Sanitary Inspector, Barton-upon-Irwell); "Domestic Hygiene" (Mrs. W. O. Meeh); "Hygiene of School Life" (Professor C. S. Sherrington). The local arrangements are in the hands of a local committee, presided over by the Lord Mayor of Manchester, with Mr. J. H. Reynolds, Principal of the Municipal School of Technology, as Honorary Secretary.

LEGAL.

DISPUTE BETWEEN ELECTRICAL ENGINEERS.

THE hearing of the case of *Bunce v. W. A. S. Benson & Co., Ltd.* was concluded on the 10th inst. before Mr. Justice Ridley and a special jury.

In this case Mr. Edward George Bunce, an electrical engineer, trading as Bunce & Co., at Nottingham-street, W., sought to recover damages for alleged libel from the defendants, electrical engineers, of 83 and 85, New Bond-street, W.

It appeared that in June, 1901, the plaintiff was employed as electrical engineer by a firm known as Messrs. Elliott, Son, & Boyton, to do certain work in connexion with the installation of electric light at No. 80, Gloucester-place, W. In September of that year the defendants, who had been engaged by a Mr. Eckersley, a gentleman who had become a tenant of the house through Messrs. Elliott, Son, & Boyton, to put fittings on the wiring work which the plaintiff had done, made the following report to Mr. Eckersley:—"Report of existing electric light wiring at 80, Gloucester-place, W. The house, which has been wired for some seventy-five points, or say eighty-five lights, is, we find, provided with only six double pole fuses to protect these. This is not in conformity with the Metropolitan company's rules, and may be objected to by them. The

system of distributing employed will necessitate the use of fuses in ceiling roses and wall plugs, a not very satisfactory arrangement, and one which has been discontinued for some time by most contractors. Owing to the manner in which the fuse-board has been connected up, the failure of one particular fuse would extinguish no less than twenty-five lights, probably putting two floors in complete darkness. There is, of course, no great harm in this, but the inconvenience caused will be readily appreciated. We certainly think that this fuse-board ought to be taken down, and the wires sorted out and connected up in their proper order. . . . The following work which we have noticed does not satisfy the requirements of the fire insurance companies—Wires under floors, in partitions, behind skirtings run without covering of wood casing or metal tubes; joints between wires merely twisted up and given two or three laps of tape, no solder used."

—(Signed) W. A. S. Benson & Co., Ltd.; C. J. Scott, Electrical Manager." The plaintiff alleged that this report was a libel upon him in his business, the innuendo being that the work at the house had been done in an inefficient manner, and that the house might easily take fire owing to the improper workmanship. He alleged that he had by the report been greatly injured in his credit and reputation as an electrical engineer, and accordingly claimed damages.

The defendants denied that the report bore the meaning alleged, or that it was libellous of the plaintiff. They also said that it was true in substance and in fact.

Mr. R. A. McCall, K.C., and Mr. Clarke Hall appeared for the plaintiff, and Mr. J. Eldon Banks, K.C., and Mr. Boydell Houghton for the defendants. Mr. McCall, in opening the case, said that the plaintiff had had a large experience, since he commenced practice as an electrical engineer in 1897, and he had done a large amount of business with the well-known firm of house agents, Messrs. Elliott, Son, & Boyton. These people had through their hands in the course of every year a large number of houses, and in opening the case, said that the electric fittings they had employed the plaintiff to do it. In May or June of last year they employed him to fit up the house No. 80, Gloucester-place, with wires. Plaintiff gave his estimate, which was accepted, and he did the work. The house was wired and it was left to the incoming tenant, Mr. Eckersley, to put in the necessary fittings. Defendants sent their man, who made a cursory examination, and on the strength of that made the report complained of on the nature of the work done by the plaintiff. That report the plaintiff said was not only impertinent, but untrue, and reflected seriously upon his reputation.

Mr. Edward George Bunce, the plaintiff, examined, said he was an electrical engineer, the defendants being also well-known electrical engineers. For the past five years he was constantly doing business with Messrs. Elliott & Co. Last year he received a letter from them asking for an estimate for the wiring of No. 80, Gloucester-place. He sent in an estimate, and was engaged to do the work. The wires were put in wood casing under the floors, and in steel conduits up the walls. On September 13, when the report in question was made the wiring was completed, but no switches were fixed anywhere. At that date another fuse-board had to be fixed in the house, and the work was to be taken away. Apart from that the rest of the work was finished. On September 16 he received a letter from Messrs. Elliott & Co. enclosing a copy of the report he complained of. He was not aware until he received a copy of the report that the defendants had made an inspection of the premises. He went with a man to the house next day to see what had been done. The boards on two floors only had been taken up. Without removing the floor boards, it was impossible for anybody to see whether the wires were cased or not. The skirtings had not been removed. He did not find that any of the wires under the floors, or behind the skirtings, or up the walls, had been altered in any way. The wires left by him had been passed by the Metropolitan Electric Supply Co. Messrs. Elliott had paid him for the work. On November 10 he had an interview with Mr. Scott, representing the defendants, at his solicitor's office. His solicitor told him of the serious nature of the libel, and told him that if he went home and wrote a letter to Messrs. Elliott & Co., and Mr. Eckersley, saying there was no foundation for the report, there would be an end to the case. Scott promised to do this, but demurred to paying his solicitor's costs, then amounting to about £25. So far as he knew Scott had not written the letter, and there had been no apology.

Cross-examined by Mr. Banks. He kept at the work till July, and on July 5 the wiring was substantially finished. On July 11 his man put in a 6-circuit distributing board. Between August 2 and September 20 none of his men were in the house at all. There was nothing in the house to indicate that he had wired it. He admitted that the first distributing board put in was wrong, and after the report he put in another—an 8-circuit board. The wrong board was put in through the mistake and fault of a clerk. He wrote to Messrs. Elliott & Co. and told them that he had not completed his contract when defendants went to the house, and that was true. It was quite true that

the defendants, directly they heard that the work was not finished, sent to Messrs. Elliott & Co. and said that as he (plaintiff) had not finished the work, he had better do so, and not they, and that they would withdraw their report. He had no complaint to make of that, but he did particularly complain of the statement in the report that the joints had not been properly soldered. They were properly soldered.

His Lordship said that he could not see where the libel was.

Mr. McCall said that the report cast a very serious reflection upon the plaintiff.

In the result Mr. McCall stated that he was glad to say that the parties had come to terms, and it would not be necessary to trouble his Lordship or the jury further with the case. It had been arranged that the record should be withdrawn, the plaintiff agreeing to pay one-half of the defendants' taxed costs of the action on defendants stating that they laid no personal blame on the plaintiff for what had happened.

Mr. Banks said that his clients had no wish to be hard on the plaintiff. The defendants had never blamed plaintiff personally for what had happened.

His Lordship concurred in thinking that no personal blame at all attached to the plaintiff.

The record was then withdrawn on the terms stated.

SUSSEX DRAINAGE DISPUTE.

THE case of the Mayor, &c., of Hove v. the Brighton Intercepting and Outfall Sewers Board came before Mr. Justice Kekewich in the Chancery Division last week, an action by the plaintiffs against the defendants, claiming a declaration that plaintiffs were entitled to discharge, and that the defendant board were bound to admit into the defendants' intercepting sewers, all the sewage of the Borough of Hove, including the sewage of that part of the borough which was within the parish of Aldington, and an injunction to restrain the defendants from excluding the plaintiffs from the exercise of the above right. The intercepting sewers which run along the front of Brighton and part of Hove, from Cliftonville to the outfall at Portobello, were constructed under an Act passed in 1870, which was an Act for making intercepting and outfall sewers from Brighton and the adjoining district (part of the district which afterwards became the urban district of Hove), then under the jurisdiction of the West Hove Commissioners and the Brunswick Square and Terrace Commissioners, and which Act vested such sewers in a representative sewers board. The plaintiffs' case was that by virtue of the Hove Commissioners Act, 1873, and an order of the County Councils of East and West Sussex made in 1890, under the provisions of the Local Government Act, 1888, which provided that the area of the parish of Aldington should be transferred from the rural sanitary district of the Steyning Union and form part of the urban sanitary district of the town of Hove, and that the Hove Commissioners Act should be read as if the words "the parishes of Hove and Aldington" were inserted instead of the words "the parish of Hove," the plaintiffs were entitled to bring the drainage of Aldington, which was not originally a district within the purview of the Sewers Act of 1870, either directly by means of openings into it, or indirectly through their own sewers into the intercepting sewers of the Board. The plaintiffs claimed further that under Section 36 of the Act of 1870 they had a right to the sewage of Aldington, and that part of the district of Hove or not, to insist upon the admission of such sewage into the defendants' intercepting sewers on payment of compensation, as being a place lying beyond the limits of the Local Authority therein mentioned. The defence, shortly, was that Aldington was not entitled as part of the district of Hove, and of right, to the benefits of the Act of 1870; and that Section 36 had no application to the case.

In the result the action was dismissed, with costs.

Mr. Macmorran, K.C., and Mr. R. J. Parker appeared for the plaintiffs; and Mr. Cripps, K.C., Mr. Boxall, K.C., and Mr. Manby for the defendants.

WORKMEN'S COMPENSATION ACT.

WHAT IS A "SCAFFOLD" AND WHAT IS "REPAIRING"?

A CASE came before Judge Stonor on Friday last at Brompton, in the County of Kent, William Plinck, a house painter, Alderville-road, Fulham, S.W., applied under the Workmen's Compensation Act for compensation against Mr. Joseph Welch, builder and decorator, Harwood-road, Fulham, the claim being in respect of personal injuries said to have been sustained by the applicant whilst in the respondent's employment.

Mr. J. Gibson, solicitor, appeared for the applicant, and Mr. E. F. Leaver, counsel, for the respondent.

Applicant's solicitor explained that on April 10 last his client was in the respondent's employment, assisting in whitening the walls and whitewashing the ceilings at a house in Waterford-road, Fulham. In order to reach his work, the man was obliged to

from a sort of scaffold, by resting a scaffold board upon two pairs of ordinary builders' steps, one pair standing at each side of one of the rooms. It appeared that while the applicant was getting upon the scaffold, the front portion of one of the steps broke, causing the man to fall. His injuries necessitated his keeping from work for seven weeks. Shortly after the accident—continued Mr. Gibson—an agent from the company with which the respondent appeared to be insured called upon the applicant, asking him to accept 20s. in settlement of his little damage away from the walls. All that was the respondent refused; but probably his Honour would say that by making the offer the other side admitted their liability.

The applicant bore out his solicitor's opening statement.

In cross-examination, applicant said that the two pairs of steps were not leaning against opposite walls of the room, but were opened and standing a distance from the walls. All that was being done to the house was the washing off and papering of the walls, and the whitewashing of the ceilings of some of the rooms. Counsel for the respondent submitted that the evidence did not go to show that the building was being "repaired," within the meaning of the Act; and also, that it had not been shown that the building was being repaired by means of a "scaffold," within the meaning of the Act. Recent decisions concerning such points in the Workmen's Compensation Act, continued the learned counsel, had been extremely contradictory, but he submitted that, although it had been held that whitewashing of ceilings and washing or tempering of walls, with certain structural alterations of the building, came under the heading of "repairing," the whitewashing of ceilings and preparing of walls for papering alone would not be "repairing." The work must be of a more substantial character in order to be classed as "repairing," as intended by the Act. He did not go so far as to say that the man claiming compensation must necessarily have been engaged in substantial work, but that the work being done on the building must be of a substantial nature. With regard to the question of the scaffold—it had been held, in the recent case of Wood v. Walsh, that two pairs of trestles with a board laid upon and between them was a "scaffold," within the meaning of the Act, although later cases went to show that this was a matter of law and fact combined. He submitted, however, that there was no case which went so far as to show that a couple of pairs of step-ladders with a board across them could be called a "scaffold." According to ordinary English usage of the word, such a small contrivance was not a scaffold, and he submitted that recent decisions went to support him in his contention. Trestles were often the basis of a scaffold, but step-ladders were quite different. A pair of steps was put to a wrong use, he submitted, when used with a view to forming a scaffold.

Mr. Joseph Welch, the respondent, and James Brown, who was assisting on the job in question, gave some evidence as to the position of the "scaffold," both before and after the accident.

The Judge said he thought that the applicant had been working upon a "scaffold," but the question then had to be considered as to whether the house was being "repaired," as mentioned in the Act. His Honour did not see why painting and whitewashing should not be included under the heading of "repairs," but there seemed to be a tendency in recent decisions to the effect that they should not be so included. It seemed that there must be something of a structural character involved in the work to bring it under the heading of "repairs." There was a distinction, although he thought it was a very narrow one. If it had not been for some recent decisions, he thought he would have been inclined to find for the applicant; but in the light of such decisions, he did not think that the present case was one in which the building was under "repair," within the meaning of the Act. Therefore he must find for the respondent. His Honour also allowed costs.

IMPORTANT CASE UNDER THE LANDS CLAUSES ACT, 1845.

THE case of the Long Eaton Recreation Grounds Co., Ltd., v. The Midland Railway Co., came before the Court of Appeal composed of the Master of the Rolls and Lords Justices Mathew and Cozens-Hardy on the 14th and 15th insts., on the appeal of defendants from the judgment of Mr. Justice Lawrence sitting without a jury, at Derby, on August 12, 1901.

This was an action upon an award. The defendants were in the simple of land situated on the north-west of Springfield-avenue, Long Eaton, in the county of Derby, which they purchased from grantees of the plaintiffs. The conveyances from the plaintiffs to these grantees contained covenants that they would not erect or permit to be erected any erection or building of any kind except a fence rail not more than 2 ft. high, with suitable iron posts, nearest to Springfield-avenue than the line drawn on the plan annexed to their conveyance and marked "building line," and would not erect any buildings on the land conveyed other than private dwelling-houses with proper conveniences thereon, situate on Springfield-avenue, of a certain value, and could not carry on upon the land conveyed any

trade or business of a noisy or offensive character. The defendants, when they purchased the land in question from these grantees of the plaintiffs, took with notice of these restrictive covenants, and they constructed a railway embankment with a permanent railway upon the land. It was admitted that the embankment encroached beyond the building line. Instead of a 2-ft. fence wall, defendants erected a post and rail fence nearer Springfield-avenue than the building line, and ran trains along the railway.

Mr. Justice Lawrence was of opinion that each of these specified acts, if done by a private purchaser of the plaintiffs' land, would have been a breach of the restrictive covenant, for which such a purchaser would be liable to be restrained by injunction. On behalf of the defendants, it was contended that a railway embankment was not a "building," within the meaning of the covenant, but his Lordship held that a railway embankment alone—namely, without its possible appurtenances, such as signal-boxes, &c.—was a building within the meaning of the covenant, the object of which was to maintain a uniform range of buildings. The question in the case was whether the land of the plaintiffs had been "injuriously affected" by the execution of the defendants' works within section 68 of the Lands Clauses Act, 1845. His Lordship held that there had been a physical interference by the defendants with the right of the plaintiffs to have no buildings other than those of a certain size and description, as specified in the covenant, erected on land which the defendants had taken. There had been a similar interference with the plaintiffs' right to have the building line regarded, and the brick wall built as provided, if built at all, and that there had also been an interference with their right by express covenant that this land should not be used for any business of a noisy character. For what the defendants had done his Lordship thought the plaintiffs were entitled to compensation, and gave judgment for them for 650*l.*—the amount of the award with interest. Hence the present appeal of the defendants.

Mr. Baggalay, K.C., Mr. W. J. Noble, and Mr. C. H. Sargent, appeared for the appellants, and Mr. Hugo Young, K.C., and Mr. W. H. Stevenson for the respondents.

At the conclusion of the arguments of counsel, their Lordships held that as a restriction had been put on the user of the land for the benefit of the neighbouring land, the withdrawal of that benefit was subject matter of compensation. The judgment of Mr. Justice Lawrence was affirmed, and the appeal dismissed with costs.

CORRECTION.—In our last issue, on page 41, in our report of the Fleet-street Ancient Light Dispute (Cooling v. Rust) the name "Mr. Edgar Ross" occurs. It should have been David A. Ross.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

5,308.—A COMBINED WIND-VANE AND ANEMOMETER: *J. Barendsen and F. L. Halliwell.*—The pressure in a tube which a vane keeps opposed to the wind is conveyed down another tube to the velocity-recording apparatus, whilst a long rod that turns with the vane works the direction-recording apparatus. The force of the wind upon a plate that moves against a spring indicates the amount of pressure upon a dial which also serves as a vane. The plate is secured to rods that can freely slide lengthwise and are joined with a cross-bar to the spring. The plate is locked so as to prevent it from moving back by means of the action of a perforated hinge upon a rod which is joined to the cross-bar. A pull upon a rope that acts through crank-levers will release the clutch. The maximum pressure is registered by an indicator worked with a rack and pinion, and a dash-pot and piston restrain the action.

5,311.—A CIRCULAR SAW GUARD: *M. Mindelsohn (Birmingham Cabinet Manufacturing Co.).*—At the back of the saw-bench is a pedestal which carries a horizontal arm, on the end whereof a boss is secured with a set-screw. On the boss is a lug, which is bolted on to a pivoted arm that is stopped and slot join the front guard to the outer end of the arm, and a backward projection from the boss carries the riving-knife, which has a corrugated section.

5,313.—A GUIDE FOR BAND-SAWS: *T. Lees, R. Lees, and W. Lees.*—Two pulleys, mounted above and below the saw-bench, respectively, support the back of the saw. The cylindrical surface of the saw is pressed against the cylindrical surface of a boss. A larger disc, having a detachable facing of steel, supports the back of the saw. The spindle of the upper pulley can be fixed adjustably in a cross-slot with a screw. The back of the saw is prevented from cutting grooves in the steel facing by means of the turning of the pulleys.

5,319.—PULLEYS FOR WINDOW SHUTTERS: *A. V. Campbell.*—Through the window frame is inserted a spindle which is slotted at its one end and screwed at the other and carries one loosely-mounted pulley or more; the mortises for the pulleys can be provided with linings.

5,336.—A MATERIAL FOR INSULATING AND OTHER PURPOSES: *J. Stocker & H. Zander.*—The compound is made of caustic potash dissolved in water with the addition of borax and a solution of finely pulverised soap-stone, and the paste is kept during some while in a vessel hermetically closed; when the superfluous liquid has been drained away there are added calcined or feather alum, calcined magnesite, chloride of calcium and Brazilian wax or some such similar ingredient; the material is described as being available for making tubes, plates, and bars, imitation marble, slate and granite, and other goods for covering roofs and walls.

5,346.—PROCESS OF CALCINING CEMENT: *B. B. Lathbury and H. S. Spackman.*—Powdered fuel is injected for the heating of rotary kilns. An elevator raises the cement clinker, after its discharge at the lower end of the kiln, into a hopper, whence a distributor feeds it into a receiver cooled with air, the hot air being conveyed by a trunk to a fan for setting up the blast that feeds the fuel. The distributor comprises a doubly-tumbling bucket, by which the material is alternately tipped from two quadrantal compartments, and which also prevents heated air from leaving the cooler. A screw conveyor feeds the ground fuel into a hopper, the stream of fuel being turned with a diaphragm over the mouth of a nozzle whence flows the hot air blast.

5,348.—A FIRE-ALARM: *W. S. Lewis.*—The inventor contrives that the escape of compressed air occasioned by fire shall close an electrical bell circuit. The weight of a rod compresses the air in a bellows which is joined to a fusible closed pipe that is passed through the rooms of a building so that, in the event of a fire, air will escape from the bellows. The descent of the rod closes circuit, and the alarm is sounded. A bell-crank lever with a flag to be turned outwards by the rod as it falls serves to indicate a leakage of air.

5,373.—SIPHONICAL DISCHARGE: *M. J. Adams.*—At the end of the shorter leg of the siphon, and made in one piece with it, is placed a vertical cylinder provided with an inlet flap-valve and a heavy piston that moves above the valve. When the piston has been raised and then allowed to descend by means of the pull-chain, it will impel water over the crown of the siphon and so start the flush.

5,374.—AN ANTI-FOULING AND ANTI-CORROSION COMPOSITION: *W. Briggs.*—A compound is made of pitch or bitumen, whitening or lime, flake mica, and fine sand or Portland cement, melted together, and applied when hot to the surface after the latter has been cleaned and coated with paint or some bituminous solution.

5,433.—TRUCKS FOR THE CONVEYANCE OF BRICKS: *R. Lindemann.*—For lifting the load in parts is contrived a frame, in which slide two or more carriers having supporting arms. As an arm on a shaft is pulled towards the right side, a cam moves a lever to pull a chain, and so to cause another lever to raise the upper carrier; then other cams press against levers for lifting the rollers that run loosely upon a cross-shaft in another carrier. After the carriers have been quite lifted up, the tendency of lever-mounted rollers to run off the surfaces of the cams is frustrated by the end of the arm upon the shaft as it bears against the edge of the truck. The frame can be disposed horizontal-wise on occasion by means of the bearings that carry the shaft of the frame.

5,450.—CONSTRUCTION OF FLOORS AND CEILINGS: *F. Canclon.*—Squared, inclined, or interlocking edges are fashioned upon hollow or solid blocks of terra-cotta or other substance, which are hung from the beams or joists by means of the recessed or bevelled blocks resting upon the flanges or ribs of the joists. The edges or top faces of the terra-cotta blocks are grooved to take the squared or dovetailed side ribs of the recessed blocks. Packing material is then filled in the grooves. In one mode cement cast *in situ* along the joists is employed for securing ceiling-blocks to the joists.

5,466.—JOINTING FOR PIPES, &c.: *J. H. Heawood and G. L. Hulme (J. Hulworth & Co.).*—The spreading or bursting of rubber and similar packing-rings is obviated by means of a light metallic ring laid around or embedded in the ordinary packing-ring, and made up of wire loops soldered or otherwise fastened to one another. An extension loop or rod, made with or fixed on to the wires, will hold the packing-ring in its place as the joint is being made.

5,475.—GUTTERS AND TROUGHS: *A. D. Pogson.*—A gutter or trough available for footpaths, stables, yards, slaughter-houses, and so on, is provided in the shape of a semi-circular box which is closed at one end and has a detachable lid to be set on the level of the surface; the sections of the lid repose upon ledges of the gutter lengthwise, their projections engage with the undersides of the adjacent sections and with studs or snugs upon the gutter, and they are locked down with a screw-down pin or with a shooting bolt.

5,509.—CONSTRUCTION OF DRYING KILNS: *R. Azer.*—The inventor seeks to obviate the corrosion of the iron trucks that convey goods through kilns of which the drying chambers consist of tunnels. He causes the exhaust gases charged with steam to be returned in part to the flues that they may there be mingled with the furnace gases before the latter enter the drying chamber, and provides hinged dampers for the charge and discharge doors for the

escape of the gases through the opened doors so as to prevent a flow of air into the chambers. The tunnels are disposed side by side, the gases of combustion from the furnaces at either side flow into cross-flues above and below the tunnels, and the openings of communication towards the middle of the kiln have increasing areas, where they mingle with a part of the exhaust gases as the latter are drawn off with a fan.

5.515—EXTINCTION OF FIRE IN PETROLEUM AND OTHER TANKS: *F. Shuman*.—Over the surface of the stored liquid is hung a weight at the end of a fusible wire. A layer of a solution of some carbonate is deposited at the bottom of the tank. Above that layer is set a subsidiary and small tank, having thin sides and charged with sulphuric or other acid. In the event of fire, the wire melts, the weight falls on to and breaks through the inner tank, whereupon the acid mixes with the solution, and the resultant carbonic-acid gas ascends to extinguish the fire. In another adaptation an explosive cartridge is substituted for the weight. The bullet pierces the little tank and the explosion sounds an alarm.

5.505—CANS FOR WORKMEN: *G. Hunter*.—At the lower end of the can is a spirit-lamp, which may be made in one piece with the can, or be detachable. A suitable door and ventilating openings are fitted to the lamp.

5.617—SPIGOT-AND-SOCKET JOINTS FOR PIPES: *P. O. Fell*.—A joint available for pipes of metal, concrete, stoneware, earthenware, and ironstone consists of a spigot having a projecting lug that fits into the doubly-socketed end of the pipe. The tapered socket flange makes a key for the jointing material, which a gasket of clay or a tar band excludes from the joint. The socket has an orifice for the escape of air.

5.681—A LIFTING-JACK: *E. Deville*.—Upon the standard is affixed a nut for engagement with a screw mounted on the head of an outside sleeve which is turned with a pawl and a ratchet-wheel; in variant forms of the invention the nut is set in a movable sleeve, the screw being fixed, or the driving worm gear is adjusted upon an outer parallel shaft which is disposed so as to gear with the lifting screw, or the worm is set in direct engagement with a worm-wheel upon the screw.

5.748—SHEET-METAL OPEN-WORK FOR LATHING: *Universal Metal Lath and Patent Co.*—Lathing for ceilings, floors, walls, freeproof buildings, screens, and so on, is fashioned in various shapes from metallic blanks; in one shape a slitted blank produces a zig-zag lathing sheet of open work by firmly holding down the alternate blank spaces upon a bench whilst intermediate strips are forced backwards and upwards in order to open the slits between the slats; V-shaped distance-strips for sustaining metallic lathing away from a wall or other surface have their slats inclined in opposed directions in order that they shall resist pressure at the angle; an expanded sheet can be affixed to a wall by means of inclined or indented portions made at intervals along its length.

5.756—INSPECTION-OPENINGS FOR MANHOLES: *C. E. Price*.—The branches are arranged so as to discharge always into the main channel in the same direction as that of the main flow, the discharge being turned into open channels formed in the iron bottom of the chamber.

5.758—IMPROVEMENTS IN PUG-MILLS: *A. Diss*.—For separation of the stones and the division or mixing of the brick-making material the inventor provides a grating for the aperture of the pug-mill, eyes or studs fashioned upon the grating engage with pins or eyes that extend from brackets which are bolted on to the cylinder of the pug-mill, and the bars of the grating have wedge-shaped cutting edges.

5.759—CONSTRUCTION OF WALLS: *A. Diss*.—For laying damp-courses of cement or asphalt on walls is devised a frame made up with cross and side bars which are to be joined together with screws and fly-nuts, and are slotted for their adjustment. The cross-bars will slide in guiding-blocks of the side-bars, one of which is rebated or has guiding-lugs that will press against the wall surface.

5.806—IMPROVEMENTS IN LEVELS, CLINOMETERS, SURVEYING INSTRUMENTS, &c.: *Sir H. Grubb*.—The transparent card, with an annular scale, of a prismatic compass is carried upon a pivot underneath a sighting-tube having apertures through which the object is sighted directly. For virtually projecting the graduations of the card, as clear or white lines upon a darkened ground, upon the object is devised an optical system, thus a reflecting prism illuminates a fiducial and sighting line, a compound reflecting and converging prism is mounted above and with a lens parallelises the light from the sighting-line and the compass scale opposite it, a reflecting prism and a plate receive the parallel rays in succession whence they enter the eye collinearly with rays from the object, whereby parallelism is obtained. For a graniometer the sighting system, being after either the refracting or the reflecting kind, is carried by a radius bar on which are needles that will prick off the direction when it has been determined. For a level the sight is mounted in a vertical tube, and in the

sighting-tube is a reflecting-plate beneath the collimating lens at the base of the vertical tube; the level can be seen by reflection in the plate by means of an aperture formed in the top of the sighting-tube immediately below the middle of the level, or the level is put in front of the sight. A combined contrivance for alternative use as an optical square or a range-finder has a prism so mounted as to turn about the axis of the sighting-tube. When turned through 180 deg. from the position for acting as an optical square, it can be employed, together with a sighting-scale, for ascertaining the range by means of the projection of the scale upon an object whereof the dimensions are known. For a circumferenter the card of a compass-box is observed by a mirror, the sighting-tube being mounted above the box, whilst to its top is affixed another box carrying a fixed tube, inside which is a rotatable tube on which a prism is mounted. A graduated disc on the box carries a tube, at the top of which is fitted a prism; to that disc toothed gearing joins the rotatable tube, which will then turn through half the angle. An inversion of the arrangement will render it available as a prismatic compass. The specification extends to optical squares and to clinometers. Confer also No. 4,420 of 1901.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

July 1.—By **R. L. ASHTON** (at Bideford).
Bradworthy, Devon.—Great Dinworthy Farm, 270 acres, *f.* £3,500
By **W. J. VILLAR & Co.** (at Dulverton).
West Anstey, Devon.—Guphill Farm, 204 a. r. r. 26 p. *f.* 1,600
July 5.—By **SALTER, SIMPSON & SONS** (at Norwich).
Great Snoring, Norfolk.—Wine Park Farm, 213 a. 2 r. 36 p. *f.* 3,100
Banham, Norfolk.—Freehold Farmhouse and 190 a. o. r. 30 p. *f.* 2,100
By **MADDISON, MILLS & MADDISON** (at Norwich).
Stokesby, Norfolk.—The Cottage Farm, 244 a. 3 r. 77 p. *f.* 5,200
The Whitegate Farm, 167 a. o. r. 12 p. *f.* 4,700
A freehold cottage, w. r. 7. 34 p. 110
Freehold grazing marshes, 105 a. r. 30 p. 3,740
The Marshman's Occupation, with drainage mill, 29 a. o. r. 35 p. *f.* 800
A freehold house and 3 a. 3 r. 34 p. 400
Enclosures of land, 13 a. 1 r. 12 p. *f.* 490
Five freehold cottages and 2 a. o. r. 34 p. 430

By **SEXTON & GRIMWADE** (at Colchester).
Boxted, Essex.—Holly Tree Farm, 10 a. *f.* 415
West Bergholt, Essex.—King's Farm, 24 a. 2 r. 6 p. *c.* p. *f.* 360

July 7.—By **FRANK NEWMAN**.
Mayfair.—27, Davies-st., (S), a profit rental of *£* 151 yrs., with reversion for 4 yrs. 1,210
By **P. W. TALBOT & Co.**

Tottenham Court-rd.—23, Warren-st. (S), *f.*, e. r. 354 960
Marylebone.—27, New-st. (workshop and stabling), u. 124 yrs., *f.*, e. r. 102 yrs. 300
Haverstock Hill, u. 124, Maitland Park-vill., u. 473 yrs., *f.*, e. r. 102 yrs. 455

By **SALTER, SIMPSON & SONS** (at Swaffham).
Spole, &c., Norfolk.—Freehold farmhouse and 77 a. 2 r. 16 p. 1,150
Great Dunham, &c., Norfolk.—Echo Farm, 82 a. 3 r. 39 p. *f.* 1,600

By **RICHARD AUSTIN & SON** (on the Estate).
Droxford, Hants.—Freehold building land, 21 a. Enclosures of land, 114 a. *f.* 2,345

July 8.—By **FIELD & SONS**.
Hoxton.—Hyde-rd., The Barley Mow p-h. &c., i. g. r. 161, 18, u. 17 yrs., *f.*, e. r. 214 yrs. 300
Romford, Essex.—27 to 35 (odd), London-rd. (S), *f.*, y. r. 127, 65 1,110
41, 43, and 45, London-rd. (S), *f.*, y. r. 784 845
Chadwell Heath, Essex.—1 to 4, White Hart Cottages, *f.*, w. r. 574, 48 870

By **HAMPTON & SONS**.
Wimbledon.—Cambridge-rd., Hollymount, and 2 a. *f.*, 3,000

By **REYNOLDS & EASON**.
Hermione.—49, Abbey-st. (S), *f.*, y. r. 454 875
Bromley-by-Bow.—27 and 29, Swanton-rd., u. 60 yrs., *f.*, e. r. 84, w. r. 541, 125 530

By **ROGERS, CHAPMAN, & THOMAS**.
Limehouse.—39, East India Dock-rd., *f.*, q. r. 401 700

By **DEBENHAM, TUNSON, & Co.** (at Newcastle).
Whitley Bay, Northumberland.—The Promenade, a freehold building estate, 5 a. 2 r. 32 p. 7,300

By **HUMBERT & FLINT** (at Watford).
Watford, Herts.—285 and 287, High-st., *f.*, y. r. 471 600
290 and 292, High-st., *f.*, w. r. 371, 48 940
19 to 21, 45, and 47, Watford-rd., *f.*, w. r. 344, 38 268
12 to 15, Red Lionyard, *f.*, w. r. 344, 38 375
76 and 78, Eastcourt-rd., *f.*, w. r. 321, 108 700
48 to 54 (even), Leaveness-rd., *f.*, y. r. 624, 88 640
Bushey, Herts.—71 to 77 (odd), Villiers-rd., *f.*, w. r. 541, 125 300
22, 24, and 16, High-st., *f.*, w. r. 271, 145 300

July 9.—By **RUSHWORTH & STEVENS**.
Chelsea.—66, Sydney-st., *f.*, y. r. 661 1,200
Sydney-st., i. g. r. 64, reversion in 25 yrs. 445
1, 4, 6, and 8, Guthrie-st., u. 634 yrs., *f.*, e. r. 261, y. r. 1801 1,625
1, 5, 5, and 7, Guthrie-st., u. 634 yrs., *f.*, e. r. 261, y. r. 1801 1,565
10, Globe-pl., u. 651 yrs., *f.*, y. r. 561 710

By **GURKEN & SON** (Hammersmith).
Hammersmith.—90, 92, and 94, Bridge-rd., area 1,760 ft. *c.* p. *f.* 1,480
761, Claybrook-rd., u. 64 yrs., *f.*, y. r. 54, w. r. 561, 82 350
Chiswick.—7, Dale-st., u. 66 yrs., *f.*, e. r. 21, 108, w. r. 321, 151 260

By **HIGGINS & SON**.
Hamstead.—123, Belsize-rd., u. 594 yrs., *f.*, e. r. 101, 108, y. r. 554 560

By **HUNTER & HUNTER**.
Hyde Park.—Hyde Park-ter., i. g. r. 451, u. 20 yrs., *f.*, e. r. 401, 45, w. r. reversion 960
Fulham.—79 to 83, Seabridge-rd., u. 105, w. r. 1201 1,650

By **MESSRS. LEAGE**.
Dalston.—22 and 24, Gayhurst-rd., u. 464 yrs., *f.*, e. r. 101, y. r. 361 710
Kingsland-rd.—35 and 41, Clarissa-st., u. 164 yrs., *f.*, e. r. 51, 64 220
By **W. SALISBURY & HAMER** (at Hurst Green).
Aighton, Lancs.—Foxfield's Farm, 77 a. o. r. 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

July 10.—By **H. J. BLISS & SONS**.
Hackney-rd.—39, 41 and 43, Brunswick-st. and 36, Dunlop-st., with workshop and timber yd., *f.*, y. r. 286, 128 2,950
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436,

		(under 40 ft. sup.)	2	8	per ft. super. at rly. depôt.
"	"	6 in. Rubbed Ditto ..	3	0	" "
"	"	3 in. sawn both sides slabs (random sizes)	1	3	" "
"	"	2 in. self-faced Ditto	0	9½	" "
"	"	Opton Wood (Hard Bed) in blocks	2	3	per ft. cube. deld. rly. depôt
"	"	6 in. sawn both sides landings	2	7	per ft. super. deld. rly. depôt.
"	"	3 in. do.	1	2½	" "

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.			
Nature of Work.	By whom Advertised.	Prerequisites	Designs to be delivered
Municipal Offices and Public Library	Bideford Town Council	301., 151., and 101.	Sep. 29
CONTRACTS.			
Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Paving Materials, Tower Bridge	Corporation of London	Comptroller's Office, Guildhall	July 21
Additions to Chapel, Kingswear, Devon .....	.....	G. H. Mitchell, Waterhead, Kingswear	July 22
Church, Broughton Moor, Cumberland .....	.....	W. D. Caroe, Architect, 8, Whitehall-place, S.W.	do.
Villa, Camborne, Cornwall .....	.....	Kierman, Moor, & Co., Camborne	do.
Road Works, Eaton-road	Dover Town Council	H. E. Stiles, Civil Engineer, Town Hall, Dover	do.
Street Paving Works, off Parson-street	Keighley Corporation	W. H. Robinson, Civil Engineer, Town Hall, Keighley	do.
Diverting part of Lillands-lane, Brighouse	L. & Y. Ry. Co.	R. C. Irwin, Hunt's Bank, Meascheter	do.
Cast Iron Pipes (8,000 yards)	Swindon Corporation	Borough Surveyor, Town Hall, Swindon	do.
School, &c., Station-road, Rednesford	Cannock (Staffs) School Board	Cannock & McDonald, Architects, Walsall	do.
Lodge, &c., Hampden Park	Eastbourne Corporation	W. C. Field, Architect, Town Hall, Eastbourne	do.
Stabling, &c., Stowes-street depot	Lichfield Corporation	E. Brooke, Surveyor, Frog-lane, Lichfield	do.
Cottage, Gas Works, Sheepshead	Leeds Corporation	R. H. Townsley, Gas Offices, Leeds	do.
Sewage Disposal Works	Leicester R.D.C.	G. W. Westgarth, Surveyor, Canoe	do.
Sewers, &c., Pentre, Glam	Rhondda U.D.C.	W. J. Jones, Engineer, Council Offices, Pentre	do.
Concrete Paving, Cambridge-street	Wellborough U.D.C.	E. Sharnam, Surveyor, Market-square, Wellborough	do.
Road Works, Kynaston-road, &c.	Croydon Town Council	Borough Road Surveyor, Town Hall, Croydon	do.
Eighteen Houses, Blackburn-street	Workington U.S.A.	J. Warwick, Town Hall, Workington	do.
"Tar Paving Materials, Plumstead	London County Council	Park Department, 11, Regent-street, S.W.	do.
Additions, &c., to Cottage, Waterworks-road	Hastings Corporation	P. H. Palmer, Civil Engineer, Town Hall, Hastings	do.
Public Slaughter House, Bellshill, N.B.	District Committee	A. W. Jeffery, Architect, 5, Haycock-road, Hastings	do.
Bridge, Yalding	Kent County Council	F. W. Ruck, Surveyor, 28, West-street, Maidstone	do.
Canal Wharf Wall, &c., Stuart-street	Manchester Corporation	City Surveyor, Town Hall, Manchester	do.
"Additions, &c., to School & Asphalting Playground, &c.	Battwa School Board	Clerk's House, Capel Bach, Langonwyd, near Bridgend	do.
"Observation Block (Isolation Hospital)	Willesden District Council	Council's Engineer, Dyne-rood, Kilburn, N.W.	do.
"Road Making and Paving Works	do.	do.	do.
"Granite Drinking Fountains, Hackney	London County Council	Parks Department, 11, Regent-street, S.W.	July 23
Drainage Works, Simon Langton, Canterbury .....	.....	J. Plummer, 38, St. Margaret-street, Canterbury	do.
House and Shop, Town End, Golear .....	.....	A. Shaw, Architect, Golear	do.
Club Institute, Eufield-road, Leeds .....	.....	Buttery & Birds, Architects, Basinghall-square, Leeds	do.
Two Stables, South-street, Dewsbury	Barrow-in-Furness Corporation	J. Kirk & Sons, Architects, Huddersfield	do.
Battery Rooms, Buccleuch-street	Rathdown Guardians	Rathdown Guardians, Barrow-in-Furness	do.
Altar, &c., Workhouse Chapel, Loughlinstown	Drogheda Corporation	P. F. Comer, Civil Engineer, 19, Lower Leeson-street, Dublin	do.
Storage Reservoir, Barnhill	Charleville R.D.C.	G. N. Kelly, Civil Engineer, Gas Offices, Drogheda	do.
Twenty cottages, near Cork	Hastings Guardians	J. Ryan, Council Offices, Charleville, near Cork	do.
Subway at Workhouse, Dro	G. W. & G. C. Joint Railways	W. G. Green, Architect, 5, Haycock-road, Hastings	do.
Thirty-six Cottages, Kitchener-road, High Wycombe	Fulham Borough Council	A. E. Butler, Paddington Station, W.	do.
Making Up and Paving Street	Stockport Corporation	S. Maunier, Engineer, Gas Offices, Stockport	do.
Cast Iron Main, &c.	Mr. J. Buchanan	Handry & Addie, 12, Union-street, South Shields	do.
Alterations to Brewery, Hanover-square, Newcastle .....	.....	Oliver & Co., Architects, Mosley-street, Newcastle-on-Tyne	do.
Hospital Buildings, City-road, &c., Newcastle .....	.....	T. M. Farrelly, Ballisborough	July 24
Creamery Building, Ballisborough, Ireland	Castelford U.D.C.	A. E. Marsden, Architect, 3, John-street, Bury	do.
Furniture Depository, Picton-street, Manningham	Market Harborough U.D.C.	W. Green, Surveyor, Council Offices, Castelford	do.
Market Hall Roof	Leigh (Lancs.) Corporation	H. G. Coates, Civil Engineer, Market Harborough	do.
Paving Works, &c., at Cattle Market	Leigh (Lancs.) U.D.C.	T. Hunter, Engineer, Bank Chambers, Leigh	do.
Underground Conveniences, &c., Market-place	Liberton (N.B.) P.C.	Buchanan & Bennett, Civil Engineers, 12, Hill-street, Edinburgh	do.
Sewering, &c., Osbourne-road	Bury (Lancs.) Corporation	A. W. Bradley, Civil Engineer, Bury	do.
Cemetery Extensions	Newman & Newman, Architects, 31, Tooley-street, S.E.	Newman & Newman, Architects, 31, Tooley-street, S.E.	do.
Additions, &c., to House at Sewage Works	Castelford (York) U.D.C.	W. Green, Surveyor, Council Offices, Castelford	do.
"Lunatic Wards at Workhouse	Rev. M. Sherrin	J. P. McGrath, Architect, 23, Carlisle-road, Londonderry	do.
Roadway, Smaythorne-lane	Llanvynnes School Board	S. Shipton, Town Hall, Mountain Ash	do.
Schoolhouse, &c., Tooban, Fahan, Derry	Office of Works	J. H. Phillips, Architect, Windsor-place, Cardiff	do.
Alterations to School, Feurhiwceiber, Wales	Elland (Yorks) U.D.C.	J. Clarkson, Council Offices, Elland	July 25
Post Office, Aberleith	Mr. G. R. Burnett	W. L. Mason, Architect, Ambleside	do.
Refuse Destructor, &c.	Colbridge (Ireland) R.D.C.	J. Whelan, Architect, 4, Lindsay-terrace, Botanic-road, Dublin	do.
Gymnasium, Seacastle, Cumberland	Sutton Coldfield Corporation	W. A. H. Garry, Civil Engineer, Town Hall, Sutton Coldfield	do.
Twenty-one Cottages	Wirral R.D.C.	T. Davies, 33, Kingsland-road, Birkenhead	do.
Making-up Digby-road	Smethwick Corporation	V. Hughes, Engineer, Gasworks, Smethwick	do.
Road Works, Walker-lane, Little Sutton	Warkworth Harbour Commn.	T. Muir & Sons, Engineers, 29, St. Andrew-square, Edinburgh	do.
Cast Iron Water Tank, &c.	Universal Steam Coal Co., Ltd.	J. H. Phillips, Architect, Windsor-place, Cardiff	do.
Sixty Houses, Seaburnside, Wales .....	.....	A. H. Richardson, Architect, Workop	do.
Fort Villas, Sunnyside, Workop .....	.....	J. Berry, Architect, 3, Market-place, Huddersfield	do.
Villa, The Quarries, Longwood Edge, Huddersfield .....	.....	Rev. E. Allison, The Masse, Kilbride, Doughty	do.
Alterations to Presbyterian Church, Kt. Bridge .....	.....	Farthing & Dunn, 21, Pligwin-street, Newcastle	do.
Eighteen Houses, Colston-at, Benwell, North. ....	.....	Secretary, The Club, Langley Moor	do.
Club and Institute, Langley Moor, Durham	Castlecote Dairy Co., Ltd.	Manager, Creamery Company's Office, Castlecote	July 26
Enclosure Wall, &c., Castlecote, Ireland	Rawlston (Lancs) Corporation	A. W. Lawson, Civil Engineer, Municipal Offices, Rawlston	do.
Excavating Works, &c., Watford	Rugby U.D.C.	D. G. MacDonald, Civil Engineer, Rugby	do.
Street Works, Dale-street, &c.	Tonbridge (Kent) U.D.C.	W. L. Bradley, Civil Engineer, Tonbridge Castle, Tonbridge	do.
Road Metal	Bedwellty U.D.C.	J. H. Lewis, Civil Engineer, Pengeam, via Cardiff	do.
Limestone Road Metal, Tredgar	Colchester Corporation	H. Godfrey, Borough Surveyor, Colchester	do.
Road Works, Claidis-road, &c.	Glasgow Corporation	D. H. Morton, Civil Engineer, 130, Bath-street, Glasgow	do.
Main Outfall Works, Dalnair	Rugby U.D.C.	D. G. MacDonald, Civil Engineer, Rugby	do.
Cast Iron Pipe Conduit, &c., Avon Waterworks	Sowbury Bridge U.D.C.	R. W. Evans, Commercial Bank-chambers, Halifax	July 28
Offices at Gasworks	Barton Regis R.D.C.	La Trobe & Weston, Architects, 20, Clare-street, Bristol	do.
Cemetery Chapel, Westbury-on-Trym	Wolverhampton Corporation	Borough Engineer, School-street Depot, Wolverhampton	do.
Market Buildings, Wulfruna-street	Paddington Borough Council	Borough Surveyor, Town Hall, Paddington, W.	do.
"Supply of Water and Slop Vans	Carlton (Notts) U.D.C.	R. Whitbread, Station-road, Carlton, Nottingham	do.
Sewerage Works, Foresters-grove, &c.	Barton Regis R.D.C.	A. P. J. Cottrell, Civil Engineer, 23, Baldwin-street, Bristol	do.
Roads, Walling, &c., Westbury-on-Trym	Rugby Corporation	T. H. Yabbicom, Civil Engineer, 63, Queen-square, Bristol	do.
Hospital Extension, Ham Green, Pitt	Rugby Corporation	D. G. MacDonald, Civil Engineer, Rugby	do.
Hospital Building, Lifford, Fife	Central London Stock Asylum	Dist. Asylum, Cleveland-street, Fitzrovia, W.	do.
Painting and General Repairs of Buildings	Barnet U.D.C.	Council Offices, 40, High-street, Barnet	do.
"600 tons Granite and Gravel, &c.	City of Dublin Electric Supply Cm.	City Engineer, City Hall, Dublin	July 29
"Subway under Grand Canal Dock	Epsum Union	Master of Work-house, Epsum	do.
Temporary Wood and Iron Footbridge, Painting, &c.	Leyton U.D.C.	Council's Surveyor, Town Hall, Leyton	do.
"Whitewashing, Painting, &c., at Infirmary	Hammer-smith Council	Borough Surveyor, Town Hall, Hammer-smith	July 30
"Making up, Paving and Kerbing Streets .....	.....	Ernest Flint, Architect, 29, Coleman-street, E.C.	do.
"Painting and Enlargement of Reculver Ward	Ealing Town Council	Borough Engineer, Town Hall, Ealing, W.	do.
"Alteration and Enlargement of Reculver Ward	do.	do.	do.
"Widening of Northfield-lane .....	.....	do.	do.
Erection of Lodge, Lamas Park .....	.....	do.	do.
"Sea Wall Improvements and Seats .....	.....	do.	do.
"Erection of Infirmary, &c. ....	.....	do.	do.
"Board School, Holland-road .....	.....	do.	do.
Large Shed, Holbeck, Leeds .....	.....	do.	do.
Factory, near London .....	.....	do.	do.
Stores, near Hillborough, Co. Down .....	.....	do.	do.
"Carriage Building Works, St. Albans .....	.....	do.	do.
"Extension of Electricity Works .....	.....	do.	do.
"Re-building Robin Hood Inn, Bury .....	.....	do.	do.
House and Surgery, Tottington, Lancs .....	.....	do.	do.
New Central Reference Library .....	.....	do.	do.

[See also next page.]

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
Boiler Inspectors.....	London School Board	110 <i>l.</i>	July 23
Clerk of Works for Heating Apparatus.....	do.	2 <i>0</i> 0 <i>l.</i>	do.
Clerk of Works	Worcestershire County Council	3 <i>l.</i> 3 <i>s.</i> per week	July 27
Architectural Assistants	London County Council,	17 <i>l.</i> 1 <i>s.</i> to 3 <i>l.</i> 3 <i>s.</i> per week	Aug. 1
Borough Engineer and Surveyor	Southend-on-Sea Corporation	500 <i>l.</i>	Aug. 6

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv. vi. viii. x. & xlii. Public Appointments, xviii. & xix.

TO CORRESPONDENTS.

F. M. & F. (Amounts should have been stated.)
 NOTE.—The responsibility of signed articles, letters, & papers read at meetings rests, of course, with the authors.
 We cannot undertake to return rejected communications.
 Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT RETURNED.
 We are compelled to decline pointing out books and giving addresses.
 Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article type does not necessarily imply its acceptance.
 Communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

(Communications for insertion under this heading should be addressed to "The Editor," and must reach us later than 10 a.m. on Thursdays. N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender given, nor any list in which the lowest tender is under 1*l.*, unless in some exceptional cases and for special reasons.)
 Denotes accepted. † Denotes provisionally accepted.

BASFORD.—For additions, &c., to workhouse, for the architects. Mr. W. V. Betts, architect, Bank Offices, Old Ford. Quantities by the architect:—
 T. Cutbert £1,300 0
 W. Savage 1,250 0
 Hopewell & Son 1,250 0
 J. Hutchinson 1,214 0
 H. Ingham, Old Basford, Nottingham* 1,200 14

BOSTON (Lincs.).—For the erection of municipal buildings for the Town Council. Mr. J. Rowell, architect, rough Offices, Boston:—
 J. & Son £1,421 4 4
 Cricknell & Son 15,915 0 0
 E. Lincoln 14,375 0 0
 Co-operative Industrial Society* 13,739 0 0

BRISTOL.—For the erection of a warehouse for Messrs. T. Adams & Bros. Mr. W. H. Watkins, architect, Summerhill-road, St. George, Bristol:—
 J. Beaven £2,740 0
 A. Hayes 2,588 0
 Phelps Bastow & Co., Ltd. 2,538 0
 Love 2,550 0
 W. & E. J. Neale 2,550 0

LILLINGHAM (Kent).—For the erection of forty-two houses, Richmond-road, for the Richmond-road Housing Club. Mr. E. J. Hammond, C.E., 111, High-st., New Brompton:—
 Reeves £16,224 0
 Sieper 13,392 0
 Willford 13,158 0
 Hall & Co. 19,480 0
 E. Phillips 12,240 0
 Candler 12,100 0

WALTHAMSTOW.—For sundry repairs, new partitions, painting, &c., for Walthamstow School Board. Mr. H. Prosser, Architect to the Board:—

	Marshall-street Boys'.	Marshall-street Girls and Infants'.	Highgate Infants'.	Camel-road Schools.	Camel-road Infants'.	Pretoria-avenue.	Pretoria-avenue Partitions.	Marthouse-road Schools.	Forest-road Infants'.	Coppermill-road Schools.	Coppermill-road Partitions.	Wood-street Schools.	Wood-street Partitions.	Shenhall-Schools.
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
White Paint Co.	49 0 0	29 10 0	18 10 0	105 0 0	43 10 0	...	...	68 10 0	...	...	125 16 8	...	125 16 8	...
W. & E. Evans .....	...	...	...	...	...	...	...	...	...	...	...	78 0 0	87 16 8	10 10 6
W. & E. Evans	30 10 0	41 15 0	...	...	...	...	...	...	114 0 0	...	...	...	...	13 8 0
W. & E. Evans .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
W. & E. Evans .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
W. & E. Evans	47 10 0	...	...	67 0 0	34 1 0	98 0 0	272 0 0	113 10 0	...	...	...	...	...	...
W. & E. Evans	34 10 0	33 0 0	23 0 0	96 10 0	40 0 0	...	...	72 10 0	...	...	...	...	...	...
W. & E. Evans .....	...	...	...	...	...	122 0 0	237 0 0	...	...	...	...	...	...	...

Accepted.

† 3d. per yard extra for sizing.

HYDE (Cheshire).—For the erection of shedding, &c., for the Cheshire Agricultural Society:—
 J. H. Peck & Co., Walsgate, Wigan, as per schedule of prices, for tents, canvas, &c.
 L. H. Woodhouse & Co., Nottingham, as per schedule of prices, for erection of the necessary shedding, &c.

LONDON.—For certain alterations and additions at 14, Hans-place, S.W., for Mr. J. T. Smith. Messrs. Walton & Lee, surveyors, 10, Mount-street, Grosvenor-square, W. Quantities by Mr. J. H. Robinson, 8, Newcourt, Lincoln's Inn:—
 Holloway Bros. £3,218
 Thompson & Beve-ridge 3,047
 Simpson & Sons 2,970
 Turtle & Appleton £2,950
 J. Carmichael 2,918
 Wallace & Co. 2,900
 Stimpson & Co. 2,800

LONDON.—For pulling down sheds, &c., at No. 245, Gray's Inn-road, W.C., and the erection on the site of stabling for sixty-four horses on the first floor, and cart-sheds under, &c. Messrs. Hayward & Maynard, architects:—
 T. G. Hawkins £4,666
 E. & E. Lea 3,968
 Patman & Fothering-ham 3,904
 W. J. Negus £3,666
 A. J. & C. Hocking* 2,900
 McDowall 2,409

LONDON.—For alterations and additions at Messrs. Phillips & Co.'s Music Warehouse, Mare-street, Hackney:—
 Barrett & Power £442
 Beale 412
 Snewin Bros. £369
 Silk & Son 320

LONDON.—For alterations, &c., to the West End Baptist Church and Schools, Hammersmith, W. Messrs. G. Baines & Son, architects, 5, Clement's Inn, W.C.:—
 J. Polden £1,323 19 6
 Collingwood & Co.* 1,156 15 0

SYDENHAM.—For the erection of two double-fronted houses in Tredrow-road, Sydenham. Mr. Money Marsland, architect and surveyor, 68, Great Tower-street, E. H. Faggetter* £1,600

LONDON SCHOOL BOARD TENDERS

The work at the following Schools will be done during the Summer holidays—July 25 to August 23, 1902. Where exterior as well as interior work has to be done an additional week will be allowed for the former:—

BEETHOVEN-STREET.—Painting interior:—
 S. Polden £640 0
 W. Clappell 450 0
 Chinchin & Co. 449 0
 G. Neal 402 0
 Brown & Sons £371 13
 W. H. & A. Hide 356 0
 Bristow & Eastwell* 310 0

BEAUFORT-PLACE.—Painting interior and exterior:—
 J. Greenwood £506
 J. F. Ford 494
 Sayer & Son £485
 Johnson & Co.* 472

DALGLEISH-STREET.—Painting interior:—
 A. E. Symes £338 0
 A. W. Derby 282 0
 Heard & Co. 280 7
 Vigor & Co. 270 0
 Gibb & Co. £259 0
 J. F. Holliday 238 0
 Corfield & Co.* 228 0

DEODAR-ROAD (Iron Buildings).—Painting interior and exterior:—
 J. & M. Patrick £139 0
 Lorden & Son 134 15
 E. Flood 126 0
 E. Triggs £110 0
 C. Curd* 90 10

DRURY-LANE.—Cleaning interior:—
 J. Appleby £292 0
 J. Greenwood 282 10
 Lathey Bros. 273 0
 T. L. Green 270 0
 Johnson & Co. 255 0
 W. Hornett £166 0
 M. Pearson 141 0
 Holliday & Green-wood, Ltd.* 113 0
 † In this case the work will be executed between August 2 and August 23, 1902.

EAST-LANE.—Painting exterior and interior:—
 H. Line £740
 J. Appleby 690
 Johnson & Co. 653
 Maxwell Bros., Ltd. 554
 H. J. Williams £545
 Sayer & Son 532
 Holliday & Green-wood, Ltd. 429

FORTRESS-ROAD.—Painting interior and exterior:—
 Viney & Stone £228 10
 G. Ball 145 0
 Wall & Co. £143 10
 Marchant & Hirst* 137 0

HIGH SCHOOL for BOYS (Plumstead Common-road).—Cleaning, painting, repairs, &c.:—
 Hayter & Son £699 10
 T. D. Leng 610 0
 E. Triggs £497 0
 E. Proctor* 495 0

HIGHWAY (B.G.I. & J.M.).—Painting exteriors:—
 A. E. Symes £335
 Gibb & Co. 205
 Corfield & Co. 191
 J. F. Holliday £186
 Johnson & Co.* 169

HOLMES-ROAD.—Painting exterior:—
 Viney & Stone £497 0
 G. Kirby 266 0
 Wall & Co. 270 0
 Chinchin & Co. 267 10
 Marchant & Hirst £259 0
 Stevens Bros. 248 0
 McCormick & Sons* 206 0

MAIDSTONE-STREET.—Painting interior (old and new portions):—
 Viney & Stone £593
 J. Stewart 554
 Chessum & Sons 540
 G. Wales 539
 T. Cruwys £498
 Stevens Bros. 458
 Silk & Son* 450

MARLBOROUGH-STREET.—Painting interior and exterior:—
 Hudson Bros. £668 4
 J. & M. Patrick 671 10
 E. Flood 619 0
 Sayer & Son 557 10
 E. Triggs 539 0
 J. Appleby £539 0
 H. J. Williams 486 0
 Johnson & Co. 470 0
 W. Hornett* 460 10

MAXEV-ROAD (Pupil Teachers' Centre).—Cleaning interior:—
 W. Jolly £110 6
 E. Proctor 93 0
 Hayter & Son* £73 0

MIDDLE-ROW (Iron Buildings).—Painting interior and exterior:—
 Chinchin & Co. £64 15
 Brown & Sons 63 10
 W. R. & A. Hide* £47 10

MILLWALL.—Painting interior and exterior.
Gibb & Co. £347
Corfield & Co. 316 J. F. Holliday* £315

MONNOW-ROAD.—Painting interior of old and new schools and painting exterior Higher Grade School, &c.:—
T. D. Leng £1,146
Johnson & Co. 979 W. Sayer & Son .. £855
J. & C. Bowyer .. 955
H. J. Williams .. 953 wood, Ltd. 836
Maxwell Bros. 894 E. Proctor* 699

MORELAND STREET.—Painting exterior:
Rice & Son £192 Stevens Bros. £170
McCormick & Sons .. 186 Bate Bros.* 162
Johnson & Co. 176

MOWLEM-STREET.—Painting interior:—
Barrett & Power .. £461
Vigor & Co. 480 G. Wales £361 12
Silk & Son 377 Willmott & Son .. 352 5
Chessum & Sons .. 364 Corfield & Co.* 310 0

NETLEY-STREET.—Interior cleaning:
Dearing & Son £200 Bate Bros. £178
W. Horner 181 G. Kirby 176
J. R. Sims 180 Marchant & Hirst* 164

PONTON-ROAD.—(Infants' school and visitors' centre).—Cleaning interior:—
J. R. Sims £450
Rice & Son 39 Maxwell Bros., Ltd.* £35 10

POPE-STREET.—Painting interior:—
W. Banks £193 19 6 E. Proctor £159
G. Bush 185 0 Hayter & Son* 155 0

PORTMAN-PLACE.—Painting interior and exterior (Junior Mixed and Special Schools):—
Corfield & Co. £490 Johnson & Co. £335
Silk & Son 410 J. F. Holliday* 208
Gibb & Co. 537

PROSPECT-TERRACE.—Painting interior:—
T. L. Green £553 M. Pearson* £331
Smith & Sons, Ltd. 493 Bristow & Eastwell 506
Marchant & Hirst 414

RHYL-STREET.—Painting interior and exterior:—
Viney & Stone £701
Wall & Co. 437 M. Pearson £470
Marchant & Hirst 437 Chinchin & Co.* 389

RICHARD-STREET (Boys' and Girls').—Painting interior:—
C. & W. Hunnings £318 10
McCormick & Sons 286 G. Kirby £220
Bate Bros. 250 Marchant & Hirst 223
Stevens Bros.* 218

ST. GEORGE'S-ROW.—Painting interior and exterior:—
J. & M. Patrick £498 W. Chappell £340
J. R. Sims 437 Lathley Bros. 289

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ST. JOHN'S-ROAD.—Painting exterior:—
T. Willson £450 McCormick & Sons £285
J. Stewart 348 10 Marchant & Hirst 261
Williams & Son 322 G. Wales* 260

SLEAFORD-STREET.—Cleaning interior and painting exterior:
General Builders, Ltd. £897 E. Flood £147
Bulled & Co. 355 E. Triggs* 345
W. Read 353

STAR-LANE.—Painting exterior:
S. Polden £139 10 W. Chappell £115
W. Hammond 120 Bristow & Eastwell* 111
Chinchin & Co. 117 18

TOTTENHAM-ROAD.—Painting exterior (junior mixed and pupil teachers' schools, painting interior (boys', girls' and infants' schools and cookery), and painting interior and exterior (manual training and laundry centres):—
Dearing & Son £951 Chessum & Sons £390
Marchant & Hirst 507 G. Wales* 350

WALDRON-ROAD.—Painting exterior:
J. R. Sims £343 E. Flood £195
J. & M. Patrick 258 Lorden & Son 188 15
W. Read 248

WALLER-ROAD.—Painting exterior:—
Lacey & Son £186 G. Kemp £167
J. & C. Bowyer 175 J. F. Ford 137
Black & Son 162

WOOD-STREET.—Painting exterior:—
Hayter & Son £317 W. Jolly £135
W. Banks 160 12 6 G. Kemp* 128 0

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VOL. LXXXIII.—No. 3103

JULY 16, 1902.

ILLUSTRATIONS.

Architectural Association Excursion:—

Broughton Castle, from the North-East	From a Photograph.
Canons Ashby and Wroxton Abbey	Drawn by Mr. W. Curtis Green.
Hanwell Church, Fawsley Hall, &c.	" "
Church, King's Sutton; Church Porch, Chalcombe; &c.	" "

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The Liverpool Cathedral Competition.



THE drawings sent in by architects who are desirous of being admitted to take part in the final competition for the proposed cathedral at Liverpool have been hung during this week in three large rooms in the Walker Art Gallery at Liverpool. We give at the end of this article the list of names of those who have sent in drawings, but the signatures on the drawings have been covered over with cards, by order of the Committee, and we are requested to refer to special designs only by the numbers, and not to connect any number with the name of the author; request which we shall of course comply with, even where the drawings, or the style of the author, are perfectly familiar to us. As we anticipated, a considerable number of the designs are definite studies, some of them very elaborate, for the actual site intended; the remainder are drawings to show what their authors have already done for church work. We will comment first on the designs which are either confessedly or obviously made for the site; passing over, however, those which show nothing special for comment.

The tendency of the majority of the drawings is decidedly Gothic; which is not surprising considering the known proclivities of the Committee. Classic designs pure and simple are few and far between; and those which are exhibited are not particularly remarkable. There are, however, some interesting compromises in regard to style.

The difficulty of the site consists in its narrow proportions, leaving little room for the development of the transepts crosswise. It will be remembered that the longer axis of the site lies north and south, so that the usual terms of "west end" and "east end" would be misplaced; it is therefore more convenient to speak of "entrance end" and "choir end." Most of those who have made designs for the site appear to have intended the north end as the entrance end, which we consider to be the right treatment, as that is the end by which the site will be approached from the centre of

the city; but as they have not all put a compass on their plans we cannot be sure of the intention in some cases.

No. 3 shows a plan of some originality, with shallow transepts with apsidal chapels facing both ways, a departure from ecclesiastical precedent; a chapel which turns its back to the altar is an anomaly. At the choir end a circular chapter-house and vestries are joined on to the apse in chevet fashion. The crossing is a large octagon space after the manner of Ely, rising into an octagon tower of low proportion. A good deal of rich tracery is shown, but the perspective sketch is poor. The author shows an alternative plan, not equal to the other.

No. 15 is a Classic design with a central area forming the nave, and covered by a large dome; on the ground floor the sides are worked externally into the aspect of transepts with colonnaded porticos. The rest of the entrance end plan is only a colonnaded approach to the real church. The columns and statues are white marble relieved against a general tone of light brown stone. There is merit in the plan; indeed, we hold that the central area plan is the right one for a modern cathedral; but the treatment of the dome, with its broad heavy ribs and succession of round openings, is poor and mechanical.

No. 23 is a set of small drawings of great merit. It shows a cathedral of a somewhat Romanesque type of Gothic, the horizontal lines strongly marked. There is a three-aisled plan with narrow passage aisles in addition, and a very wide three-aisled transept; a tower at the crossing, and two towers at the entrance end. The proportions of the plan seem hardly long and narrow enough for the site; but the whole design is in excellent taste, with a severe restraint about it; evidently the work of a competent hand.

No. 25 is completely designed for the site, with a three-aisled nave, shallow transepts, and an octagon centre like Ely. This idea of the octagon crossing, we may observe, seems to have possessed the minds of a good many of the competitors; as well it may. The centre rises into an immense octagon lantern or tower, with a large and heavy spire over it, the thrust of which is counterbalanced to some extent by an assemblage of vertical turrets round the lower portion; but even with this precaution the structure,

considering that the octagon is about 90 ft. span, seems rather risky. There is a narthex and flanking towers with short spires. The style is Decorated Gothic of orthodox type; the sepia perspective sketches are very effective, but the design is rather unquiet as a whole, and wants more simplicity and concentration.

No. 31 is a pure Classic design with a dome—"A Suggestion by a Student." It is correct and in good taste, but not original. The plan is too short and wide for the site.

No. 35 is a long and narrow plan with a large octagon between nave and choir, which projects externally beyond the line of the nave, thus forming a kind of transept; the octagon has an interior arcade forming aisles round it. There is a good deal of merit in the plan, and the pencil elevations are graceful, especially the entrance end and towers with their small octagonal lanterns. The style is orthodox Gothic; good work, but imitative. There is a spire over the centre of the octagon, the lower slope of which is shown through open arcades. The terrace wall towards St. James's-road is made a special feature, and is effectively treated with piers and arched recesses.

No. 37 is a fine set of coloured drawings, with a long three-aisled plan, a double narthex, or a vestibule and narthex, and shallow transepts. There is an octagon crossing rising into a large exterior tower, within which is planted a timber and leaded spire, which looks structurally more comfortable than the immense solid stone spire of No. 25. The style is Early Decorated of the most imitative type.

No. 38 is a really original and clever design. It shows a long plan with a centre aisle very wide in comparison with the side aisles, which are divided from it by columns coupled transversely. But in the middle and at the end of the nave the centre aisle breaks into a square space, each of which is marked above by a square tower, the two towers identical in design, and supported externally by small projecting transepts. These two towers rising from the centre and end of the nave form quite a new and very effective grouping. The style is somewhat Romanesque in feeling (each tower is roofed with a leaded dome) but not imitative—it cannot be labelled; narrow pilasters and square terminations are its note. The entrance porch is circular on plan, and

decorated with bas-reliefs and other sculpture.

No. 40, "A Suggestion for a Modern Cathedral," is amusing and rather clever as far as plan is concerned. The axis is east and west, across the site; a rectangular choir faces eastward, and the nave is a great semi-circle in the form of a theatre, the choir where the stage should be. Subsidiary buildings (chapter-house, &c., &c.) form long blocks to the right and left of the choir. Unfortunately the architectural treatment, in the usual sense of the word, is childish; nor do we think the spectacular arrangement of the nave will really appeal to any sympathies; but the author deserves credit for a new idea.

No. 45, called "The Cathedral Church of St. Paul,"^{*} is, from the perspective, evidently designed for the site, as the low level ground of the cemetery is shown. The plan is practically three aisles of equal height, after the likeness of Bristol, but centre and side aisles are divided by double piers placed at some little distance from each other, forming really narrow intermediate aisles. This space is vaulted in each bay by a longitudinal vault at right angles to the main transverse vaults, a bold and fine idea. The crossing is an octagon rising into a lofty octagonal tower, within which however is a spire which is only seen from the interior, through the opening of the crossing vault. It could only be seen in a very foreshortened sense, and it may be doubted whether the effect would be worth the cost. The style is Early Gothic of somewhat French character. As the author takes the perspective view from the low ground of the cemetery, we here note that it is surprising that neither he nor any other competitor seems to have appreciated the grand effect which might have been obtained by carrying the transept walls on this side visibly down to the low ground, making them the facing of the bank. It is a suggestion of the site which seems to have been overlooked.

No. 57 shows a three-aisle plan with the aisles all the same height, and narrow passage aisles added. The architectural treatment is of orthodox Early English character.

No. 58 is a plan only, which fits the site well, and might be susceptible of effective treatment as a Classic design.

No. 59; no plan; elevation of entrance front and interior and exterior perspectives of great elaboration. Ambitious gimcrack.

No. 75 shows fairly good Gothic elevations, with some originality in the finish of the towers. The plan wants definite motive.

No. 83 A very curious design shown in small drawings; the perspective, taken from the low ground, appears to be a photograph of the actual site with a perspective sketch photographed on to it. The plan is a long basilica with three aisles and square piers, each bay of the nave being treated with a quarter-circle apse in the exterior aisle wall. The chancel finishes in a triple apse making a trefoil on plan. To the great bewilderment of some of the committee, as we observed, the author has adopted the suggestion made many years ago by Fergusson, of showing the vaulted roof externally in its

naked simplicity, as a ridge-and-furrow surface, without the usual covering of a timber roof. There is much to be said for such a treatment, in principle; but if adopted, some attempt should surely be made to treat the exterior in a more decorative manner. The elevations and sections are blocked in, in the simplest manner, with hardly any indication of detail, and the sketch of the tower in the perspective looks almost like a joke; a conical chimney-like mass with two tiers of large open arches near the top with bells visible in them. Nevertheless, this set of drawings contains an architectural thought, and is evidently the product of an original mind. We should not have much difficulty in putting the name to it, in spite of the committee's veiling card.

No. 85 shows an ordinary three-aisle plan with narrow shallow transepts and a tower at the crossing. The proposed architectural treatment is indicated in two alternative perspective sketches, one showing a sober Early Decorated design, the other an example of "L'Art Nouveau" both in design and in manner of drawing; a building nearly white against a shaded background, with battering central tower, battering buttresses, sculpture cropping up in unexpected places; white spaces and bits of concentrated ornament here and there. A very clever sketch, but quite inadequate in dignity and style for a cathedral; it might furnish a hint for a picturesque parish church.

No. 86 shows a double transept on plan, the tower over the crossing of the first and smaller one. The plans and elevations are cut out in white paper and pasted on a grey paper; a little dodge which attracts the average committee-man but will not draw the assessors. The style is orthodox Early English. The perspective, with its central and two entrance spires, groups effectively.

No. 44, entitled "The Cathedral Church of St. John," appears as if intended for the site. The exterior seems all buttress. The main tower, over the choir, is effectively carried on four groups of four piers each, arranged at the angles of a square. The details are imitative Gothic, but there is some power and originality in the general design. The enormous buttresses, however, plain masses of stone, go far to destroy the scale.

No. 98: a peculiar plan, with long narrow nave and two transepts, the first with a central tower, the second with an octagon centre covered by a dome with a rich Gothic balustrade at its base. The severe style of the entrance end towers suggests Coutances; the centre tower has a contrasted and more ornate treatment. Each tower has a spire. Except for the dome there is nothing very original, but the work is good, except for the lantern or finial on the top of the dome, which is bad in outline and wrong in scale.

No. 101, signed "Liverpool," has what architecturally is a single-span nave, for the side aisles can only be regarded as passages. The plan and arrangement of the piers is very peculiar, and the whole should have been illustrated by a section. The piers show a large circular column towards the centre of the nave, with a long tapering block towards the aisle, and a small intermediate shaft between, in line with the extremity of this part of the piers. The main piers and the shaft are answered by principal and subordinate buttresses on the exterior, so that the general scheme is that

of coupled bays. The wide crossing is square on ground-plan, but develops into an octagon lantern above the roof. The general design, with its rich bits of tracery contrasted with plenty of plain walling, is very effective. The octagon lantern or tower is kept low, with a conical slated roof within a richly-treated open-work parapet, broken at the angles by high piers containing statues in niches. In regard to the peculiar plan of the nave piers, it is suggested that the wide spaces formed by the projecting blocks would be available for sculpture or sacred pictures. There is a great deal of merit in this design.

Near this is a set under the title "Cathedral Church of St. Peter," the number of which we omitted to record. It has a very peculiar and decidedly clever plan, which can hardly be described without a diagram; the central space is a hexagon, and around this are chapels which project partially beyond the main nave line, and make an exterior line of part of an octagon diversified by shallow projecting bays. This elaborate central plan is worked out, in the perspective, into a tumult of contrasting surfaces and planes, with rich window tracery, which is very effective. Some portions of the treatment seem a reminiscence of the east end of Wells. This design is both clever and ambitious, but as a whole it wants reticence and what is sometimes called "pulling together." Still, the treatment of the centre portion of the plan is distinctly an idea.

If we have passed over, among the specially prepared designs, some that were shown by very large and elaborate drawings, this is not because we did not see things which were so very patent to the optic nerve, but because we did not think them worth any serious discussion. Large drawings do not make great architecture. On the whole, the collection of specially prepared designs can hardly be said to be a very remarkable one, considering the importance of the occasion. There is far too much of mere reproduction of Mediaeval Gothic, and a want of a distinct and governing motive in many of the designs. What we want is to see a building which embodies an architectural idea, well-marked in itself, and governing the whole design; and of this there is not much, too many of the designs representing what one may call the average notion of a mediæval cathedral. Of those which show something beyond this, and whose authors might usefully be asked to take part in the final competition, we should be inclined to name 23, 38, 45, 83, and 101.

Of the drawings which are sent as examples of what the authors can do, but which are not designed for the site, some are mere collections of drawings of executed work, others are studies for the idea of a modern cathedral, but not specially for this site. Of those which represent executed work we noticed under Nos. 20, 29, 33, and 43, the easily recognisable works of architects who have made a reputation in church architecture. Under 41 we recognise the hand of a very able man among the younger generation of architects, who has produced many designs for churches, as well as the design for a modern cathedral shown (and which was exhibited at the Royal Academy some years ago), all characterised by refinement and originality of design, but who has not hitherto had any adequate opportunity.

^{*} We understand that the special dedication of the new Cathedral is not decided on. Two or three of the competitors seem to have thought they should make suggestions on this point.

we suggest that this competitor is one who ought to have a chance. Among the drawings are two examples of church work by French architects, as we see both by the style and the French lettering on the drawings; but we hope, in Mrs. Quickly's phrase, that "it has not come to that yet." There is also a collection of Dutch drawings, which we recognise as the work of a man very eminent in his own country, but we do not think he would produce a cathedral satisfactory to English associations, nor do we see any reason why the Committee could go beyond our own country for competitors, or that they would be likely to do any advantage by doing so.

No. 1 is a study for a rather graceful cathedral in Italian Classic style, with an octagon central area and an ante-nave; a low circular dome over the octagon. The design, however, cannot claim higher praise than that of being agreeable. No. 18 shows a design for a cathedral in Late Gothic style, with an octagon dome over the crossing; this is a nature to be considered; otherwise the design is only good imitative Gothic of the conventional type. No. 28 shows a study for modern cathedral plan with widely projecting transepts and a front block with an arch extending far to right and left of the nave front; these blocks are connected to the ends of the transepts by arcaded piers, so as to leave a cloister court on each side of the nave. The plan has narrow aisles for passage only, and an octagon central area; the whole shows originality in plan; the design is imitative Late Gothic, and, as such, very well carried out.

No. 46 is a rather remarkable "Study for Cathedral"; it has an octagonal crossing with a dome over it, which is buttressed by small towers planted at an angle of 45 deg. against the oblique sides of the octagon; the grouping of these square towers and small spires around the central dome is very effective. The same idea of oblique angles is carried out on the entrance front, where the flanking towers are set at an angle of 45 deg. with the line of the nave, connected by a narthex with front segmental on plan; a novel but rather questionable effect. The centre, however, is fine and original. The style adopted is Late Decorated Gothic. No. 51 is a rather remarkable "Study for a Cathedral," in which a design of generally Gothic detail is combined with a dome of classic appearance and outline. The transition from early and geometrical Gothic to something like classic feeling in the upper and central portion of the design is cleverly managed, and the whole shows a good deal of thought; the decorative treatment of the exterior architecture, however, though rich, is perhaps what may be called somewhat mechanical. No. 53, "A Sketch Design for a Modern Anglican Cathedral," is a very clever and original conception. The plan shows a three-aisled nave with a circular crossing and transepts marked by segmental circles projecting beyond the line of the nave walls. The entrance front has a tower in the centre, of rather Lombardic character, with open arches and visible bells in the upper story. The crossing is roofed by a dome almost exactly on the lines of the St. Sophia dome, with semi-domes towards the transepts and an apsidal-ended choir; eastward of the choir is a small cloistered court. The architectural treatment is a kind of mingling of By-

zantine and north Italian elements, shown in sepia-tinted elevations. The interior would perhaps be more effective than the exterior, but this is a very clever and thoughtful study, and we should like to see its author invited for the final competition.

Under 56 are various sketches and perspectives, all showing good work; and under No. 55 is a photograph of a fine and dignified church tower, which we seem to know, but cannot identify at the moment. No. 62 is a sketch design with no plan, the style a clever mingling of French Renaissance with touches of Gothic detail, but in general effect more suggestive of a town hall than a cathedral. All the work shown under No. 66 is very good. No. 68 is a "Design for a Nineteenth Century Cathedral" of considerable ability, though we do not see why it is peculiarly suitable to or expressive of the nineteenth century. The plan shows a long narrow nave with piers arranged so as to form three square compartments with interspaces between them and narrow aisles running past them; each of these is marked externally by a transverse gable carried to the outer walls of the aisles; two towers form transepts at each flank of the crossing. The style is Early Gothic well treated, with plenty of plain spaces of masonry; and on the whole this is an interesting and able design.

We can only just briefly allude to two or three more. No. 69 is a design prepared in 1886 as a suggestion for the Monument-place site, with a central west tower and spire facing down London-road, the plan spreading eastwards as the roads diverge, with flanking towers at the transepts. It is only ordinary imitative Gothic, but the general idea for the treatment of the site is very good. The various drawings under Nos. 79 and 91 are all good work. No. 95 is a design for a cathedral with a long narrow three-aisled nave and a tower separated from the entrance by an arcaded loggia; the tower is a fine one, very well designed, and the entrance front is effectively treated. This may perhaps have been made specially for the site; it is not quite obvious whether it is or not. No. 94 is a set of very large drawings, excellent as drawings, for a purely Classic domed cathedral on a Greek cross plan, treated in a scholarly manner, but not particularly interesting; and the plan shows but a very commonplace treatment.

The following is the list of architects who have sent in drawings:—

R. A. Briggs.	F. Waller.
René Buyck.	"Burgos."
Fred. H. Dudley.	E. P. Warren.
E. Goldie.	W. Woodward.
J. Dale.	Leonard Stokes.
Albert D. C. Capronnier.	J. F. Doyle.
A. W. Crook.	G. & I. Steane.
Geo. Simmonds.	S. O. Herbert.
Geo. Taylor.	G. Walesby Davis.
F. R. Kempson.	H. C. Corlette.
Hippolyte J. Blanc.	J. J. Creswell.
de Mathelin.	J. Jeffrey.
Basil Champneys.	Beresford Pite.
W. J. Medcalf.	J. Burnet & Son.
John Bloore, Jr.	— McKenzie.
R. W. Collier.	C. Spooner.
Austin & Paley.	Murray & Murray.
W. D. Caroe.	H. Beecroft Downs.
W. H. L. Leverton.	J. Honeyman.
A. Greotheart.	Eastwood & Greenslade.
F. Billerey.	Reed Smart & Tappin.
A. Colpoys Wood.	P. A. Robson.
Sir Thomas Drew.	M. Metdepinninghen.

J. Brooks, Son, & Godsell.	W. H. Bidlake.
Robt. W. Gibson.	Wm. Mackay.
J. Robertson.	C. J. Anderson.
Walter le Riele.	Hy. J. Price.
E. Dobbeleers.	J. Th. J. Cuyper.
C. H. Miletam.	A. E. Street.
F. M. Simpson.	F. E. Butler.
Alph. Gosset.	F. Todd.
E. Grayson.	Jas. H. Cook.
C. Demaeght.	C. E. Powell.
G. P. D. Saul.	W. C. Bishop.
J. Oldrid Scott.	M. Stark.
C. A. Nicholson.	H. B. Carre.
H. A. Prothero.	B. M. Ward.
W. H. Jewitt.	W. R. Gleave.
J. Coates Carter.	H. K. Bromhead.
E. A. Heffer.	W. Boswell.
A. H. Skipworth.	G. H. Shackie.
F. H. & J. Sparrow.	Max Sainsaulieu.
J. A. Wilson.	Temple Moore.
Chas. L. Bell.	A. D. Sharp.
Cram Goodhue & Ferguson.	H. Wilson.
Edouard Ramaekers.	Reilly & Peach.
B. Ingelow.	W. F. Tapper.
Colson, Farrow, & Nisbett.	Goodwin & Packer.
G. H. Fellowes Pryant.	G. G. Scott.
Gerald C. Horsley.	C. V. Johnson.
	J. Atwood Slater.

The names are taken from the type-written list furnished by the Committee, which seems to have been very carefully done. We have corrected a good many mistakes in the spelling of the names known to us; if there are others, among the names we do not know, the Committee, or their Secretary, must bear the blame.

PETERBOROUGH CATHEDRAL.

BY a rather curious coincidence, the same week which has witnessed the exhibition of suggestive designs for a modern English cathedral has witnessed also the celebration of the completion of the repairs necessary for the preservation of one of the most important of our ancient cathedrals. On Wednesday there was a special service of Thanksgiving held to mark the completion of what is called in the service-book the "restoration," but should more correctly be called the "repair," of the west part of Peterborough Cathedral. We may take the opportunity to recapitulate briefly what has been done, and notice the result.

The west front, as every one knows, had been out of the perpendicular, and leaning outwards away from the building, from a period at all events previous to the erection of the late Gothic porch and parvise built between the centre piers, as its masonry had been adjusted to the present line of the piers. But it was the damage caused to the pinnacles of the flanking towers by the great storm of March 24, 1895, which led to the erection of the scaffold and the careful examination of the whole structure. It may be mentioned as a remarkable incident that in this storm one of the lofty and picturesque pinnacles of the south-western tower, triangular on plan, was forced from its base and lay back against the face of the central spire, without coming to the ground. The flanking towers, however, are on better foundations than the rest of the west front, and did not require anything but the repair of the local injury caused by the force of the gale. But the occasion was taken for a thorough examination of the whole structural condition of the front, resulting in the discovery of the dangerous state of the structure which was

fully described in our columns at the time. We need only here remind the reader that the two main elements of danger consisted in the inadequate nature of the foundations of the two central piers, which had been the originating cause of failure, and in the wretched construction of the filling of the vault between the great arcade and the main west wall of the church, and of the interior portions of the arches and gables of the portico, all which were of small unshaped stones set in mortar which had long ago lost whatever cohesive property it may once have possessed, and ran out like water wherever an opening was made. The groining of course had spread in consequence of the piers leaning outward, and the north and south gables had been twisted and cracked, more than the central one, owing to the very fact of the comparatively stable condition of the piers adjoining the flanking towers; the impost on one side of the arch remaining stationary, while that on the other side had gone over more than 2 ft. The centre gable was much less strained than the two side ones, owing to the fact that both its supporting piers had moved out to the same extent, and the whole, imposts, arch, and gable, had settled over together. Hence it was not thought necessary to take down the centre gable, which, though out of the perpendicular, was in a tolerably coherent state, but only to repair it in places where the stonework was decayed.

The work done has been, first, to underpin the two centre piers of the great arcade and carry them down to the limestone rock, filling up with concrete an ancient well which was in close proximity to them, and which the Mediæval builders had calmly disregarded; secondly, to take down and rebuild the northern and southern gables and the upper portions of the arches carrying them, to build a solid backing behind the arches, and to take down and rebuild the vault over the portico. The original groin-ribs of the vault have been reset, made up with new stones as far as necessary to fill in the increased width caused by the settling outward of the piers. The facing stones of the gables were numbered before being taken down, and are now nearly all replaced in their original positions.

We were always of opinion that the real and most satisfactory thing to have done would have been to have taken down the whole—perhaps a portion at a time, numbering the facing stones, and to have rebuilt it truly vertical, on a concrete foundation. We admit however, that this was a counsel of perfection which, though more satisfactory in the result, would have been a long, difficult, and very costly operation, for which it might have been impossible to find the funds, since the Government of this country will vote no public money for the repair and preservation of buildings which are of national interest. What has been done will probably prevent the front from going over any more; the foundations are now firm and secure, and the upper masonry, besides being strengthened with new backing, is tied back to the main west wall (some 7 ft. or 3 ft. thick) by steel ties with gun-metal flanges. What is satisfactory is that all this has been done with so very little disturbance or alteration of the original appearance of the front; in fact, no one who knew the building before the repairs would

be at all likely to guess, from the outward appearance of the front, that two of the gables had been taken down and re-erected. In the north gable, which required the most repair, 2,006 facing stones were taken down, and of these all but 170 have been replaced in their original positions, and of the 170 new ones, replacing stones which were too much decayed to be retained, the majority are of an unimportant character. The present appearance of the front is indeed the best practical reply to the absurd clamour which was raised by some archaeological fanatics that the front was being wantonly and unnecessarily destroyed. It has, in fact, been preserved from impending destruction.

Some of the most decayed shafts in the arcading have been renewed with the local material once largely used in the fabric, and now known as Alwalton stone, or Alwalton marble, for it is in fact a marble, and takes a polish as such. The old quarry is worked out, but deposits of the marble have been found in the neighbourhood. It varies in colour a good deal, as is seen in the new shafts worked into the back of the portico, and is only now obtainable in comparatively small pieces, never more than 5 ft. in length; though it must have existed in larger deposits formerly. There is preserved in the choir triforium a curious relic executed in this stone; the main portion of a large circular lavatory fountain of Early English work, divided into small radiating basins all round for washing in. The support is gone; it lies on the floor. In spite of its date, the series of scooped-out basins give it a curiously modern appearance.

The work done on the west front, as we need hardly remind our readers, was commenced under the late Mr. Pearson, and completed under the direction of Mr. G. F. Bodley.

In one of the wall arches at the back of the portico this inscription has been cut in the stone, in memory of the late Dean:—

Remember W. Clavell Ingram, D.D., Dean 1893-1901 A.D., under whom the repair of the west front was begun, and in whose memory it was finished in 1902.

The total amount expended on the repair of the west front and of the portions of the cathedral immediately contiguous to it, has been about 13,000*l*. The end wall of the north transept, which is leaning outwards, is the only portion of the fabric which now appears to call for structural repair on a large scale. It is at present shored up, though we understand that it has shown no recent signs of settling further; and indeed the shores would hardly keep it if it were inclined to go. But it is a part of the building which cannot at present be considered to be in a structurally satisfactory state.

NOTES.

SIGNOR BONI has the investigation of the ruins of the Campanile in hand, and is no doubt the most competent person in Italy to superintend the sorting out and identification of the various portions of the remains. We are glad to hear that Sansovino's splendid gates to his little loggia, the elegant design of which stood in such curious contrast, as to scale and style, with the tower against which it was built, are hardly injured. These gates were illustrated in a large plate in our issue of July 2, 1887.

The Venice Campanile.

There appears now to be evidence that the fall was owing to something else than the giving way of the foundations, and that the walls were weakened and cracked, but the evidence seems doubtful and contradictory, and it may be questioned whether the condition of the walls was cause or effect; all events the event ought to lead to a careful examination of the foundations, this and other erections in the vicinity which, as already observed, are of far more value. The talk seems now to be of rebuilding the Campanile as it was, being stated that there are so many of the old stones available that it will be rather re-building than a restoration. We doubt very much whether, when everything has been picked out that can be, this will be found to be the case; and we regard rather as an argument in advance against objections to restoration. But whether the original stones can practically be rebuilt or not, the desire to rebuild it just as it stood is a characteristic indication of the modern state of feeling about architecture. Whatever its historical interest and association the Campanile was architecturally a crude and clumsy design; it would be possible to retain (for the sake of pictorial effect) its general proportions, but to rebuild it on a better design; especially to increase the proportionate height of the stalk and to get rid of what we have called the "box" stage beneath the spire. In any really lifelike age of architecture the opportunity of its fall would have been taken to improve it in rebuilding. Now, the great object appears to be to rebuild it as bad as it was before.

Proposed Site for the County Hall.

THE idea of a new County Hall for the London County Council is again under serious consideration, having been practically dropped since the rejection of the Bill for the Spring Gardens site in 1896. The "Special Committee on New Offices" now report in favour of the purchase, at a cost of 900,000*l*., of a site described as bounded on the north by William-street, the Tivoli Music Hall, and Adam-street (this last is an inaccurate description, as Adam-street runs north and south), on the south by the Embankment Gardens, on the east by the Hotel Cecil and on the west by York buildings. Do our readers realise what the site thus vaguely described really is, and what the scheme involves the destruction of the whole of the quarter built by Robert Adam, including the Adelphi-terrace and John-street, and the historic house of the Society of Arts? Considering the important position held by Adam in the history of modern English architecture, and the fact that this quarter was the memorial, as it were, of him and his brothers' architectural success, the project to coolly pull it all down for a new building site appears to us, as we think it will to many others, a piece of sheer vandalism. If there had only been some reference in the Report to the historic interest of the buildings we should have felt less strongly on the subject; but the nature of the property is entirely ignored, and it is referred to merely as if it were any valueless collection of old houses. Some action ought to be taken against this proposal for the wanton destruction of the work of a man who made such a mark in the world as Robert Adam.

THE coroner's jury have returned a verdict of accidental death in the case of the fatal accident in Langham-place where a lady was killed by the fall of a coping of the church to which a wire rope had been attached. Considering that the thing had been done before without any bad consequences, by the same persons, it was hardly possible that any other verdict could be given in this case; but we think that after this painful proof of the danger of attaching ropes, on which a heavy strain may come, to portions of buildings not constructed for that purpose, no such verdict ought to be returned in any future case of the kind. There ought to be a by-law placing the attachment of ropes for flags and decorations under the supervision of the District Surveyor, who at present is powerless in the matter. But even without such a by-law, after this warning those who attach ropes to any part of a building, without taking proper advice as to the safety of the attachment, ought to be made responsible in law for any injury caused by their action.

AN interesting decision to the general public in these days of municipal trading has been given by the Court of Appeal in the case of *Jeremiah Ambler & Sons v. the Corporation of Bradford* (the *Times*, July 22). The Corporation was sued by the plaintiffs to prevent them from diverting the flow of water from Bradford Beck. The plaintiffs failed in their action, and the defendants, under the Public Authorities Protection Act, 1893, now claimed to be entitled to costs as between solicitor and client. Section 1 of the Act provides, where any action is commenced in the United Kingdom against any person for any act done, or for any neglect or default in the execution of any act done, "in pursuance or execution of any Act of Parliament, or of any public duty or authority," then, if judgment is obtained by the defendant, it shall carry costs as between solicitor and client. The question under this section has been whether this enactment will extend to public authorities engaged in municipal trading. In the case of the Attorney General *v. Margate Pier and Harbour Co.*, where the earnings were appropriated to the shareholders, it was held in the Chancery Division that the Act had no application; and in the case of the *Ydun*, the President of the Probate Division expressed the opinion that it would not apply to railway companies. In the present case the report is silent as to the purpose the Corporation used the water for, but the effect of the judgments is to decide that where a Municipal Corporation, in pursuance of an Act of Parliament, engages in trading, but applies the profits to the relief of the ratepayers, then, if their operations are directly concerned with their public duty, they are within the Act. The Court of Appeal recognised the hardship this Act might impose; and, indeed, it is impossible to exaggerate it. For instance, a person injured by what he deems to have been negligence on a municipal tramway can only take action at the risk of being mulcted in solicitor and client costs.

THE question of the liability for extraordinary expenses caused by extraordinary traffic on highways is one of a good deal of im-

portance to contractors and builders. By the Highways and Locomotives Act, 1878, where it appears to the Authority which is liable to repair any highway that extraordinary expenses have been incurred by such Authority in repairing such highway by reason of the damage caused by extensive weights passing along the same, or extraordinary traffic thereon, such Authority may recover from any person, by or in consequence of whose order such weight or traffic has been conducted, the amount of such expenses. In the recent case of the *Egham Rural District Council v. Gordon*, the question arose whether the person by, or in consequence of whose order, the extraordinary traffic was caused was a builder or a building owner. It appeared that the building owner was about to build a house in the plaintiff's district, and in March, 1901, he gave an order to the Bracknell Brick and Tile Co. for 250,000 bricks to be delivered on the land where the house was to stand. The company, without the knowledge of the building-owner, made arrangements with a contractor for the delivery of the bricks by means of a traction-engine and trucks, and it was admitted that the roads had been damaged by the use of the traction-engine and trucks, and would not have been damaged if the bricks had been delivered in carts in the ordinary way. In this litigation the building-owner was the defendant, but the Court held that the traffic was not caused in consequence of his order. Of course there may be circumstances when the owner of property who is about to build a house might be liable, but the result of this case is to show that where there is an independent contractor he, and not the building owner, will be liable to the Highway Authority, and may have to incur expenses which will take away the profit from his contract.

Water
for Domestic
Purposes.

THE case of the *Barnard Castle Urban District Council v. Wilson* and others decided in the Court of Appeal, raises an interesting question as to what is a use of water for domestic purposes. The Urban Authority, under the Public Health Act, 1875, had the right of supplying water, and the respondents were the Governors of the North-Eastern County School, an institution not carried on for profit. The governors of the school had erected a swimming-bath, and claimed to have the right to the water as for domestic purposes without paying a special rate. Two Acts of Parliament govern the subject, Section 53 of the Waterworks Clauses Act, 1847, simply enacting that the occupier of any dwelling-house, having paid the rate, shall have the right "to demand a sufficient supply of water for his domestic purposes," and Section 12 of the Waterworks Clauses Act, 1863, defining certain uses as not being domestic purposes, viz., amongst other things a supply of water "for any trade, manufacture, or business." A school has been held to be a "trade or business" in the case of *Doe v. Keeling*, even when carried on as a charitable institution, *Rolls v. Miller*, but the point in the present case was whether the water supplied to the swimming bath was required for any purpose connected with the business of the school. Mr. Justice Buckley, in the Court below, had held it was not but the Court of

Appeal (Lord Justice Vaughan Williams with some hesitation) held it connected with the business, being apparently assisted in this conclusion by the fact that the boys were taught swimming. The Court of Appeal also held in such cases regard must be had to what could reasonably be considered a necessity for domestic use. One of the exceptions in the Act of 1863 is water used for any ornamental purpose, but we are glad to say it appears not to have been argued the bath fell within this exception.

Sparking in
Electric
Switches.

THE paper by Messrs. Russell and Paterson on "Sparking in Switches," recently published in the *Journal* of the Institution of Electrical Engineers, treats of a subject which we have always considered of pressing importance owing to the general adoption of higher pressures of supply. They have discovered several simple laws governing the lengths of these sparks, and so have enabled manufacturers to rate their switches themselves instead of being forced to send them to testing laboratories to find out whether they will survive the rough-and-ready test suggested in the Institution rules. When a direct current circuit is quickly broken, a spark ensues at the point of break. Now, for pressures greater than 200 volts, this spark increases rapidly in length, and if the contact pieces of the switch are not sufficiently far apart an arc will be set up, and it will be impossible to break the circuit with the switch at all. If the fuse protecting the circuit be too large then the arc will melt away the contact pieces, and in certain circumstances there might be a risk of fire. The authors suggest as a basis for rating switches that the "factor of safety" should be two. This does not mean that with double the current the switch is rated to carry "arcs" will be established across the air gaps; it means that the distance at which an arc could be maintained at the normal current and pressure is half the air gap. This method of rating agrees very closely with that adopted by the Glasgow Corporation for use on their 250-volt circuit, and it is satisfactory to find that a scientific basis for rating switches has been discovered. The paper is well illustrated with curves showing the lengths of the sparks got by breaking circuits carrying currents up to 100 amperes, and at pressures up to 600 volts. The experimental data given will be most useful to manufacturers, and if more papers of this type were published we should hear less about the lack of uniformity in supply company and Corporation rules.

Royal Courts
of Justice.

WE are informed that the Board of Works is now engaged on the work of installing the electric light in the chambers of the Courts of Justice. It is surprising that this work has not been undertaken before, but we hope that the fact that it is now in hand is an augury that other necessary work will not be neglected. It is high time that the passages throughout the building were warmed by hot air; one would also suppose that hot water might be supplied in the counsels' lavatories. Nothing has yet been done to improve the ventilation of the Court passages, nor to affix outside the doors leading to the Chancery and other

chambers any indication of the way to reach them. It is really surprising that so many small but necessary improvements, the aggregate cost of which could not amount to more than a few thousand pounds, have been so long left undone.

WE have received a copy of Architectural Association Day the programme for 1902-3 of the Day Courses in architectural training at the Architectural Association, for which, as our readers will remember, Mr. A. T. Bolton is the Master. These were instituted with the object of giving to young men who are thinking of adopting the profession of architecture some special preliminary training before they actually enter an architect's office; it being considered that pupils are often unable to take advantage of the opportunities afforded in an architect's office because they have not previously studied the elements of their work; and a year or two spent in the kind of preliminary school now established at the Architectural Association will enable them to acquire, at a moderate cost, the rudiments of their work. The two main subjects taught are the history of architecture, and elementary knowledge of construction and materials; thirty-six lectures on each subject. The lectures on construction are illustrated by visits to workshops and buildings in progress. The course is for two years, and the student who distinguishes himself most in the first-year course will be given a free pass to the second-year's course; so that this arrangement forms an annual prize or exhibition for the first-year students. Mr. Bolton is, we think, an ideal instructor for such a school, as he combines artistic feeling with a great deal of practical and historical knowledge. He undertakes, moreover, to give (by appointment) an interview to each intending student who has entered his name on the books. This is a valuable concession, as the master learns the special wants or acquirements of the student, and may be able to give him advice useful to his special case. Full particulars of the classes can, of course, be obtained from the secretary to the Architectural Association.

National Competition Drawings, South Kensington. THE exhibition of the selected works of schools of Science and Art and Art classes which have been rewarded with prizes is held this year in the upper gallery of the India Museum, in Imperial Institute-road. This position is a great improvement on the arrangements of past years, which have often left much to be desired, both for lighting and facility of access. With the abatement or the exclusion of the Royal College of Art, the Glasgow and other schools, the exhibition really retains little of a national character, and is considerably beneath the average of past exhibitions in quality and quantity. We should have particularly liked to see the work in architecture of the Royal College, under the influence and training of Professors Beresford Pite and Lethaby. The architectural work from the provincial schools maintains its usual characteristic of amateurism, where either measured work of elaboration or advanced design is concerned. There are a good many sets of designs that have been exhibited on the walls at the Institute, amongst them the design of Mr. Gascayne, of Nottingham, which won the Tite prize this year, and is now rewarded

with a silver medal. It is not in the architectural section that the best work is to be found. Figure-decoration applied to architecture is well represented by Miss Annie McLeish, of Liverpool, with designs for decorating a dining-room. Several friezes are noticeable, one by Mr. William Chase, of Regent-street Polytechnic, of the Canterbury pilgrims, is deserving of the award it receives. Of applied designs from Nature, that by Mr. Harold Whitaker, of Bradford, is far away the best we have seen. Miss Elizabeth Thorpe, of Huddersfield, sends a design for a jewel case, which is a delightful conception. Amongst the book illustrations is a sheet of life studies by Mr. Gilbert Rogers, of Liverpool, treated in stencil of two or three tints, which are admirable for the effects obtained both of light and shade and modelling. Miss Eugenie Richards' illustrations for nursery rhymes are possibly the best thing in the exhibition; their grouping, humour, colour, and drawing are all that could be desired.

New Inn,
Wych-street.

ON Friday last week were sold at auction the materials of the greater portion of New Inn, which will be speedily demolished for the improvements in that quarter. We gather that the twenty "Ancients" of the Inn, being lessees for a further term of 300 years from the Society of the Middle Temple, the freeholders, have disposed of their proprietary rights for 157,000*l.*, to be vested in representatives of the "Ancients" and the Middle Temple as trustees in that behalf. Of New Inn as a place of legal instruction the annals are very meagre. Five hundred years ago its site was that of a travellers' hostelry, commonly known as the Inn of Our Lady, having the Virgin Mary for its sign. Stow tells us that Sir John Fineux, Chief Justice of the King's Bench, bought or hired Our Lady's Inn for 6*l.* per annum, temp. Edward IV., for law students, who then lodged in a house called St. George's Inn, by Seacoal-lane, in Little Old Bailey. The students, one of whom had been Sir Thomas More before he migrated to Lincoln's-inn, were afterwards joined by others dispossessed by the demolition of Strand, also known as Chester, Inn, for the Lord Protector Somerset's palace by the riverside. St. George's Inn had been reputedly the oldest Inn of Chancery in London, its successor subsequently became attached to the Middle Temple, and after the demolition of Strand Inn remained as the only law seminary belonging to that Society. Over the Hall, and in the older portions of the present buildings along the north side of Wych-street, are some curious sets of chambers after a kind that will not be built again, and in various rooms are some old panelling, mantel-pieces, and other carved fittings; but for some while past, in view of its impending fate, the buildings of the Inn have not been maintained in a state of repair. The Hall and its garden stand at the upper end of the court named Danes Inn, erected in 1854-5 on the site of the Angel Inn, whence Bishop Hooper was carried in 1555 to be burned at Gloucester, and shortly to be pulled down in its turn. On Tuesday last Mr. Justice Farwell formally approved a scheme whereby out of the above-named purchase-money a sum of 26,000*l.* is apportioned to the "Ancients" as renters for life, and a sum of 55,000*l.* to

the trustees for public charitable uses, the Court having decided that the property in New Inn is a charitable trust.

THE ARCHITECTURAL ASSOCIATION ANNUAL EXCURSION.

AFTER an interval of seventeen years, Banbury has again been chosen as the headquarters of the Architectural Association's annual Excursion. This year, however, several places were included in the programme for the Excursion that were not visited on the last occasion. About a dozen members, including the President and the two Excursion Secretaries, travelled down on Saturday afternoon by the train leaving Paddington Station at 3.15, arriving at Banbury in time for a substantial dinner at the Red Lion Hotel; more members arrived during the evening, and on Sunday, from far and near; so by Monday morning the party was practically complete, the number this year having been restricted to thirty. On Sunday the usual informal programme was followed, the morning being spent quietly in strolling round the old streets of Banbury, and in the afternoon an impromptu excursion was made to Edge Hill, from the top of which a magnificent panorama may be seen with the river Avon stretching far away to right and left; on the way an hour was spent in the interesting village of Warmington, where the church and manor-house were much appreciated; in the churchyard are several very quaint headstones. Ecclesiastical and domestic architecture were about equally represented on the programme laid before the members, the former included such interesting examples of churches as Adderbury, King's Sutton, and Bloxham, whilst among the latter were at least four old houses of great architectural interest: Broughton Castle, long the home of the Saye and Sele family; Wroxton Abbey, for years associated with the name of North; Compton Winates, the charming Tudor house of Lord Northampton and Canons Ashby, for so long the home of an old friend of the Architectural Association, Sir Henry Dryden, now also gone to his rest.

The town of Banbury, known to history no less for its cakes and ales than for the cross celebrated in nursery rhyme, is, as the local guide says, one of the cleanest and brightest towns in Oxfordshire, and possesses what is an absolute necessity for an Architectural Association tour, a really good hotel, the Red Lion. There are many very interesting old houses, not a few very "sketchable" subjects for an architect's note-book. Almost opposite the headquarters is an interesting old house, overlooking the narrow street, with three high-pitched gables, with much-ornamented barge boards, perhaps rather coarse in detail; below are bold semicircular bay windows, with pargeted walls. Unfortunately, the roof is now covered with blue slates instead of the old stone slates of the district. The Rectory House, built of a rich brown-coloured stone, with mullioned windows, adjoins the church, which was commenced in 1793 from the designs of Robert Cockerill; it replaced a much older Gothic building, which, if local tradition be reliable, must indeed have been an elaborate structure. Not far from the church is the Banbury Cross. The original cross was destroyed in the year 1602 by ruthless Puritan vandals, and the present structure, which can hardly be said to be a fine architectural composition, is of comparatively modern date. There are some interesting inns to be seen; amongst them The Swan Inn, an old stone building, nearly opposite the cross, and The Reindeer, with its quaint sign projecting halfway across the street, beneath which are the oak doors, dated 1571, giving access to the old-fashioned stable yard, wherein generations of farmers from all the countryside round have been wont to "put up" on market days. A very fine Jacobean room overlooks the yard, from which it is entered by a flight of steps. It is panelled throughout in oak, now black with age, and is in a very fair state of preservation; here and there pieces of moulding are broken away, the fireplace has been modernised, but the over-mantel, which is quite a fine specimen, still remains. The room is not of large dimensions, and has a well-modelled ceiling with broad ribs ornamented with running patterns, the spaces between filled with little figure subjects that appear to have been formerly gilt; it is in



all probability the work of travelling Italian plasterers, and is in some respects similar to one at Compton Winates, not many miles away. A plaster cast of this ceiling has recently been placed in the South Kensington Museum. On one side of the room is a large bay window, on either side of which are angle doors, which, together with the panelling and the fireplace, are remarkable for their good details and delicate workmanship.

On Monday morning the weather looked far from hopeful, but fortunately rain kept off, and at nine o'clock a start was made for Adderbury, where the church, dedicated to St. Mary, was visited. It consists of a chancel 40 ft. by 20 ft., transepts 71 ft. across, nave 61 ft., including the aisles, and 71 ft. long. It has also a western tower, with spire and north and south porches. The open timber roof over the nave is of very pleasing character. It consists of ten principals, and is about 19 ft. span. The principal rafters and struts are shaped in ogee form. The curved parts beneath the tie beams of the four principals nearest the east end have cusped enrichments, adding considerably to their appearance. The chancel is said to have been built by William of Wykeham, who in 1385 gave this vicarage to New College, Oxford. His bust is sculptured with his armorial bearings on the external wall over the east window of the chancel. Dividing the north and south aisles from the transepts are two very interesting square moulded pillars, with sculptured caps, that to the north aisle

having female faces and that to the south aisle male faces, with foliage ornamentation.

The building is of various dates; the tower and spire and nave are of the Decorated period, and there are many remarkably fine specimens of mediæval sculpture, which called forth the admiration of Sedding, who read a paper here at the Architectural Association visit in 1885. He said: "I doubt whether, through all the range of English carving, there is anything better in its way than this. The capital to the north transept has busts of women with grave, beautiful faces, evidently studies from life. That to the south transept is re-chiselled and spoilt. Such carving as this shows us that the old carver could both jest and pray; he knew how to mix things human and divine as they ought to be mixed upon the wall of that building which is the trysting-place of God and man; he could express his faith, and tell of man's relation to the court and company of heaven, and yet give his art local flavour and a spice of humour by inserting current village jests and contemporary portraiture." There is a fine rood-loft with attached staircase. The window tracery was cut out in 1790 to save the cost of repair, and its place filled with stone bars. On the south side of the altar is a fine sedilia and piscina. On the north side of the chancel is an original vestry, with a room over, now used as an organ-loft; it has an oriel window. This building is known as the "monument house," probably a corruption of muniment

There is a fine brass of a knight and lady, about 1400, in good preservation.

The church has undergone several restorations—in 1834 by Buckler, in 1870 by Sir Gilbert Scott, who inserted windows in the aisles and added a coved canopy to the chancel screen, and later by Mr. John Oldrid Scott. On the north side of the church is the old parsonage house, which still bears much of its original character.

After leaving Adderbury, a drive of a few miles brought the party to Deddington, where once there existed a castle of some importance. The church is dedicated to St. Peter and St. Paul, has a very wide nave and a fine fourteenth-century screen dividing it from the chancel. On the outer walls of the north and south aisles are the remains of staircases, in the thickness of the wall, which formerly led to rood lofts in the aisles, separating them from chapels.

The roof of the north porch is a flat, dome-like shape of Gothic tracery. In 1634 the tower fell, carrying away part of the church, and the bells were damaged. King Charles, who was then at Oxford, hearing of the mishap, thought it a pity that such good metal should be wasted. He therefore addressed an order to the parson, churchwardens, constables, and others, requesting that the bells be sent "to our magazine here in New College, at the same time promising to either return the bells or send a contribution to the church, but neither promise was fulfilled. When the tower was rebuilt, the builders made very sure that no such calamity should again overtake their tower, and built massive buttresses and very thick walls. The curious mixture of Gothic and Classic detail shows the feeling of the time.

The Manor House on the north side of the churchyard is a picturesque building of yellow Hornton stone, with bands of a grey stone from Bruckley in Northants. On the garden side is a large bay window running the whole height of the house, which is dated 1654. In the centre of the building is a tower, round three sides of which runs a balustrade. In the interior is a fine staircase with double newels and open carved pendants, well-proportioned balusters, and carved strings. Inside are several well-proportioned rooms. The house has recently been restored. Here the party were very hospitably entertained to luncheon, and, after a hearty vote of thanks to the owner for his kindness, a start was made for Somerton.

A drive of about three miles past North Aston Church and park, and across the river Cherwell, brought the party to Somerton Church, situated on rising ground. The church consists of a nave, north and south aisles, chancel, south chapel, and tower. The nave is 52 ft. and the chancel 33 ft. in length. There is much interesting modern work in the interior, by Sedding & Wilson.

On the south side of the church is the burial-place of the Fermor family, and several memorials to them exist. The oldest is to the memory of William Fermor, who was lord of the town and patron of the church and a prominent lawyer during the reigns of Henry VII. and Henry VIII. He died September 20, 1552.

On the north side of the tower is a representation of the Crucifixion, with our Lord between the two thieves. Over the communion-table is a rudely-sculptured representation in stone of our Lord, seated, surrounded by the apostles. In the churchyard on the south side of the church is a fine crucifix, raised on stone steps.

The time at the disposal of the party proved far too short, and it required more than one call from the secretary's whistle before another start was made. Such a church as this, and also the one at Warmington, would prove a good subject for illustration by a monograph.

Rather more than a mile from Somerton is Fritwell, where the party were entertained to tea by Mr. Garner. This visit was the most interesting of the day, and the Association were fortunate in having so enthusiastic a guide. The house is of a type not unusual in the early seventeenth century; the entrance front has projecting wings, and a central porch with quaint little balustrades on either side, very similar to St. Catherine's Court, near Bath. The interior of the house is delightful in every way, in fact, quite an ideal architect's home, with very many fine examples of furniture. The garden, too, with its formal beds and yew hedges, is an ideal frame to the grey old manor house.

From Fritwell a drive of about five miles

brought the members to Kings Sutton, where the church and manor house claimed attention. The church, which is celebrated for its very fine tower and steeple, was restored by Sir Gilbert Scott. The tower is placed in an unusual position, its western face being flush with the ends of the aisles, with a porch extending beyond of sixteenth century date. The two pinnacles at each corner of the spire, where the tower springs, are interesting features. They are connected by small flying buttresses with the main structure. The party left Kings Sutton after a stay of rather more than an hour, reaching Banbury soon after seven o'clock.

Tuesday morning was inclined to be wet, and the train was taken to Woodford Station on the Great Central Railway, and after a drive of about an hour in the rain the party reached Fawsley Hall, where they were met by Lady Knightley, who very kindly acted as guide to the Hall and church. The Hall stands in a well-wooded park, improved by Capability Brown with two artificial lakes.

At the time of the Domesday survey, the lordship of Fawsley was held by the Crown, and later the families of Russell, Capes, and Fawsley possessed it, until in 1415 it was bought by Richard Knightley, whose descendants have ever since retained it. Some parts of the house date from this period. The great hall, of early sixteenth century date, has a very fine fireplace and a large oriel window, the upper part of which is a secret chamber with no means of access other than by a ladder. It is supposed that in this chamber were printed the anonymous pamphlets known as the Martin Marprelate tracts, which appeared in 1588 in support of the Puritans, and for which Sir R. Knightley suffered so severely. The printer was one Waldegrave, who first set up his press at Moulsey in Surrey, then at Fawsley, and later at Norton, another seat of the Knightleys, who always supported the Puritan cause. Before the outbreak of the Civil War, many conferences took place at Fawsley Hall between the leaders of the Parliament.

Fawsley Church consists of a nave about 50 ft. by 21 ft., chancel 17 ft. by 21 ft., and north and south aisles. It contains many interesting monuments, and, indeed, is quite a history of monumental architecture in itself. On the south side of the nave, next the chancel arch, is a very fine alabaster tomb enriched with colour decoration. It is to Sir Richard Knightley, who died in 1534, and his wife, Joanna Skirton. The knight is in full armour. After visiting the church, luncheon was taken in the riding school, and before leaving Fawsley Park a visit was paid to a very interesting early Tudor building known as the Dower House, dating from the early sixteenth century. It is now a ruin, not having been occupied since 1704.

From Fawsley the party drove to the *prieuré de résistance* of the day, Canons Ashby. Canons Ashby is so called from a priory of Augustinian canons which existed here as early as the reign of Henry II. After the dissolution the possessions of the priory were granted to Sir Francis Bryan, about the same time as the earliest Dryden came hither from Cumberland. From Sir Francis Bryan the property passed to the Cope family, who converted the domestic buildings of the priory into their home. A daughter of the Copes married John Dryden, who had already built himself a house not far off, and as years went by the Copes died out, and the whole place came into the hands of the Dryden family. The original parts of the house were put up between 1550 and 1574. Between 1708 and 1710 great alterations were made to the old house, and since this date nothing has been done. The house is arranged round a picturesque central courtyard, to which admittance is gained through a low archway past the old brew-house. On the east side are the offices, consisting of kitchen, bakehouse, and laundry. The entrance door is on the north side up a flight of steps, and leads directly into an oblong, stone-paved hall, with walls decorated with old armour trophy. On the west side of the hall are the principal apartments, overlooking the delightful old garden; the dining-room and library on the ground floor, and the drawing-room above. The dining-room is panelled throughout, it is said, from the wood of one oak. The drawing-room on the first floor is not a very large apartment, measuring 25 ft. by 18 ft. It has a coved ceiling springing from each of the four sides, richly modelled

and ornamented with ribs, which meeting, form a curious pendant in the centre of the room. One compartment is richly coloured with the arms of Sir John Dryden and his wife, whom he had married in 1632, and the ceiling probably dates from about this time. The fireplace is pleasing, with three pairs of little Corinthian columns of better design than one usually meets with in these early days of the Renaissance. The house also contains a fine collection of old furniture, some good old armour, and many interesting pictures and portraits, including one of the poet, "Glorious John," who frequently came here to court his cousin, the daughter of the reigning baronet.

The chief glory about Canons Ashby is that it retains so much of its old-world character. This is no doubt due to the conservative care of its late owner and the present Baronet, who has done necessary works of repair. The garden, too, retains its old character, and has for two centuries successfully withstood the changes in garden fashion; it is therefore a rather valuable example, and deserves more than a passing reference. It consists principally of a green court enclosed with walls on the north-west side of the house, which lead up to the original entrance on this side, now no longer in use. This court, which is entirely laid down with grass, although remains of a drive may be traced, has eight cut yews leading to the front door, on either side of which are very handsome Georgian lead rain-water heads. At the opposite end of the green court are some very good gate and angle piers, about 11 ft. high, terminated in obelisks supported on groups of scrolls, forming an original and suggestive design.

The remaining gardens slope away gradually on the south-west side of the house; they are enclosed with old lichen-covered walls, with masses of brilliant old-fashioned flowers and well-kept grass walks between. Near the house is a group of four old cedars, between which a delightful vista is obtained, through the garden, past the sundial, and down a long avenue in the park. No wonder, then, that the members of the Architectural Association waxed enthusiastic, and the three and a half hours proved far too short to exhaust the glories of the old house, and left little time to examine the thirteenth century church which is all that now remains of the Augustinian priory, and even this is reduced to one-sixth its former extent; the west front is an interesting mixture of early and late work, the lower part consisting of a beautifully moulded Early English arcade and door; above it is a large Perpendicular window; two bays only of the nave arcade are now standing, the other three bays were cut off at the time of the Reformation, when the large bay window was inserted and the present flat roof introduced. On the homeward journey Thorpe Mandeville Church was visited, and Banbury was reached soon after seven o'clock.

COMPULSORY REGISTRATION OF TITLE TO LAND.

A VOLUMINOUS, but clearly expressed, Report on the working and results of the application of the system of compulsory registration of title to land, in London, has been presented to Parliament and is of great interest to all landowners and to all professions concerned in transactions affecting landed property.

The Registrar, in addition to reporting on the results obtained, gives a brief description of the method by which the work is carried on, and also some general directions as to the procedure. The Report should therefore be carefully studied. The figures given are instructive, land to the value of about 35,000,000l. has been dealt with the transactions numbering 54,000; and when one bears in mind these figures and the fact that the indemnity fund has not been called into action, and further that only one appeal from the Registrar's decision has been made (and in that case the Registrar was upheld), it is apparent that the system must be a good one, and that it has been skilfully applied.

One fact is especially worthy of notice, namely, that the cost has been entirely borne by the fees, no charge whatever being made upon the public exchequer, and in connexion with this it is stated that a great deal of surveying has been done in bringing the Ordnance Map up to date, the expenditure on which, no doubt, might very properly have been considered as provision for the future, and therefore treated as of deferred benefit and the cost

spread over some years. That this has not been necessary affords grounds of congratulation to those officials who, by reason of their skilful forecast, enabled a scale of fees to be determined, which, although moderate, has resulted so satisfactorily.

From the description of the procedure given by the Registrar, the system would appear to be simplicity itself. He says that the applicant for registration has only to bring to the registry his title deed and then do four things—(1) visit the Map Department and point out his property on the Ordnance map; (2) have the proposed entries in the register drafted (and we are pleased to observe that these entries are not arbitrarily drawn up by officials, but, before being settled, are submitted to the applicant for his approval); (3) next he pays the fee, and, lastly, leaves the document in the proper room, and the transaction is complete.

The Registrar says that half an hour suffices to carry this out, and that the land certificate is despatched in from a week to a fortnight, and we think no one would feel disposed to grumble if the time occupied was longer; when one contrasts it with the wearisome delay usually entailed by the old system of conveyancing, the time occupied appears trifling.

The delay that does sometimes occur, and which has been severely commented on by some legal critics, is solely caused, so the Registrar says, "by the discovery of some serious discrepancy between the description of the land contained in the deed and the actual state of the property as shown on the Ordnance map." If this be so, then the fault must rest with the legal expert who drew the deed, and we endorse the Registrar's remarks that "the majority of landowners appear to take the sensible view that a clear and accurate description of the property of which they are in occupation and to which they believe themselves to be entitled, is an advantage which they seldom obtain under the present conveyancing system, but which, if the new system can give it to them, is well worth procuring even at the cost of a little trouble and time at the outset."

The Registrar proceeds to emphasise this part of the Report by stating "sometimes the claim (based on the deed) embraces more land than has been conveyed, sometimes less," "sometimes the position and shape of the boundary walls and fences are different to those shown by the plan attached to the lease or conveyance," "sometimes when the dimensions are correct the angles are wrong and overlap neighbouring property," and, finally, "sometimes the description has been copied from an old deed and has no relation to the existing state of the property at all."

In Appendix III, the Registrar illustrates a few of the causes of delay, and if it were not for an official Report one would feel justified in doubting that the present day conveyancing practice could be guilty of such errors.

In the first example the deed gave a plot of land 40 ft. wide in front and 43 ft. at rear, but what the purchaser really was entitled to appears to have been only 30 ft. in front and 20 ft. at the rear.

In Example 3 the deed omitted about one-sixth part of the land.

Examples 4 and 5, from the illustrations given, border on the ludicrous, the plans on the deeds having little or no resemblance to the actual properties.

Example 6 is of a deed which the Registrar labels as of "land described and identified forming no part of the land intended to be conveyed."

With such instances occurring in the daily practice, the Registrar must have felt severely indignant to the criticisms which have from time to time appeared in our legal contemporaries.

Dealing generally with the effect of the Act upon the question of title to land, the Registrar admits that a possessory title is not a good thing or of much practical benefit until it has aged, and therefore he advocates that the acquisition of an absolute title should be made easier and less expensive than at present, for, as he says, "If the titles now being registered could be all entered as absolute titles there would be no possible question as to the benefit to the public that would at once accrue as a result."

The Registrar propounds three methods by which absolute titles should become the rule, but as he himself dismisses the first two as being in some respects unsuitable to this country, and also entailing further legislation, and we are disposed to agree with him, it is

only necessary to consider the third alternative. Briefly described, what the Registrar suggests is (by alteration of the rules only) to give him the power to grant an absolute title when our conditions have been complied with, namely:—

1. Sale under ordinary conditions, completed by entry into possession.
2. Possessory title registered for upwards of two years.
3. Applicant's production of and deposit in the registry for a substantial period of such documents of title as he ought to possess.
4. Public advertisement.

As this part of the subject is of engrossing interest and of far-reaching effect on all landed property, the Registrar's proposals should be fully considered and discussed in professional circles, and as some assistance we would direct attention to the following points:—

As regards condition 1, the Registrar remarks that "where a purchase has been bona fide completed in the usual way and the purchaser has entered into possessions or receipt of the rents and has remained undisturbed for a year or more, the occurrence of actual loss or trouble of any kind arising out of the anterior title is practically a thing unknown or unheard of."

This appears to be a sound argument, for it is difficult to conceive a case where a property could be sold and possession held or the rents actually received for a year or two by the purchaser, without the true owner's knowledge.

Again, the Registrar says "the commonest form of fraud is by duplication of a recent deed," and it is just this kind of fraud which the registry practically renders impossible and against which the old system of conveyancing affords hardly any protection.

Condition 2 is supported by the Registrar by the statement that as practically all possessory titles have been immediately preceded by a purchase, there has consequently been some (more or less strict) examination of title on behalf of the purchaser.

The production and retention in the registry, as per Condition 3, of the applicants' title deeds, would be useful as placing obstacles in the way of any unregistered dealings subsequent to the registration, and would be no hardship to the applicant who could not want them unless to carry out some dealing which should, *per se*, be notified to or carried out in the registry; the few exceptional cases in which the deeds were otherwise required could easily be provided for.

The last condition, namely, that of public advertisement, would be a further check on fraud and also a safeguard as to disputed rights of ownership, and we should hardly suppose that an owner would object to the fact being advertised that he had applied for an absolute title to certain property (no other facts being disclosed), and we venture to think that it could result in no detriment to the property and certainly none to the applicant.

The Registrar points out that naturally the registry has collected and will continue to accumulate much general information about titles which render it possible to eliminate the elements of fraud and mistake; in other words, the Registrar by virtue of his official knowledge of Smith's title knows a good deal about Jones' title, and, although, of course, he would not disclose his knowledge to either Smith or Jones, he can act upon it.

This leads us to another paragraph of the Report, which, although preceding the foregoing, will be more readily understood by dealing with it as following those observations.

The Registrar explains that an absolute title means that the registered proprietor can dispose of his land without delay, without cost, and without trouble, also that the purchaser can acquire it likewise without delay, without risk, and with no more trouble than is involved in reading a few plain entries in a book and in filling up a short printed form of transfer for the vendor to sign, and with no more cost than the registry fees, which the Registrar generalises as being only *one-fifth* of the usual legal charges.

We may mention that the actual fee on a transfer is 6s. per 100l. up to 1,000l., 4s. per 100l. for next 2,000l., 2s. per 100l. for next 7,000l., and 1s. per 100l. for remainder up to 32,000l., when the maximum fee, 25l., is reached, and these fees are, of course, payable by the purchaser only; the vendor pays nothing whatever.

The Registrar contends that only an abso-

lute registered title can enable an ordinary landowner to deal with his land himself, and with the same freedom and facility and entire absence of cost and delay as that which attends his similar dealings with goods or stocks and shares, and that it is only an absolute title that can be accepted by a purchaser or mortgagee on his own responsibility without recourse to legal assistance. We are prepared to agree with him that if attainable these are solid advantages to the community at large which are worth a certain amount of general effort and even cost.

Trammelled as we are by our experience of what usually happens when one sells one's farm or one's house, it is difficult to imagine it to be possible that it *can* be effected by merely reading the entries in a book and filling up a form, and yet, as the Registrar very appositely points out, that is how real estate is conveyed in our Australasian and other colonies and in the German and Austro-Hungarian Empires.

The Report also emphasises the facility with which a permanent mortgage or temporary loan can be effected by means of the register, and the Registrar makes the noteworthy statement that "London bankers who have had experience of the registry system are already beginning to express their preference for it." This is a substantial argument in favour of registration from a class of the community whose opinion is specially valuable.

The Registrar proceeds to make some trenchant comments on the reason why, in his opinion, landowners have not more freely applied for absolute titles, and, in fact, have made so comparatively little use personally of the registry.

He says (1) that landowners, as a rule, do not know that such personal applications can be made at all, and that he doubts whether, of 30,000 persons registered as proprietors of land in London, more than a small fraction of them are aware of the fact, or, indeed, even of the existence of the land registry system at all, and he gives the following as his reason. As the reason given is, to say the least, a grave reflection on the method adopted by some members of the legal profession to subvert the intention of the Act, we will quote his own words:—"The entry of a purchaser's title on the register is now one of the regular consequences of a sale, and it is concluded by the solicitor without any necessary communication with the client in regard to it, and, unless something leads the client to make special inquiry about it, the probability is that the land certificate is merely put away with the other title-deeds in a safe, and no further thought is given to the matter."

The obvious inference of this statement is that the Registrar thinks that some solicitors have, if not actively, at any rate, passively, concealed from their clients the fact of the system of registration being in existence; we hope this is not generally the case, as, although, no doubt, the system hits the solicitor a hard blow, yet we should be reluctant to think he would adopt such means to controvert its efficiency.

But that the Registrar is in earnest in this statement is shown by the paragraph which follows, in which he says, "the first thing to be done is to place before the landowners themselves information as to the object and purpose of the Acts, and especially as to registration with an absolute title, how it can be obtained, the probable cost and such other particulars as may be deemed advisable."

Again, in the last paragraph the Registrar is evidently girding at his legal critics when he says, "With regard to the supposed disposition of the Land Registry to discover technical flaws in a good holding title, and so render the application abortive, it will at once be seen that the regulations leave very little room for that kind of activity. Further, it may be stated with some confidence that no such disposition exists. There does not appear to be a single case of a title which had been the subject of a bona-fide sale within recent times having been refused registration as absolute. A certain number of applications have been refused, but they have usually been cases in which the owners were aware that they would have trouble if they attempted to sell in the ordinary way, and hoped that the Land Registry might be able in some manner to cure the mischief."

In the sub-Report submitted by the Director of the Survey and Map Department, there are two paragraphs which are of special interest to our readers who belong to the profession of surveyors. The Director says: "Men of the

surveyor and reviser class were especially difficult to find, the fact being that a thoroughly good surveyor and draughtsman is sure of employment, and at a high rate of pay," and "considerable difficulty was experienced in obtaining suitable men, owing to the low commencing rates of pay and limited prospects of advancement offered."

We need hardly say that we are glad to read both of these statements by the Director, as it is at once a recognition of the status of the profession, and, at the same time, a condemnation of the Committee who fixed those low rates of pay and limited opportunities of advancement.

Evidently those gentlemen had little or no knowledge of what it costs to learn to be a surveyor, or of what his, the surveyor's, knowledge consists.

We are struck by the information given in the Report as to the relative rates of pay of the officials of the Survey and Map Department and those of their legal brethren. For instance, the Registrar states that an Assistant Registrar (of the legal department) is paid 825l. per annum and a Chief Superintendent (of the Survey Department) only 306l. per annum, although each holds the same relative rank in his respective department; and the Registrar, in describing the duties of a Chief Superintendent, says he is responsible for the clearing up of all doubts and difficulties (excepting questions of law).

As the Registrar in another part of the Report refers to "the onerous and responsible duties" of the Survey Department, and, as we have already pointed out, gives examples of the serious discrepancies between the deed plan and the actual pressures which frequently occur, and also admits that "questions arise more frequently as regards the plan than as regards the legal features of the case," it would appear desirable that there should be an inquiry by experts into the rates of pay of the officials of the Survey Department; for although we have only instanced one class, the same disproportion and inadequacy appears to be the rule throughout the department. We do not advocate extravagant salaries for officials, but when the exercise of skill and judgment is required the truest economy is to pay the official adequately, and then to insist on personal responsibility and efficiency.

It will be seen by the above comparison that there is a most marked disproportion between the rates of pay of the two classes of officials, especially when it is obvious that in a system of registration the plan plays by far the most important part. And, in fact, the Act itself states this, for it provides that, in case of dispute between the verbal description and the plan, the plan is to prevail; consequently, the responsibility of the officials of the Survey and Map Department must be at least equal to that of those of the Legal Department.

When it is borne in mind that the system has worked for three years under all the adverse circumstances attaching to an innovation and amidst all the complications of this busy metropolis, and has, by the report of the Registrar, worked so smoothly and satisfactorily, it becomes a question whether it would not be desirable to extend the principle as rapidly as possible to the provinces and, therefore, it is perhaps to be regretted that the provisions of the Act of 1897 render the consent of the Council of each county essential before the system can be applied in any particular county.

Obviously, the subject being primarily a legal one, the ordinary councillor is very apt to refrain from giving it much personal consideration, being content to be guided in such a matter by the opinion of the Clerk of the Council, and as that gentleman is necessarily a member of the legal profession, it is perhaps expecting too much to hope that he will be very enthusiastically in favour of a project which interferes with the privileges of his class.

Before the assent of a County Council be asked it would, perhaps, be as well to afford the councillors (and the electorate) information on the subject; a few lectures in the principal towns would be effective and, if discussion was allowed, very instructive.

We have entered somewhat fully into the matter, as we feel that, in their own interests, all landowners, land agents, surveyors, auctioneers, and others concerned in dealings with land should give the subject of registration of title their earnest consideration; manifestly it will, if it becomes general, very materially affect them.



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.

A NOTE FROM ITALY.

PROFESSOR GIOVANNI PATRONI, having had the opportunity of making some excavations near the celebrated "Certosa di Padula" (Sorrentum), in the spot occupied in ancient times by the town of "Consilinum," has found the remains of a large building of public character.

This large rectangular building has been destroyed almost to the foundations, the materials having been employed in the construction of the neighbouring mediæval "Certosa." Happily some very important architectural fragments have been saved from the general wreck. It has been possible to recover sixteen drums of fluted columns of 74 centimetres in diameter, with the central hole intended for their bronze dowels, many still showing some of the lead that kept them in their places. There has been found also a fragment of a small frieze with metopes and triglyphs, some broken half-columns also fluted, some capitals with figures, and two draped headless statues, all made from the calcareous stone found in the neighbourhood. The half-columns stand as a proof that the edifice had a portico, in which an inside half-column corresponded to the exterior column.

In one of the capitals we have a head of young Herakles, covered with a lion's skin (fig. 1); in another we see a head of a Menad, with wine-grapes hanging about her neck

(fig. 2); a third shows a feminine head (another Menad, perhaps), with dishevelled hair; the fourth capital is very important, with its bust of young Pan (fig. 3); a Gorgon head, with snakes round her neck (fig. 4). These capitals are of good workmanship, both in the figures and the leaves.

Two statues were also found with the architectural fragments; they are life-size, and probably represented some magistrates. These sculptures somewhat resemble the Æschines of the Museum of Naples, with the arms characteristically draped in the mantle and crossed on the breast.

Professor Patroni thinks that the edifice of which the remains have been discovered was a sanctuary erected outside the city of Consilinum, of which the traditions were continued by the Christian worship (Certosa di Padula). It was probably a temple sacred to Bacchus, as the emblems of that divinity are predominant in the heads which adorn the capitals.

L. B.

ST. STEPHEN CHURCH, HAMPSHIRE.—It is announced that the Reverend J. Kirkman, Vicar, will present a stained-glass window, to be executed by Messrs. Lavers & Westlake, as a thanksgiving offering in respect of his long term of ministration, he having been appointed to the vicarage thirty-two years ago. The church was consecrated on December 31, 1860, having been built at Hampstead Green after S. Sanders Teulon's plans and designs.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

THE MIDSUMMER EXAMINATIONS.

Preliminary.—The Preliminary Examination, qualifying for registration as Probationer R.I.B.A., was held in London and the various non-Metropolitan centres indicated below on the 10th and 11th ult. Of the 207 candidates admitted, forty, having furnished satisfactory evidence of their attainments, were exempted from sitting. The remaining 167 sat for the examination, with the following results:—

	Passed.	Relegated.	Total.
London	67	20	87
Birmingham ...	8	...	8
Bristol	9	...	9
Exeter	5	...	5
Leeds	15	2	17
Manchester ...	24	3	27
Glasgow	4	1	5
Newcastle	8	1	9

140 27 167

The passed candidates, with those exempted—numbering altogether 180—have been registered as Probationers. The following are their names:—

H. E. Adams, Brixton, S.W.; D. M. Addis, Edinburgh; J. Allner, Manchester; J. E. Bailey, Bushy Heath, Herts; D. Bamford, Manchester; T. M.

Intermediate.—The Intermediate Examina-

I. Design	23
II. Mouldings and Ornament	18
III. Building Materials	16
IV. Principles of Hygiene	10
V. Specifications	8
VI. Construction, Foundations, &c.	15
VII. Construction. Iron and Steel, &c.	15

sumer. With improved sanitary conditions, including pure air and pure water, the number of water consumers had increased even more than proportionately to the advance of the trade of the country, with the result that in many cases sources of supply which seemed inexhaustible a generation ago had gradually failed to meet increasing demands, and the consideration of additional supplies had been forced on the various water authorities from time to time. In this way

I. Design	23
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Derby, Nottingham—as well as Leicester. Owing to the magnitude of the works required, this new source of supply would not be available for about eight years.

Already the water population of Leicester had reached 250,000 persons, the consumption for all purposes averaging 19·25 gallons per head per day, of which about one-third was supplied by meter for trade purposes, and the remainder used for domestic supply. During the period of municipal control the water population had increased by 150 per cent., while the consumption per head per day had been reduced by 30 per cent.; in other words, while the total average yield of the present works was under 5,000,000 gallons per day, the prevention of waste enables a constant supply to be given. If the consumption per head was the same now as at the time the company's undertaking was acquired, the quantity of water necessary to give a constant supply would be 7,000,000 gallons per day; thus, the result of the system of distribution and prevention of waste adopted in Leicester under municipal control was a saving of 2,000,000 gallons per day.

It could not be denied that many of the great cities and centres of population had been obliged to seek new sources of supply much sooner than would have been the case had reasonable precautions been adopted to reduce the amount of preventable waste which in so many cases was permitted to go on unchecked. It was well known that some authorities were using as much as forty-five to fifty gallons per head per day, and were consequently surprised and alarmed when, during a summer drought, the sources of supply threatened exhaustion, the simple and obvious reason being that in most cases the consumers were permitted to waste their resources by the use of bad or inferior fittings, and excessive underground waste from burst pipes and services was also neglected, both of which could easily be detected by a proper system of waste inspection. That Association would confer a lasting service on all water authorities if they would take this matter into consideration and draw up a set of standard regulations for the prevention of waste and misuse of water. Such model regulations should then be submitted to the Local Government Board for confirmation, and application be made to Parliament for a short general Act conferring the necessary powers of compulsion upon any water authority that desired to avail themselves of them.

On the proposition of Mr. Priestley, a vote of thanks was accorded to the President for his address.

Standardising Water-fittings.

Mr. R. S. Lloyd then presented a paper on "The Standardisation of Water-fittings." He said that at the present time the attention of the Institution of Mechanical Engineers was being devoted to the standardisation of pipe-flanges, and that of this Association to the standardisation of cast-iron pipes. Why should it not be possible to agree upon a standard of construction of water-fittings, especially when the disadvantages of the present want of system were obvious? These disadvantages might be summarised, first, to the waterworks engineer, because, in the absence of any standard, he had to lay down his own rules. There were not many engineers, however experienced, who had had the special training that was essential to draft rules and regulations, and consequently, they rarely found any two undertakings making similar rules, while in many cases the system of supervision was extremely lax and inefficient, thus producing an enormous amount of preventable waste throughout the country. Secondly, to the public, because the consumer lost the benefit of free and open competition, and often had to pay a special price for a fitting which might not be the best procurable. Thirdly, to the manufacturer, because he had to keep large stocks of finished and partly manufactured goods of a large variety of patterns. The fittings which it was suggested should be dealt with at the first were (1) connections between mains and services; (2) stop-cocks; (3) draw taps for hot and cold water, including basin and sink taps; (4) cisterns and valves for closets and urinals; (5) fittings for automatic supply, such as automatic flushing cisterns and ball valves; (6) fire hydrants and road-watering posts or standpipes; and (7) hydrants. The standard might prescribe the size, weight, thread, and finish of cocks, valves, and hydrants. Standardisation would give

relief to the waterworks engineer from a difficult and thankless addition to duties, would give the public the opportunity of buying reliable fittings in an open market, and would give the manufacturer greatly increased facilities for production and distribution at a reduced cost.

Mr. Jones (Leyton), Mr. Kennedy (Kilmar-nock), Mr. Terry (Sheffield), and others took part in a short discussion.

Illustrations.

ILLUSTRATIONS OF THE ARCHITECTURAL ASSOCIATION EXCURSION.

THE whole of our illustrations are of places which are being visited in the course of this week by the members of the Architectural Association in the course of their annual excursion; and they will be found mentioned or described in the account of the excursion which has been written for us, and the first portion of which appears in this issue.

Broughton Castle, which is illustrated this week, belongs to the latter part of the excursion, and will be described in our next week's issue; but we thought it better to group as many of the illustrations as possible in the present issue.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir J. M'Dougall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Shoreditch Borough Council 5,180l. for purchase of land, Battersea Borough Council 6,000l. for electric light installation and street lighting, and 2,000l. for preliminary expenses in connexion with a housing scheme; Hampstead Borough Council 2,150l. for underground conveniences; and Woolwich Borough Council 530l. for provision of a disinfecting station.

The Council and the Bill-posters.—The General Purposes Committee reported the receipt of a communication from the London Society of Lithographic Printers, asking that a deputation might be received upon the subject of bill-posting on the Council's hoardings. The request was acceded to, and the deputation urged that greater use might be made of the hoardings for advertising purposes. A discretionary power in these matters was conferred in 1896 upon the various committees concerned. The General Purposes Committee, having inquired into the extent to which the power had been exercised, were of opinion that the existing regulations were satisfactory. The report was received.

Inventions by Officials.—The General Purposes Committee recommended the Council to assent to the assignment to Mr. A. C. Brown of a joint patent for improvements in telephonic fire-alarms on certain conditions. One of the conditions was that the free use of the invention should be allowed to the Council, but that the name of the Council or of Captain Wells should not be used in connexion with it. The recommendation was adopted.

Application of Science to Industry.—An adjourned report of the Technical Education Board stated that England, and particularly London, had suffered the loss of certain industries, and that others were in danger, in consequence of defective higher education, by which the application of science to industry was retarded. London was still seriously behind other cities, notably Berlin, in the provision for the higher grades of scientific training and research. The circulation of the Report was recommended.

Mr. Organ moved to add to the recommendation—"and that the Technical Education Board be instructed to report as to the steps it proposes to take in order to give practical effect to the suggestions contained in the report." He was anxious that so important a report should not be shelved, and that some definite action should be taken upon it. Our trade was leaving us because we had not the means of training the leaders of industry in the way they should be trained, and because the London boy had not a free and open

chance of getting his living at skilled industry. Any sum between 5,000,000l. and 10,000,000l. was necessary to put London on the same high educational basis as Berlin or the Scottish universities.

Mr. Benn formally seconded the amendment.

Mr. W. Emden said Mr. Organ was not correct in some of his statements. He (the speaker) denied that pottery, for instance, could be bought as well abroad as in England.

Mr. Burns, M.P., said he declined to accept the conclusions of the Committee. He was in Germany a year ago, and out of 117,000 men in the past, and of 117,000 men in the present, 20 per cent. out of work. Coming to England, which was supposed to be tottering to its fall in the opinion of some people, he found out of 117,000 people engaged in the electrical and cognate industries there were only 2 to 3 per cent. of men out of work.

Dr. Napier said that while he did not take a gloomy view of the situation, he thought they were entering on a great commercial struggle in which scientific training would be of greater importance than ever before.

Mr. Sidney Low said the doctrine of relying on the instincts instead of trained knowledge had been the cause of many misfortunes in the past, and would be the cause of greater misfortunes in the future. They were told that they were to rely not on knowledge and training, but on the inherent ability which was in the breasts of the British working man. He yielded to no one in his admiration of the intelligence and courage and discipline of the British working man, but Mr. Burns would not substitute the courage and discipline of the soldier for the scientific training of the officer. The Committee did not say that the London workman was inferior to other workmen, but that the organiser and director was insufficiently trained, and they pointed out that Berlin alone was spending more money and training many thousands more people than the whole of England. He felt that no one who had the interests of British industry at heart could refuse to accept the conclusion that it was necessary to do something in this matter. At the same time, he deprecated the appeal of millionaires, and he thought the more dignified course would be for the governing body of London to come before the governing body of the Realm and ask them to take steps to remedy the defects, and put London in the position of relying, not merely on the instincts of its inhabitants, but on the scientific knowledge with which other nations are developing their industries.

Mr. Howell J. Williams said that many building trade industries were being enticed away from London by provincial towns, and the local industries in those towns were also being fostered. The Technical Education Board ought to do very much the same. What was needed in London was a return to the apprenticeship system.

Mr. Crooks suggested the giving of scholarships in the form of premiums for apprenticeship.

Mr. Webb said they had no power to do so. They had already strained the law in the direction of the practical teaching of trade. London had lost the watch-making and silk weaving industry, and he was afraid they would lose the leather industry. It was true they had other industries developing, but the question was whether they were as good as those lost. They wanted industries which would call forth the highest qualities of Londoners and not the lowest.

Mr. Ward (Chairman of the Technical Education Board) accepted the amendment and the Report was adopted.

Means of Escape in Case of Fire.—The Building Act Committee brought up an adjourned Report setting out revised regulations as to the provision of means of escape from fire at factories and workshops. The Report was printed in our last issue, p. 56.

The Council approved the new regulations.
Tramways Reconstruction.—The Highways Committee recommended votes amounting to 114,000l. for tramways reconstruction, in view of electrical traction, between New Cross Gate and Greenwich.

The Finance Committee pointed out that 644,350l. had already been voted for similar purposes, and that the conversion of the line to electric traction was estimated to yield a large increase of net profits.

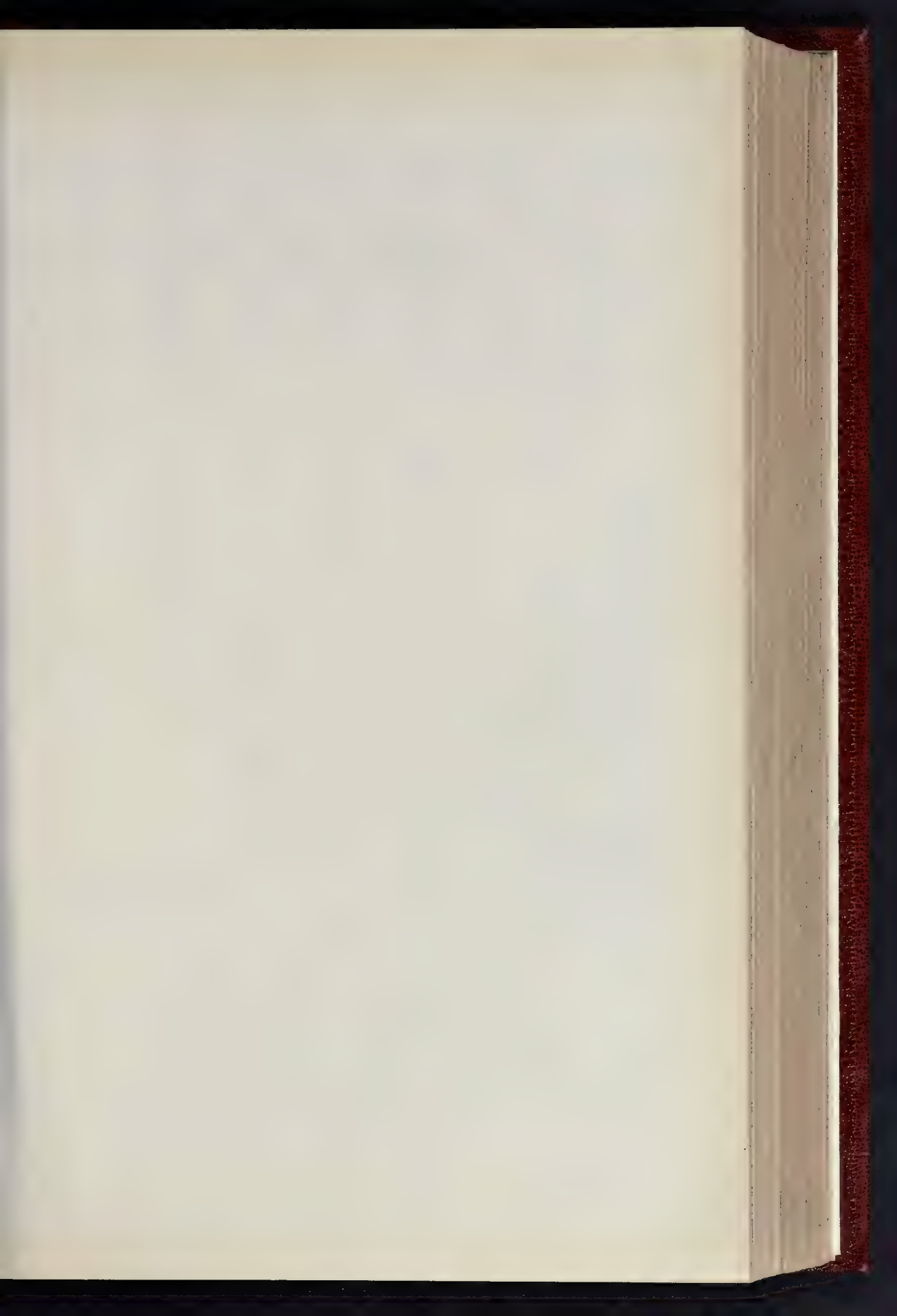
The Council approved the estimates, and



FROM A PHOTOGRAPH BY H. B. STANLEY, BANBURY

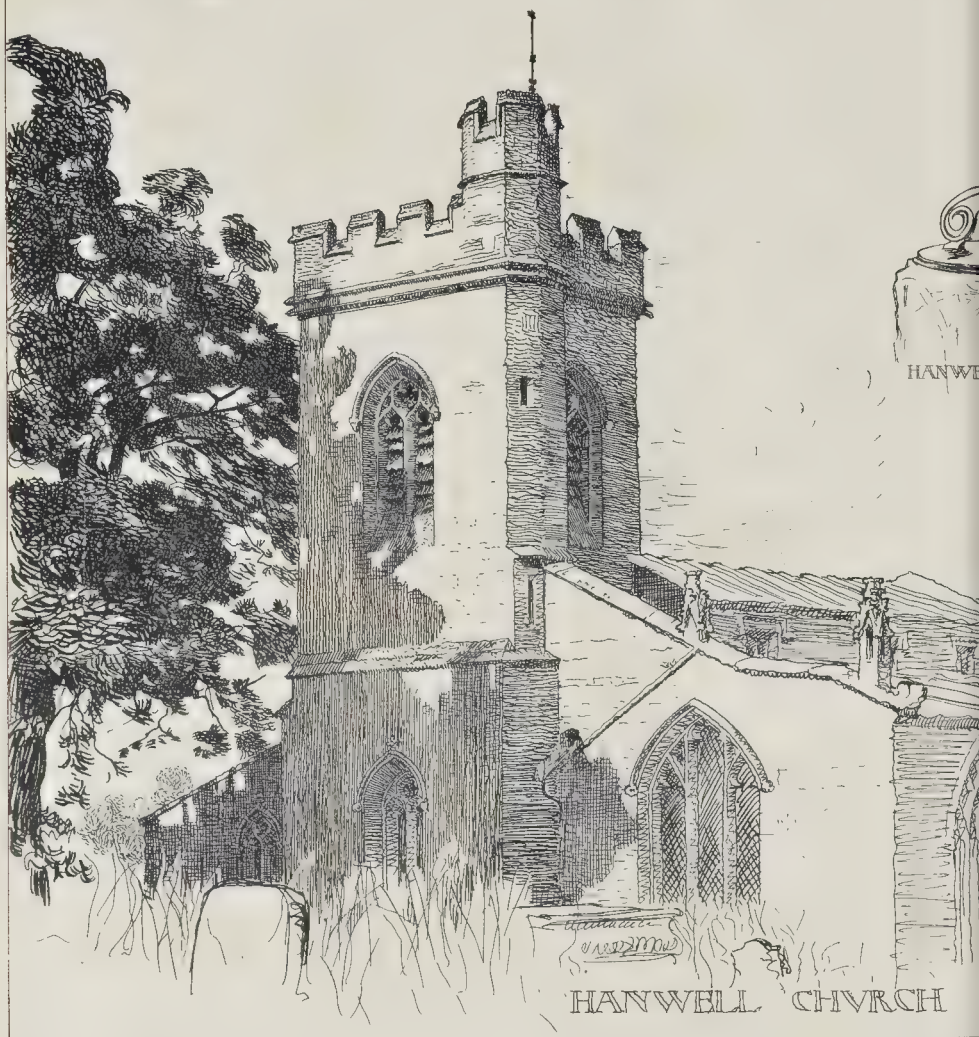
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ARCHITECTURAL ASSOCIATION EXCURSION BROUGHTON CASTLE FROM THE NORTH-EAST

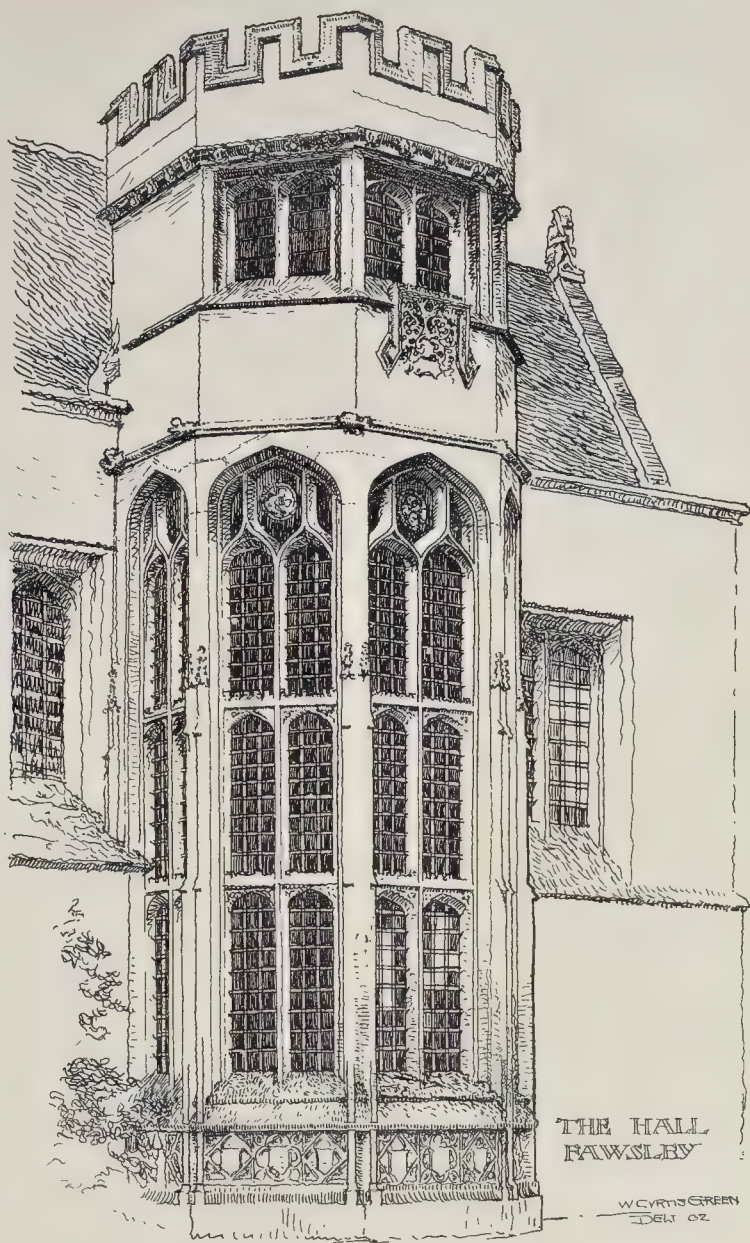




FRAGMENT IN HANWELL CHVRCH



HANWELL CHVRCH



ADDERBURY

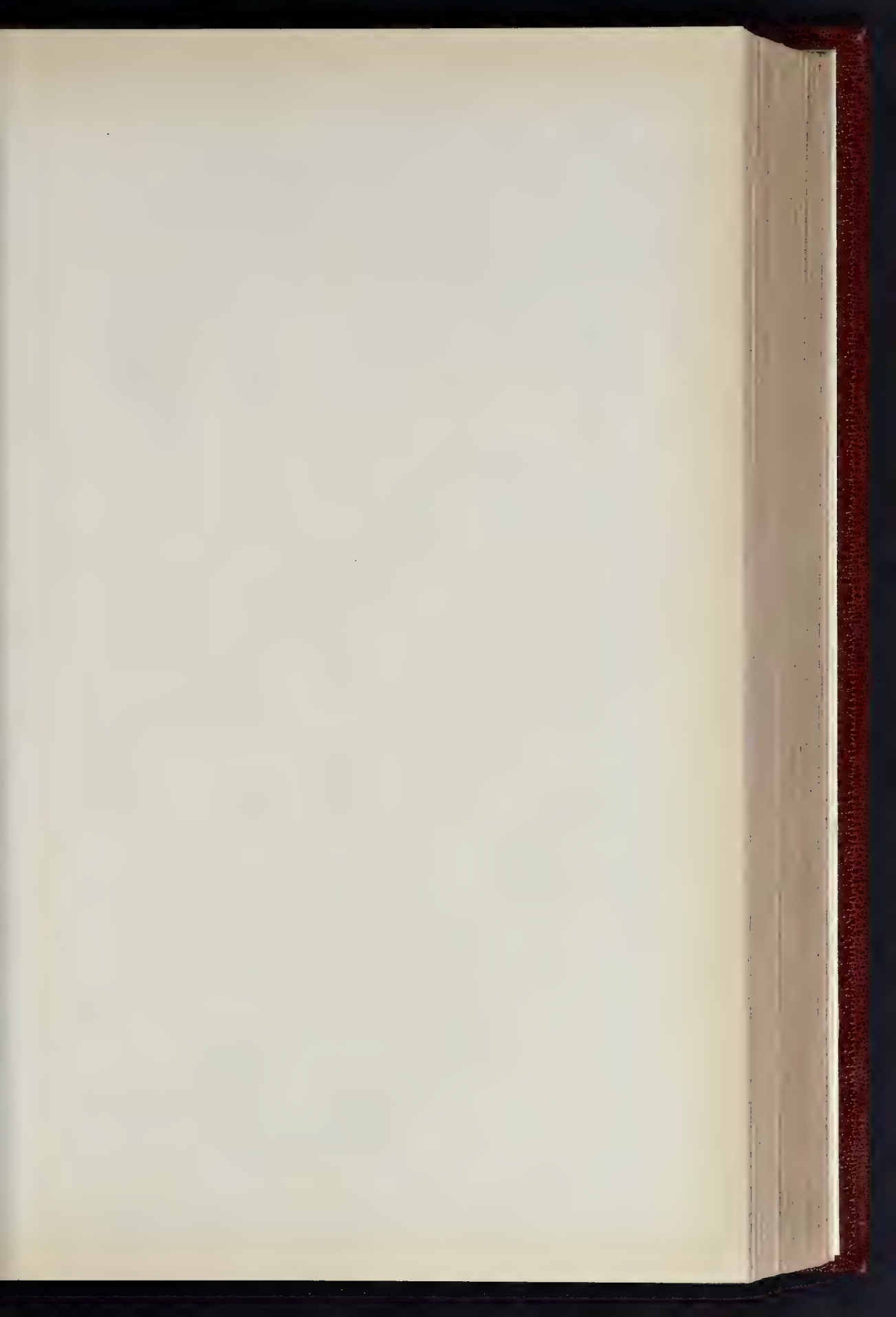
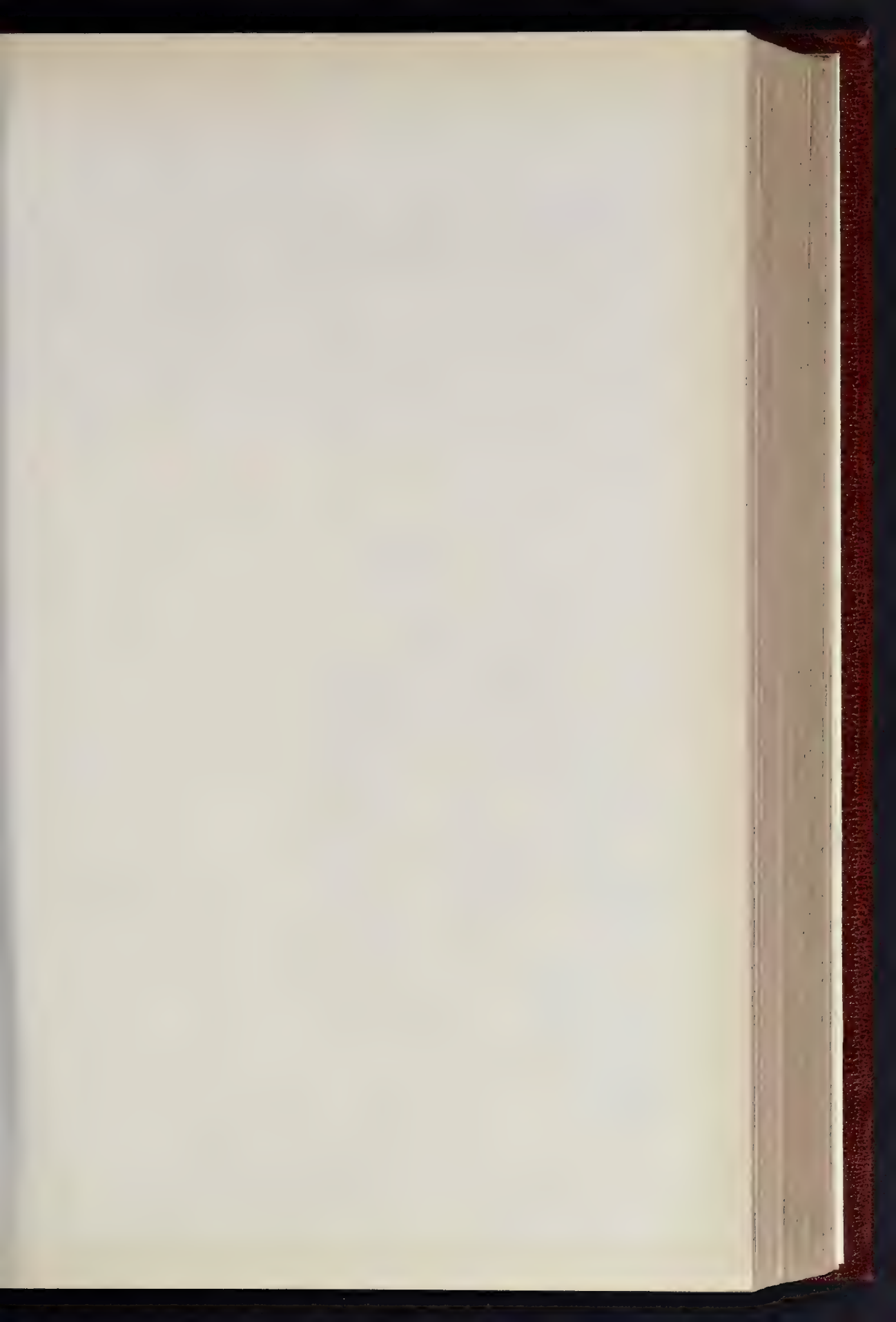
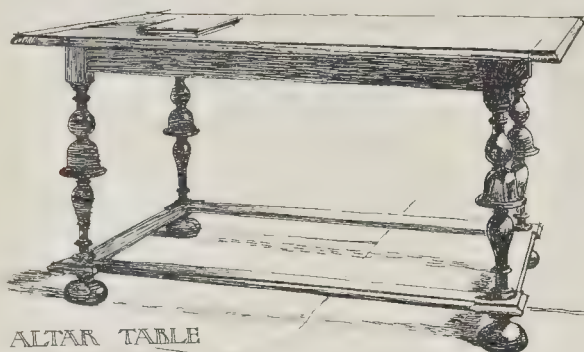




PHOTO LITHO SHIRAZ & CO. 44 & 45 EAST MADISON STREET CHICAGO, ILL. U.S.A.

ARCHITECTURAL ASSOCIATION EXCURSION





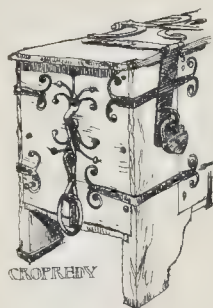
ALTAR TABLE
ADDERBURY



DEBINGTON



EAST GABLE
CANONS
ASHBY



CROFTBY





authorised the Bridges Committee to make all necessary arrangements for the alteration of bridges over the railways, in order to permit of the laying of electrical conduits in the carriage-way.

Cambridge-road, Bethnal Green, Improvement.—The Improvements Committee reported that as far back as 1885 a proposal for the widening of Cambridge-road was made to the Metropolitan Board of Works by the Vestry of Bethnal Green. It was an important main thoroughfare, but it was only 30 ft. wide in the narrowest parts, and an improvement was urgently needed. The Committee asked the Council to approve an estimate of 50,000*l.*, subject to a contribution of one-fourth by the Borough Council, for the widening of Cambridge-road to 70 ft. between Old Ford-road and Palestine-place.

Mr. Austin opposed the recommendation, and moved an amendment to refer it back, which was seconded by Dr. Cooper.

The amendment, however, was rejected, and the recommendation was adopted.

Main Drainage Extension.—The Main Drainage Committee observed that considerable progress had been made with the enlargement of the northern outfall sewer between Abbey Mills and Barking. Two additional lines of sewers were now required between Old Ford and Abbey Mills, and the Committee submitted an estimate of 200,000*l.* for that purpose. It would be necessary to apply to the Home Secretary for compulsory powers to acquire the land, which was now vacant, but which might shortly be used for the erection of school and other buildings if the Council did not take steps beforehand.

The Finance Committee pointed out that the proposed works formed part of a scheme, estimated to cost about 3,000,000*l.*, which was submitted to the Council in December, 1899, and in respect of which 1,250,000 had already been voted.

The Council approved the estimate of 200,000*l.*

Theatre Regulations.—The Theatres and Music-halls Committee reported that the Council, at its meeting on November 9 last, granted twenty-three licences for stage plays, and to each of such licences attached rules which were to be observed by the lessees.

They were of opinion that certain of the rules should be printed on the programmes of the performances for the information of the public, and that certain other rules should be posted up behind the curtain for the information of the artistes and employees. The Committee pointed out that it was not suggested that any of the rules should be waived, and they had simply made selections of those which principally affected the audience and the artistes respectively.

A recommendation on the lines of the Report was adopted by the Council.

Rotherhithe Tunnel Rehousing.—The Bridges Committee reported that the draft scheme for rehousing persons of the working classes who would be displaced by the construction of Rotherhithe Tunnel had been forwarded to the Home Secretary. It provided for the erection of dwellings in Ropemaker's-fields and London-street, on the north side of the river, and in Swan-lane and Albion-street on the south side. All the property on the Ropemaker's-fields site had been acquired, and the Housing Committee proposed to erect dwellings to accommodate 340 persons, at an estimated cost of 15,995*l.* The amount available was only 14,198*l.*, thus leaving a capital deficiency on the erection of the buildings amounting to 1,797*l.*, to which must be added the value of the land, estimated by the Council's valuer for housing purposes at 1,000*l.* It had been found necessary to carry the foundations to a depth of 20 ft. 6 in., which in itself was a heavy disability on the site. The dwellings were urgently needed, and the Committee recommended the Council to fix the value of the site at nil, and to charge the deficiency of 1,797*l.* on the building to the account of the tunnel improvement.

The Finance Committee submitted a special report, stating that the proper course to adopt was to debit the scheme with the value of the land and the estimated deficiency on the cost of building, or to offer the site for sale. The proposal of the Bridges Committee could not be carried out without a suspension of the standing order, which provided that the rents to be charged for working-class dwellings should not exceed those ruling in the neighbourhood, and that the cost of building, plus

the housing value of the site, should involve no charge on the county rate. Moreover, no such entry as was proposed by the Bridges and Housing Committees could properly be made in the Council's accounts.

Lord Welby moved to refer back the recommendation of the Bridges Committee, with instructions to put up the site for sale in order to test its market value.

Mr. Beachcroft seconded the amendment, and stated that the land cost the Council 17,000*l.* They were entitled to know why it was originally bought for such a purpose, and why it was written down, first to 1,000*l.* and then to nothing.

Earl Carrington said this case was a good example of the Council's housing difficulties. The loss on all compulsory rehousing operations ought to fall on the ground landlords of London. They escaped all taxation at present, and imposed all losses and expenses upon their miserable tenants. He hoped to bring forward a detailed scheme, under which the ground landlords would be called upon collectively to do their duty, and meanwhile he supported the amendment.

Mr. Ward urged the Council to consent to the proposals of the Bridges Committee, who must carry out their rehousing obligations.

Sir W. J. Collins pointed out the injustice of blaming the Housing Committee for responsibilities which were thrust upon them of building upon ineligible sites, in connexion with public improvements.

The amendment was carried.

Appointment.—On the recommendation of the Establishment Committee, Mr. W. Bevan was appointed assistant in the Housing of the Working Classes Section of the Architects' Department.

Housing.—On the recommendation of the Housing of the Working Classes Committee, it was agreed that the tender of Messrs. F. & T. Thorne, amounting to 14,959*l.*, for the erection of Ottawa and Baffin-buildings, Preston's-road site, Poplar, be accepted; that the offer of Messrs. Thorne to build the remaining four blocks of buildings at the Preston's-road site at a reduction for all six blocks of 3*1*/₂ per cent. on the prices contained in their tender for the erection of Ottawa and Baffin buildings be accepted.

The Improvements Committee recommended and it was agreed, that the site in York-road, upon which accommodation is to be provided for the persons of the labouring class to be displaced in connexion with the widening of York-road, Garratt-lane, and Merton-road (re-named Tooting High-street) be appropriated for the purpose of such accommodation, subject to the Home Secretary's approval being obtained in due course to the rehousing scheme for the Garratt-lane and Merton-road improvements, and that the housing value of the land be fixed at 2,380*l.*

Water Gas in the London Gas Supply.—The Public Control Committee recommended, and it was agreed, that a copy of the chemist's report, with regard to the amount of water-gas found in the London gas supply, be forwarded to the President of the Board of Trade, and that he be urged to give effect to the promise contained in his letter of November 21, 1901, and to promote legislation in the matter in the session of 1903.

The Council adjourned soon after seven o'clock.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—A very interesting visit was made by the Members and Associates of the Society of Engineers on Wednesday July 16, to the works of the new graving dock and the widening of the Old Extension Quay, at Southampton, and afterwards to the Southampton Corporation Waterworks at Otterbourne. The graving dock now being constructed for the London and South-Western Railway Company at Southampton will be the largest of six dry docks belonging to the company. The river channel is being deepened by dredging to form an ample approach to it. The dock itself will be 860 ft. long (clear inside gates), with provision for extension if necessary, 190 ft. wide at entrance, with the same bottom width inside; and 125 ft. wide at cope level. The whole depth from cope to floor will be 43 ft., giving a depth of water over the keel blocks of from 20 ft. 6 in. neap tides to 33 ft. spring tides at high water. It is built almost entirely of Portland cement concrete, the floor, altars, and walls being faced with

this material. The bulk of it is made in the proportion of 8 to 1, the facing to walls and floor, together with the culvert linings, being somewhat stronger, generally 4 to 1. A skin of 4 to 1 concrete is also laid on the underside of the floor, and carried up the back of the walls, so as to prevent any water which may accumulate there from soaking through the more porous concrete into the dock. This 4 to 1 concrete is made with special care, the large stones in the gravel being reduced in a crusher. A mass of 5 to 1 concrete is built in at the skew back, where the walls and floor meet, to resist the heavy crushing stress at that point. The entrance gates, which will have a span of 90 ft. and a rise of 16 ft. 9 in., will be of steel, and will be worked by direct-acting hydraulic rams. The hollow quoins and sill quoins will be of granite from the Shap Quarries in Westmoreland. The steps and timber slides will also be faced with this stone. For emptying the dock the water will fall into large pits near the entrance. From these three large culverts will lead it to the pump wells, placed at some little distance behind the eastern wall, and at a depth of 10 ft. below the dock floor. Over these the pumphouse will be built, and will contain two 48 in. centrifugal pumps, capable of emptying the 85,000 tons of water in the dock in a little over two hours. Space will be provided for a third pump in case the dock should be lengthened. The boiler-house will be built alongside the pumphouse. The site of the dock originally formed part of the extensive mudlands on the River Test shore, which were covered by every high tide. To reclaim the site a bank was tipped round it with chalk taken from the railway company's cutting at Micheldever. While tipping this bank a dredger was at work within removing the top mud, which was very soft and foul. The sea-face of the reclaiming bank was pitched with stone to preserve it from storms, and covered with clay to render it water-tight. The latter process was a very troublesome one, owing to the difficulty of finding suitable clay. A supporting toe of 3 in. sheet piling was provided in places where necessary. As soon as the bank was sufficiently sealed to keep out the tidal water the enclosure was dried out with a 9-in. centrifugal pump and engine, erected just inside the bank. At the entrance end the chalk enclosing bank approaches very near the dock, and protection was given to it by driving a complete belt or dam of 12 in. sheet piling across the entrance, which in its turn is supported by raking struts. Inside this again a cross trench was sunk, so as to build the first 20 ft. of dock floor, which now forms a massive toe for the timbering. The arrangement of this timbering is worthy of notice. The wall trenches are now being sunk and timbered in a substantial manner, and directly a length is sunk to its full depth the concrete wall is started inside it. When these walls are completed the dumping between them will be excavated in a similar fashion and the concrete floor built in, length by length. The excavation for the pump wells, &c., is being similarly dealt with, the trench being heavily piled to avoid all risk of dislocation. Any water which finds its way into the enclosed area is led by pipes and grips to one or other of two pumps, which are provided to keep the works dry.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

St. George, Hanover-square.—A stone front to No. 45, Grosvenor-square, Hyde Park (Messrs. E. Wimperis & East for Sir J. Miller).—Consent.

Westminster.—Variation from the plans sanctioned on January 21 for the erection of a one-story shop and porch on part of the forecourt in front of 119, Victoria-street, Westminster, so far as relates to an alteration in the height and projection of the proposed porch (Mr. B. Woollard for Mr. J. Browne Martin).—Consent.

Strand.—An iron and stone balcony at the first-floor level in front of No. 7, St. James's-street, St. James's (Messrs. J. Kinninmont & Sons for Messrs. Glaser).—Refused.

St. George, Hanover-square.—The retention of two oak pilasters, forming part of a shop front, at a less distance than 4 in. from the centres of the party

walls, and the retention of a wood and glass lobby forming an entrance to both shops and dwelling-rooms (Messrs. Waring & Gillow, Ltd., for Mr. E. Collins).—Refused.

Holborn.—The retention of an iron and glass hood over the entrance to No. 37, Hatton-garden, Holborn (Mr. C. J. Higgins for Mr. P. A. Brice).—Refused.

Width of Way.

Whitechapel.—Buildings on the south side of Wentworth-street and east side of George-yard, Whitechapel (Mr. M. W. Jameson for the Council of the Metropolitan Borough of Stepney).—Consent.

Southwark, West.—A workshop building on the south-west side of Waterloo-road, Southwark, with the external walls at less than the prescribed distance from the respective centres of the roadways of Dodson-street and Boucher's-place (Messrs. C. A. Lean & Son for the Corporation of the School for the Indigent Blind).—Refused.

Whitechapel.—A one-story shed to adjoin No. 20, Royal Mint-street, Stepney (Messrs. J. Sparks & Sons for Mr. A. C. de Rothschild).—Refused.

Means of Escape from Top of High Buildings.

Kensington, South.—Means of escape in case of fire on the sixth and seventh stories of block No. 1, Iverna-court, Wright's-lane, Kensington, for the persons dwelling or employed therein (Messrs. Metcalfe & Greig).—Consent.

Width of Way and Lines of Frontage.

Poplar.—That the application of Messrs. J. & S. F. Clarkson on behalf of the Governors of the George Green Schools, for an extension of the period within which the erection of a two-story addition to the Technical Schools, East India Dock-road, Poplar, to about upon Kerbey-street, was required to be commenced, be granted.—Agreed.

St. George, Hanover-square.—An iron and glass verandah over an existing balcony at the first-floor level in front of No. 9, Queen-street, Mayfair (Messrs. H. Smith & Co. for Mrs. Christophers).—Refused.

Uniting of Buildings.

Paddington, South.—The uniting of No. 11, Westbourne-grove, Paddington, with Nos. 5, 7, 9, 13, 15, and 17, Westbourne-grove, and Nos. 38-43, Douglas-place (Messrs. Barrett & Driver for Mr. H. Dobb).—Refused.

* * * The recommendations marked † are contrary to the views of the Local Authorities.

COMPETITIONS.

PUBLIC OFFICES, &c., ALDERSHOT.—The first premiated design in this competition is by Mr. C. E. Hutchinson, 11, John-street, Bedford-row, W.C.; the second was by Mr. Thos. Davison, A.R.I.B.A., 28, Great Ormond-street, W.C.; and the third by Messrs. Coggin & Wallis, 15, York-buildings, Adelphi.

TRADE CATALOGUES.

Mr. George Wragge (Wardry Metal Works Salford, Manchester) sends us a sheet with illustrations and description of his "Wardry" steel casement and frame, hung to open outwards. The sections are well designed to ensure weather-proof qualities, and the treatment of the beading as shown is artistic and in good taste; this of course, however, may be carried out from the architect's design. It is in every sense a good casement, both for practical design and appearance.

Messrs. F. Braby & Co. (Glasgow) send us an illustrated catalogue of the principal articles produced at their works. Among these are their "Empress Brand" corrugated and galvanised iron and steel roofing sheets, for which they claim specially durable qualities on account of their not being passed through squeezing rolls. The catalogue shows also corrugated skylights; wrought-iron sashes and casements; gutters and pipes; "rustless" manhole covers and other iron and steel articles, treated by the Bower-Barff process; copper boilers; galvanised cattle-troughs, and dust-bins; hurdles, gates, &c.

Messrs. Anderson & Son (Belfast) send a pamphlet with illustrations of numerous buildings, chiefly factories and workshops, which have been covered with what they describe as the "Belfast" roof, made at their Lagan Felt Works, Belfast. They should have added to these a geometrical section of their roof, which is wanting; from the views it appears to consist of a series of lattice girder principals of timber, with an elliptical or segmental upper member and a straight tension member, the whole covered with felt on light purlins. Economy and lightness is claimed, and probably with justice, for this form of roof; but why it should be more durable than iron roofs covered with felt, as seems to be implied,

we fail to see. However, the roof has a good deal to recommend it.

Messrs. Joseph Cliff & Sons (Wortley, Leeds) sends us a splendidly-printed illustrative catalogue and a price-list of their glazed bricks and tiles. The most notable point in these is the various sections which are made for ensuring a perfect bond between facing bricks and backing, whether of brick or concrete; especially the Shoppee's dovetailed bricks for facings to flat or arched concrete ceilings. There are various forms, too, of their walling which are very well constructed. The few specimens of coloured ornamental bricks we do not like so much—these things are seldom well done except from an artist's designs; but the colours for the self-coloured glazed bricks are very good in tone and furnish opportunity for a great variety of colour design; and the coloured elevations of fire-places built with these bricks are very satisfactory in appearance.

We have received from the Saxon Portland Cement Co., of Cherry Hinton, near Cambridge, a small pamphlet entitled, "Inside Facts about Saxon Portland Cement." It contains a description of the works at Cherry Hinton and of the processes of manufacture. The raw material is a chalky material of varying composition, which is mixed to insure uniformity, dried, and ground, and again mixed in hoppers, from which it passes into a damp-trough, where it is damped sufficiently to enable it to be pressed into brick shape by means of heavy presses. These bricks are calcined in continuous kilns, and the resulting clinker is crushed and ground to the requisite degree of fineness to form the finished cement. The results of tests by Messrs. Slanger & Blount and Mr. J. West Knights are quoted, and show that the cement is finely ground, sound, and develops a high tensile strength both neat and with sand. The dates of the tests are not given, but we gather that the works have only been in operation for a little over six months, and that during this period the cement has been used on some important works.

The Pulsometer Engineering Co., of London and Reading, send us a pamphlet "concerning the Pulsometer steam-pump," in which there are many interesting illustrations showing the varied purposes to which this useful apparatus may be applied.

Cresswell's Asbestos Company send us a pamphlet on their manufacture, drawing special attention to their asbestos "curfew" blind for placing before a fire, either as a blower for drawing it up, or as a safety precaution when a fire has to be left alight at night. In both conditions it seems to be a useful thing. They have also a special asbestos fire-blower, for use as a newspaper is now often used to fix before a fire and revive it, but which will not catch fire as the newspaper often does. The pamphlet also describes their asbestos artist's canvas and asbestos carbon filters.

Messrs. Lockerbie & Wilkinson send us a card illustrating their registered designs for rain-water heads and pipes, which are excellent in style and are the designs of competent architects—Mr. J. J. Joass, Mr. C. A. Nicholson, and others. It is satisfactory to know where one can find artistic things of this kind kept in stock.

LONDON BUILDING ACT, 1894:

TRIBUNAL OF APPEAL CASE

THE Tribunal of Appeal under the London Building Act sat at the Surveyors' Institution on Thursday, the 17th inst., to hear an appeal by Messrs. Gellatly & Son, on behalf of Messrs. Taylor, Walker & Co. under Section 13 (4) of the Act, against the decision of the London County Council dated June 10, namely:—"That the request of Mr. James Richard Johnston, on behalf of Messrs. Taylor, Walker & Co., for permission to retain a one-story stable building on the south side of Rope-makers' Fields, Limehouse, at the corner of Thomas Rents, with the external wall of such stable at less than the prescribed distance from the respective centres of the roadways of Rope-makers' Fields and Thomas Rents, be not acceded to."

The members of the Tribunal present were Messrs. J. W. Penfold (Chairman), A. A. Hudson, and E. A. Gruning. Mr. F. F. Dalby, barrister, appeared for the London County Council, and Mr. R. Cunningham Glenn for the appellants.

It was explained that Messrs. Walker, Taylor, & Co. are the owners and occupiers of certain land and premises situate on the south side of Rope-makers' Fields, a highway used for street traffic, and

on the west side of the Thomas Rents, a highway used for foot traffic only. For many years the premises were separated from the highways by a boundary wall 12 ft. or thereabouts in height. Between this wall and a building upon the land was a space, the distance across which from Rope-makers' Fields was 24 ft. 20 in., and from Thomas Rents 6 ft. In August, 1901, the appellants, wishing to extend the stables upon the land, instructed their surveyor and builder, Mr. Johnston, amongst other things, to raise the boundary wall to the height of 16 ft. for a distance of 23 ft. 7 in. beside Rope-makers' Fields, and for a distance of 55 ft. beside Thomas Rents, and to roof in the space between the boundary wall and the appellants' buildings. This, which constituted an extension of the appellants' stables, was completed in March last without the consent of the London County Council having been first obtained thereto under Section 13 of the London Building Act, 1894, of which fact the appellants were wholly unaware. Subsequently, the District Surveyor wrote to Mr. Johnston, pointing out that he had erected stables without the necessary yard in the rear and without the necessary certificate. Some weeks afterwards the District Surveyor again wrote, saying he should be glad to hear whether the sanction of the London County Council for the extension of the appellants' stables had been obtained or application made for such sanction. As a fact, a few days previous to the date of that letter, Mr. Johnston made an application to the London County Council in the following terms:—"I hereby formally beg the Council's permission to erect a one-story stable not exceeding 16 ft. in height on the site coloured pink and in accordance with the accompanying plan." In consequence of what afterwards transpired, Mr. Johnston, on May 20, sent a further letter to the London County Council stating that in making an application for new building there was absolutely no intention to mislead the Council or to suppress any facts, although it appeared that application should have been for permission to retain the existing building. It was on June 10 that the County Council passed the resolution already quoted.

The grounds of appeal were these:—1. That the erection of the stable wall would not, if at all, materially interfere with or diminish the air space on either side of the highways. 2. That the appellants were entitled to maintain the boundary wall within the prescribed distance of the respective centres of the highways whether or not sanction be given to the erection of the stables. 3. That the refusal of the London County Council's consent to appellants' application was unreasonable, and should be reversed.

Before evidence was taken, Mr. Glenn raised an objection to the jurisdiction of the Tribunal, and after considerable argument, the Chairman made the following statement:—"If the application is to erect a new building the London County Council have not refused such an application. Their decision is merely as to the retention of an existing building. The notice of appeal, therefore, is bad, because it is an appeal from a refusal of the County Council to an application for the erection of a building. If the application is for permission to retain an existing building, the London County Council have no power to entertain such an application under Section 13 (4)—therefore there is no appeal to the Tribunal under that section.

Eventually, the Tribunal allowed Mr. Glenn's objection to their jurisdiction, and awarded costs to the London County Council.

Correspondence.

VALUE OF WASTE STEAM.

SIR,—As subscribers to your journal for many years, we have been pleased to note some of your recent editorials, including those in the issues of May 24 and July 5, the latter on "Central Heating Plant." The average man to whom such questions are brought at times flies in the abstract to rows of dusty and unsightly "socket and spigot" pipes, and not one man in a thousand has any idea of the economics of the matter.

For instance, to those of us who have studied the various uses to which exhaust steam (or waste steam, as most people call it) can be put for domestic engineering and other purposes, it is almost pitiful to see the daily loss, amounting, without any exaggeration, to tens of thousands of pounds, caused to the owners or those in charge of factories, hotels, asylums, workhouses, &c., by allowing the exhaust steam from the engines, pumps, &c., to blow away to waste. It seems impossible to convince the great majority of men that steam in passing through an engine loses practically nothing. True, it is deprived of its pressure, but its bulk increases in proportion, and for every pound of steam put into the engine, at least 20 per cent. is available for use at low-pressure steam for other purposes, and should be considered as a most valuable asset in any building where a non-condensing engine is fixed.

The article mentioned on page 516 in your issue of May 24 has been specially interesting to us, as our business brings us in daily contact with such

work as you refer to. We have no wish to make this letter an advertising medium, or we should be glad to quote cases where, for a moderate outlay, many hundreds of pounds per annum have been saved in coal bills alone. Your remarks as to central heating stations are very pertinent, and in our opinion the time will come when every electric lighting station will be a heating station for the benefit of the surrounding district. This work is specially practicable now that the "Paul" and the Warren Webster systems of "atmospheric steam heating" are being so successfully handled in this country.

We feel sure that when journals such as yours make this question up as you are doing, people will begin to realise the magnitude of the possibilities of economy which are involved in this direction.

D. M. NESBIT.

Managing Director, Ashwell & Nesbit, Ltd.

TOUR IN NORMANDY.

SIR,—Would any of your readers who have been in the North of France give me some idea as to how much the best use of a fortnight's sketching tour there?

R. E. STEWARDSON.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

4.—SAND, SAND SUBSTITUTES, POZZUOLANA, AND LIME.

THE word "sand" is applied to any siliceous material in a fine state of division. The sand employed for building purposes usually consists mainly of silica (SiO₂), but it may be either quartz sand or flint sand, and is most commonly a mixture of the two. Flint and quartz are almost identical in chemical composition, both consisting almost entirely of silica, but both usually containing small quantities of iron and other impurities. Of the two forms of sand the quartz sand is usually the purer.

Pure quartz sand is practically inert when in contact with lime, but modern research indicates that flint slowly enters into chemical combination with lime to form calcium silicate. Quartz sand is almost insoluble in hot dilute caustic soda solution under normal pressure, whereas flint is readily dissolved by this solution. Silica in the form of quartz crystals differs, therefore, in certain properties from silica in the form of flint.

The usual text-book statement that the sand in lime mortar is not in any way chemically acted upon by the lime, but is simply in a state of mechanical mixture with it, requires modification. It has been shown by E. Donath and others that the sand used for mortar is rarely pure quartz, but almost invariably contains silica in a form which, unlike quartz, is capable of entering into chemical combination with the lime. The proportion of this active silica varies in different sands. Sand is found in many grades of purity. When it consists almost entirely of silica, it is termed *siliceous* sand, and when it contains much silicate of alumina (clay) it is called *argillaceous* sand, and when it contains much carbonate of lime it is known as *calcareous* sand.

The physical condition of the sand is a matter of importance. It should be clean, free from fermentable matter, and should have sharp edges. It is also commonly said that a great irregularity in the size and shape of the sand grains is very advantageous in sand used for mortar, but the accuracy of that statement requires further practical demonstration.

Pit Sand is generally good for mortar manufacture, because it has angular grains, but if it contain much clayey or organic matter it should be well washed before use by running water in machines which maintain the sand in constant agitation.

River Sand is water-worn, and does not, therefore, afford so good a "grip" to the setting lime or cement as pit sand. It has usually the advantage of cleanliness and freedom from soluble alkaline salts. For plaster work, river sand is often preferred on account of its freedom from colour. Pit sand is usually yellow or red, owing to the presence of iron oxide.

Sea Sand has not only the fault of being water-worn, but is also impregnated with alkaline deliquescent salts. When it has to be used, the sand should first be washed with fresh water until it is as free as possible from all soluble salts. This washing is a simple, but tedious and somewhat costly operation.

Sand Substitutes.—Any siliceous matter in the form of rough angular grains, free from matter capable of fermenting, and from matter soluble in rain water, can be used as a substitute for sand in lime or cement mortar. The London County Council by-laws allow the use of burnt ballast or broken brick as a substitute for sand. Among the many substances which have been successfully employed in lieu of, or in admixture with sand, are furnace slag, burnt clay, clinker from brick kilns, and cinders.

Pozzuolana.—In certain districts siliceous deposits are found which may be used partially or wholly as a substitute for sand in lime mortar, and they have, moreover, the property of forming a hydraulic mortar when mixed with limes which are too pure for use in ordinary lime mortar. These deposits are known in different countries under the names *pozzuolano*, *trass*, and *arènes*, but are sometimes all classed under the term *pozzuolana*.

Pozzuolana is, strictly speaking, a volcanic clayey earth found in the neighbourhood of Pozzuoli, near Naples. Pure or fat limes, which are unsuitable for ordinary mortar manufacture, produce, when mixed with *pozzuolana*—with or without a certain proportion of sand—mortar which resembles that made with hydraulic lime. The proportions commonly used are 2½ of *pozzuolana* to 1 of lime, or 1 of *pozzuolana*, 1 of sand, and 1 of lime.

Trass or *arènes* is a volcanic earth similar in character and composition to *pozzuolana*. It is found near Andernach on the Rhine, and may be used in place of *pozzuolana*.

According to Berthier *pozzuolana* and *trass* have the following compositions respectively:

	Pozzuolana.	Trass.
Silica	44.5	57.0
Alumina	15.0	12.0
Lime	8.8	2.6
Magnesia	4.7	1.0
Oxide of Iron	12.0	5.0
Potash	1.4	7.0
Soda	4.0	1.0
Water	9.2	9.6
	99.6	95.2

These analyses are, however, of little practical value, because they give no indication as to the form in which the silica is present.

Arènes are natural mixtures of ochreous sand and clay, containing a large proportion of soluble silica. They do not appear to be of volcanic origin.

Artificial Pozzuolanas are sometimes manufactured by calcining clays of suitable composition at a low temperature.

capable of entering into chemical union with the lime in the presence of water, then the limestone is more valuable as a source of lime for building purposes than a stone of greater purity. When, however, the limestone merely contains silica in the form of quartz sand, the silica in the resultant lime is of no greater value than quartz sand mixed in the ordinary manner when making mortar. Most limes contain certain proportions of both the active and the inert forms of silica.

The limes of commerce may be divided into the following four classes:—(1) Fat, pure, or rich limes; (2) poor or sandy limes; (3) feebly hydraulic limes; and (4) hydraulic limes; but there is no sharp line of demarcation distinguishing one class from another.

Rich Limes are the purest forms of lime, such as are commonly obtained by calcining white chalk. They do not contain more than 5 per cent. of siliceous matter, and are only used by builders for plastering. They increase largely in volume when slaked.

Poor or Sandy Limes contain a considerable quantity of inert silica, in addition to a small proportion of active silica, and should not, therefore, be mixed with so large a proportion of sand as is used for limes free from inert silica. Poor limes do not augment so greatly in volume as rich limes when slaked.

Feebly Hydraulic limes.—The material commonly known in London as "stone lime," which is usually grey chalk lime, ranks in this division. Feebly hydraulic limes, as a rule, contain very little inert silica, but from 5 to 12 per cent. of active silica.

Hydraulic Limes have the power of setting under water. There are many grades of hydraulic lime, the value of the lime increasing with the proportion of active silica and alumina present. Some authorities speak of hydraulic limes containing 15 to 20 per cent. of silica and alumina as "ordinary" hydraulic, and of those containing 20 to 35 per cent. as "eminently" hydraulic. Hydraulic limes slake very slowly, do not become so strongly heated when sprinkled with water as rich limes, and do not increase very largely in bulk when slaking.

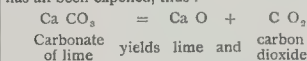
Artificial Hydraulic Lime is made by calcining a fairly pure lime with the amount of clay commonly found in good hydraulic lime, say 20 per cent. It may be regarded as a kind of Portland cement. The two ingredients are intimately mixed and then subjected to carefully regulated heat.

Different limes of the same class vary considerably in chemical composition, but the figures in the following table may be regarded as approximate analyses of average samples of the different classes.

Typical Analyses of Different Classes of Lime.

Class.	Rich Lime.	Poor Lime.	Feebly Hydraulic.	Hydraulic.	
Source	White Chalk.	Sandy Limestone.	Grey Chalk.	Blue Lias.	Carboniferous Limestone.
Lime	95.4	76.0	84.0	69.3	59.5
Silica	2.5	16.5	11.0	13.7	29.8
Alumina	1.3	3.0	2.0	9.2	5.2
Oxide of iron	0.6	1.0	0.6	4.6	3.3
Magnesia	0.2	3.5	1.9	2.9	1.0
Alkalies	Trace	Trace	0.5	0.3	1.2
	100.0	100.0	100.0	100.0	100.0

Lime is known in chemistry as calcium oxide (CaO), and is a compound obtained by heating calcium carbonate in the form of chalk, limestone, or marble, until the carbon dioxide has all been expelled, thus:—



The foregoing chemical equation shows the products which would be obtained if pure calcium carbonate were heated, but it has already been shown that no natural stone is a pure compound, and the great differences in the various limes of commerce are mainly due to the presence of different proportions of clayey impurities in the limestone from which the lime is obtained.

When the limestone contains silica or silicate of alumina and iron in a form which, when the limestone is converted into lime, is

The silica in the poor lime is mostly of the inert variety, but in the other limes it is mostly present as active silica. All the building limes usually contain traces of phosphorus and sulphur.

Blue Lias Lime not necessarily derived from *Blue Lias Stone*.—Blue lias limestone is of a dark blue colour, but when calcined yields lime of a grey colour. The stone varies greatly in composition in different localities, and genuine lias lime may vary through all the grades of hydraulicity, from feebly hydraulic to eminently hydraulic. It has been commonly believed, however, that blue lias lime must necessarily be made from lias limestone, but in view of the recent decision of Mr. Horace Smith in a case at the Westminster Police-court, that faith must be abandoned.

Summonses were taken out by the Blue Lias Lime Burners' Association against the Cam Portland Cement Co., Limited, of Cambridge,

for selling lime under the alleged false trade description of "Ground Blue Lias Hydraulic Lime." The lime in question appears to have been as valuable for building purposes as average blue lias lime, but was made from a stone found in Cambridgeshire, a county in which Blue Lias limestone has never been found.

The evidence and decision given in this case was reported in the *Builder* of February 9 and March 23, 1901, but the decision is so important that the following remarks of the magistrate should be carefully noted:—

"Lime would never have been 'blue lias lime' had it not been that it was for many years made from the Blue Lias formation. But as time went on, many persons began to make lime out of limestone, which was very different from blue lias, and did not belong to the same stratum or formation; but the lime made from the new quarries was as good, or nearly as good, as the blue lias lime, containing the same valuable qualities in an almost equal degree.

Upon the whole, I find that the weight of evidence as to the general use of the term as expressing quality, and its acceptance by all branches of the trade, cannot be resisted. If in the present case defendants had called the lime 'Warwickshire Hydraulic Lime,' a conviction might have followed. The summonses are dismissed without costs."

Properties of Lime.—Pure calcium oxide is a white solid substance, which readily absorbs water from the atmosphere. The lime and water enter into chemical combination, and form calcium hydrate and slaked lime ($\text{Ca H}_2 \text{O}_2$). During the process of hydration heat is evolved and the lime increases in bulk. When a mass of quicklime is sprinkled with water the evolution of heat occurs so rapidly that the mass may become heated to a sufficiently high temperature to char wood or ignite gunpowder. When exposed to the atmosphere lime absorbs carbon dioxide as well as water vapour, and after exposure for some time the lime is found to consist of a mixture of carbonate and hydrate of lime.

Lime is feebly soluble in water, about 90 grains of lime being dissolved by 1 gallon of water at ordinary temperatures. Unlike most solids, lime is more soluble in cold water than in hot water. A noteworthy property of lime is that it is more freely soluble in a solution of sugar than in pure water. A mixture of sugar and white chalk lime will set with a very hard surface, but the interior of the mass remains friable and deficient in strength. Lime is readily dissolved by hydrochloric acid, a solution of calcium chloride being formed.

The following table shows the relative weights of equal volumes of sand, sand substitutes, and lime. The weights of the sand substitutes are given by Mr. W. J. Dibdin in his work on "Lime, Mortar, and Cement," and it is noteworthy that whereas the weight of brick in brick form is not less than 115 lbs. per cubic foot, the weight of a cubic foot of broken brick is, according to Mr. Dibdin, only 53 lbs.

Weight of one cubic foot of Sand.

Pit sand (coarse)	100 lb.
" " (fine)	95 "
River sand	118 "
Thames sand	103 "

Weight of one cubic foot of Sand Substitutes.

Broken brick	53 lb.
Burnt clay	71 "
Cinders (clean)	60 "
Clinker	50 "

Weight of one cubic foot of Quicklime.

White chalk lime (in lumps) ...	39 lb.
Grey chalk lime (in lumps) ...	44 "
" " (ground)	43 "
Portland stone lime (in lumps) ...	47 "
Blue lias stone (in lumps) ...	58 to 70 lb.
" " (ground)	49 to 68 "

BOOKS RECEIVED.

ABYDOS, PART I, 1902. By W. M. Flinders Petrie. Being the twenty-second memoir of the Egypt Exploration Fund. (Kegan Paul, Trench, Trubner, & Co.)

DAWLISH, AND THE ESTUARY OF THE ENE. By Beatrice F. Cresswell. Homeland Handbooks Series. (The Homeland Association. ed.)

GENERAL BUILDING NEWS.

RESTORATION OF CRANTOCK CHURCH, CORNWALL.—The church of St. Crantock, near Newquay, has just been reopened after restoration. A figure of the patron saint fills a niche in the east wall opposite the south door, being the work of Mr. Hitch, of London, who also carved the Calvary in the transept gable. The carved woodwork is the work of Mr. Rashleigh Pinwill, of Plymouth. The building has been repaired and restored by Mr. Nicholls, near Launceston, under the directions of Mr. Edmund Sedding, of Plymouth.

CHANCEL, WASHINGTON PARISH CHURCH, DURHAM.—The foundation-stone of the new memorial chancel in Washington Parish Church was laid recently. The architects are Messrs. Hicks & Charlewood, Newcastle, and the builder is Mr. Robinson, of Washington.

RESTORATION OF DEEWORTH CHURCH, LEICESTERSHIRE.—The restoration of this church has just been completed. The contractor was Mr. F. W. Pendleton, of Leicester; and the architects, Messrs. R. J. & J. Goodacre, also of Leicester.

RESTORATION OF ST. MARY'S CHURCH, LEICESTER.—The restoration of the tower and spire, also the south aisle and chancel of this church, have just been completed at a cost of 3,000l. The contractor was Mr. J. W. Pendleton, of Leicester, and the architects, Messrs. R. J. & J. Goodacre, of Leicester.

PRESBYTERIAN CHURCH, NEWCASTLE.—A new Presbyterian church has just been opened at Newcastle. The buildings occupy a site on the north side of College-road, and comprise a church seated for 700, hall seated for 500, and a number of classrooms, vestries, and a caretaker's house. The style is Late Gothic, and the church is built on the west side of the site, with a tower 80 ft. high at the south-west angle fronting on College-road. A porch admits to a vestibule the full width of the nave, with fireproof staircases at each end, leading to the gallery, which is at one end of the church only. Ladies' and gentlemen's cloakrooms are provided off the vestibule, and there are four doorways leading into the church. The floor has a fall of 12 in. from vestibule to transepts; the east transept is occupied by the choir and organ. Behind the church a corridor gives access to the minister's vestry, choir vestry, tea kitchen, and hall, and the front vestibule is also in direct communication with the hall. A large building is placed in front of the hall, facing on to College-road, and contains class rooms and managers' room on the ground floor, session and ladies' room on the first floor, and caretakers' house on the third floor. A pitch pine screen the width of the nave divides the vestibule from the church, the upper portion fitted with lead glazing in cathedral glass. The roof is of hammer beam construction, in pitch pine, with panelled ceiling. The pulpit is of pitch pine, and the apse behind the pulpit has panelling in pitch pine carried up to the sill of the window. Behind the pulpit is a five-light tracery window, fitted with stained glass by Messrs. Morris, of Marton Abbey. The full length of the church from the south wall of the gallery to the north wall behind the pulpit is a little over 100 ft.; the nave is 41 ft. wide, and the transepts 27 ft. wide, and the height from the floor to the ceiling of nave is 41 ft. 6 in. The lighting is by electricity. The heating is by low-pressure hot water, with pipes and radiators. Messrs. Bader & Bruce, Newcastle, are the architects. Mr. Geo. H. Mauchlin is the general contractor, under whom Messrs. France & Sons have executed the plumbers' work, Messrs. Henry Moat & Son the slating, Mr. Andrew Convery the plastering, and Messrs. Adam Robertson & Son the painting. The lead glazing has been supplied by Mr. Bagley, and the heating has been carried out by Messrs. Dinan & Cooke, while the tile floors and stoves and chimney pieces have been supplied by Messrs. Emley & Sons. Messrs. Falconer, Cross, & Co. have installed the electric light, &c.

PRIMITIVE METHODIST CHURCH, BASINGSTOKE.—A new church and Sunday school has just been opened at Basingstoke. The buildings have been erected by Mr. H. Munday, of Basingstoke, from designs prepared by Mr. T. E. Davidson.

CHURCH, BRADFORD.—A new church has been erected at Bradford in an outlying corner of St. Stephen's parish, at Chapel Green, Little Horton. The cost of the building is 15,000l., including the site. Messrs. T. H. and F. Healey are the architects, and they have adopted the Early English style. Twin chapels are provided on either side of the chancel, the organ being located in the north-east corner, with an opening into the semi-circular bay of the north side. The chancel is built in three bays, and the nave in four; the seating accommodation being estimated at 600.

BAPTIST CHURCH, SOUTH NORWOOD.—A new aisle, with entrance porch, vestry, organ-chamber, choir stalls, &c. (the memorial stone of which was laid by the late Rev. J. Spurgeon on his ninety-first birthday) has been erected at this church, and a complete renovation of the buildings has been carried out by Messrs. Hanscomb & Smith, builders, London-road, West Croydon, the architect being Mr. W. Theobald.

TECHNICAL COLLEGE, GLASGOW.—The plans have just been passed for the erection of that

portion of the Glasgow and West of Scotland Technical College which is to be built on the ground recently acquired from the School Board of Glasgow, and which is at present occupied by the historical buildings of Anderson's College. The Young Laboratory buildings, which addition will form the basis of a later application to the Dean of Guild Court for the erection of the second portion of the college. The new buildings of the Technical College are in the Renaissance style, and are to be built of red sandstone, and, in their entirety, are constructed to accommodate 5,000 students—a number slightly in excess of those attending the college at the present time. The portion to be erected at the present juncture will run parallel with Montrose-street. On the ground floor will be accommodated the department of natural philosophy. With the exception of two or three rooms to be used for general purposes, the second floor will be devoted to the department of natural science. The third floor will provide accommodation for the department of architecture and building construction, while the chemical department and the department of technical chemistry will be housed on the top floor, the whole of which will be practically occupied by the completed building. Behind the Montrose-street portion of the college, and running parallel to it, will be three blocks of buildings. The first block will contain a portion of the electrical engineering department, but will be principally occupied by the examination hall. In the next block the remainder of the electrical engineering department will be housed, while the third block will embrace rooms for wood-working classes and the department of mining and geology. A wing connecting the three blocks will be occupied by the department of prime movers, mathematics, and metallurgy. Mr. David Barclay is the architect of the new college.

NEW CHAPEL, KNOWLE, NEAR BRISTOL.—On the 15th inst., the new chapel of St. Raphael, which is the first portion of the permanent house to replace the Sisters' old house in Cumberland-road, was opened in connexion with the House of the Sisters of Charity. The chapel is of permanent stone, with Bath stone dressings. There direct communication from the chapel through a covered passage with the Home of the Sisters. There are plans prepared for the erection of a home, in three blocks, which will at some future period furnish accommodation for 100 Sisters. The contractors for the chapel were Messrs. Stephens & Bastow, the architect being Mr. G. F. Bodley, R.A.

CONSERVATIVE CLUB, TYNEMOUTH.—A new Conservative Club has been erected in Albion-road. The new club premises occupy a site on the main thoroughfare from North Shields to Tynemouth. They have a frontage, facing south, of 60 ft. The building is of red bricks, relieved with stone, bay windows and porch. In the basement there is a cellar, and the ground floor contains smokeroom, reading-room, cardroom, and luncheon-room. The steward's kitchen and parlour are also on the ground floor. The first floor consists of a billiard-room, the full front length of the building, and is fitted with four billiard tables. On the same floor, and parallel with the billiard-room, is a hall with seating accommodation for 400 persons. Two attic bedrooms are provided for the steward in the upper story. A separate entrance, on the east side of the building, is provided for the hall; also ante-rooms for ladies and gentlemen. On the staircase there is a ticket box. The building throughout is lighted by electricity, and the principal rooms are connected by electric telephones. The heating apparatus is hot-water pipes. The buildings were designed by Mr. F. R. N. Haswell, North Shields, and the contract has been carried out by Mr. W. Weir, of Howdon-on-Tyne. The cost of the new premises and their equipment has amounted to over 6,000l.

EXTENSION OF FREE LIBRARY AND MUSEUM, PAISLEY.—At a meeting of the Paisley Town Council, on the 15th inst., the Clerk, Mr. Francis Martin, submitted a letter from the Free Library and Museum Committee regarding the extension of that institution. The Committee pointed out that Mr. James Coats, of Auchendrone, had recently agreed to give 5,500l. to cover the cost of the extension. Messrs. Honeyman, Kieppie, & Mackenzie, Glasgow, had prepared plans for the proposed extension, and on estimates being taken from these it was found that the work would cost about 1,500l. more than Mr. Coats' original offer. Mr. Coats had, however, intimated that he would be pleased to supply the additional sum required, so that the work might be carried out in the most suitable manner.

WITTON HALL INDUSTRIAL SCHOOL, BIRMINGHAM.—Witton Hall is a three-story, square, red brick house, Georgian in its appearance, with low pitched slated roofs partially concealed by parapet carried above a moulded stone cornice; with massive, lofty chimneys. The old floors are of oak and some of the walls are lined with oak panelling. An interesting feature is the old oak staircase, with its moulded balustrade. Previous to the recent alterations there were five rooms on each floor, one of which was the kitchen. A 10-foot-story wing with tiled roof running east and west contained the scullery, pantries, wash-house, laundry, &c., with bathroom over; a second wing at right angles to the first, forming the third side

a quadrangle, consisted of a coach-house, stable, cow-house and pig-sties. In the alterations now completed, by removing several walls, &c., a portion of the ground floor of the house-block has been converted into a dining-hall 48 ft. by 19 ft. On the floor over, a dormitory of similar dimensions has been constructed, accommodating twenty-six beds. The remainder of the house is now used as the Superintendent's residence. The old scullery wing has been extended, its walls thickened, and a roof raised, giving space on the ground floor for a new scullery, pantries, a boys' lavatory with twenty-four basins, and a bath-house containing a bath lined with glazed white bricks, and measuring 17 ft. 6 in. by 6 ft. 6 in. and 3 ft. deep. The upper story has a dormitory, 61 ft. by 17 ft. 6 in., accommodating twenty-nine beds, and a sick-room with an independent staircase entrance for isolation; also a masters' bathroom. The stable wing has been cleared out and made to accommodate carpenters, shoemakers, and tailors' workshops, wash-house, laundry, and storeroom. A new wing has been erected on the south-east side of the house, containing the schoolroom, 38 ft. by 24 ft. by 16 ft. high, to be used also as a gymnasium, the principal staircase, and a dormitory over the schoolroom, 38 ft. by 24 ft., accommodating twenty-five beds. Each dormitory is under the control of a master, whose bedroom adjoins, and has a small window for inspection. A one-story wing has also been added, containing the office for Superintendent and Committee and an officers' sitting-room. A playground has been formed in the rear, and a play-shed, 64 ft. by 16 ft., which will eventually be enclosed. The buildings are warmed by hot water on the low-pressure system, which has been supplied by Benjamin Parker, Ltd., of Birmingham. Automatic ventilators and fresh-air inlets have been arranged to give a good supply of fresh air, and the interiors and entrances are lighted by gas. The work has been carried out by Messrs. Mills & Son, from the plans and under the superintendence of Mr. Freeman Smith, architect, of Corporation House, Birmingham. The Birmingham opened the building on the 17th inst. The total cost, including the freehold, was 6,360l.

BATHS AND GYMNASIUM, DUNFERMLINE.—The memorial stone of new baths and gymnasium, Dunfermline, was laid recently. Mr. Hippolyte J. Blanc is the architect, and Mr. James Stewart the building contractor.

DISTRICT BATHS FOR BRADFORD.—The Baths and Team Labour Committee of the Bradford Corporation held a meeting on the 27th inst. and decided to accept sketch-plans prepared by Mr. F. E. P. Edwards (City Architect) for the provision of three district baths. The estimated cost of each is 7,000l., including the cost of land.

The new baths will be built in Drummond-road (opposite the new Westgate Wesleyan Chapel), in Wakefield-road (near St. John's Church), and in Leeds-road (near the Bower Green district). Those in Drummond-road will first be undertaken.

LEEDS TOWN HALL AND MUNICIPAL BUILDINGS.—The Property Committee of the Leeds Corporation have called in Mr. Leonard Stokoe of London, to advise them as to the adaptation of the Town Hall and Municipal Buildings, and, in fact, on the whole question of accommodation for law courts and municipal offices.

SANITARY AND ENGINEERING NEWS.

SEWAGE WORKS, ALDERSHOT.—Lieut.-Col. Alfred S. Jones, V.C., A.M.Inst.C.E., has been appointed by the Secretary of State for War manager of all sewage works in the Aldershot District. The work will involve the preparation of land for irrigation in six separate localities, at three of which septic tanks and other forms of artificial sewage treatment have been tried and found wanting.

THE CHISLEHURST TUNNELS.—It is stated that Sir Benjamin Baker has made a thorough inspection of the Chislehurst tunnels, which have recently shown signs of failure, and has reported to the Directors of the South-Eastern and Chatham Railway. In the case of the old tunnel, for a comparatively short length there was, he found, some flaking off of the brickwork at the side of the wall nearest the new tunnel, and at the crown of the arch. The new tunnel at the same spot also showed some slight signs of abnormal pressure, as there were a few vertical cracks at the side wall nearest the old tunnel, and the drainage culvert was somewhat distorted. The cause of the damage in both cases was the compressible nature of the soil intervening between the two tunnels at this particular spot; the old tunnel had stood nearly forty years without any signs of failure. The remedy in both cases was, he thought, the same—namely, to invert the old tunnel, and to raise the side walls, so as to distribute the weight over the foundations and prevent side walls from moving forward. This was a simple and comparatively inexpensive work, and had often been done before in the case of many other railway tunnels under similar circumstances. It could be executed far more expeditiously and economically than the tunnels were intended over, and the contractors free from the traffic and at the same time, the risk of accident to trains from portions of brickwork flaking off and falling on the rails would be avoided. He strongly advised, therefore, that the

traffic should be diverted, not merely until the damaged brickwork of the side walls and arch was restored, but until the new inverts were completed. This course would not only be safer, but involve, in his opinion, less public inconvenience in the long run. The directors, it is stated, will act upon his advice.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS. Mr. Henry B. Downs, architect and surveyor, has removed his offices from 49 Queen Victoria-street to 10 and 11, Lime-street, E.C.—The firm of Diespeker & Co., artists in mosaic, 37-63, Holborn Viaduct, has been formed into a limited company. Mr. L. Schlenheim, who has been a partner in the firm since its foundation in 1879, will be joined as director by Mr. R. O'Brien.

THE LAW RELATING TO BUILDING SOCIETIES.—In our notice of this work in our issue for July 12, p. 35, we gave the author's name incorrectly. It should have been printed E. A. Wurtzburg, not Warburg.

ST. MARY'S CHURCH, STAMFORD.—The writer of a communication on this subject should have sent his name and address.

APPOINTMENT OF SANITARY INSPECTOR.—The Local Government Board has sanctioned the appointment of Mr. F. J. Habsas as a sanitary inspector in the metropolitan borough of Hackney.

AMERICAN BUILDING TRUST.—The New York correspondent of the *Morning Post* has sent the following communication to that journal:—"A trust affecting Great Britain has been formed by the principal construction firms in the United States with a capital of sixty million dollars. The Fuller Construction Co. is the chief mover in the combination, and there is almost unlimited financial backing for the trust. Several contracts have already been secured for London, and the combination intends to make determined efforts to enlarge its business in the British provincial fields. It is prepared to bid for the erection of structures from one to forty stories high."

THE ROYAL AQUARIUM, WESTMINSTER.—At the sitting, on Wednesday last, of the Wesleyan Conference at Manchester, it was announced that provisional arrangements had been made for acquiring the freehold site and buildings of the Royal Aquarium, Westminster, at an expenditure of 330,000l. The site covers about 100,000 ft. super., and will be cleared for the erection of the new Church House and a Great Central Hall, as dedicated to the service of Methodism. The present buildings include the Imperial Theatre, of which a fourteen years' lease at an annual rent of 2,000l. was taken by Mrs. Langtry, who has expended some 30,000l. or 35,000l. upon the property. The Royal Aquarium and Winter Garden was opened on January 22, 1876, having been erected after plans and designs prepared by Mr. A. Bedford, and illustrated in the *Builder* of May 1, 1875 (general view, double-page woodcut), and January 22, 1876 (plan). Messrs. Lucas were the general contractors for nearly 90,000l. The two principal fronts, built of red Farnham bricks with Bath and Portland stone dressings, extend about 600 ft. and 85 ft. along Tothill and Princess-streets respectively. The roof, glazed after Rendle's patent, was constructed by the Thames Ironworks Company. Beneath the floor of the main building were built a reservoir with nine large brick tanks having invert and culvert arches for the supply of fresh and sea water to the exhibition tanks, with a service of vulcanite pipes, the engineers being Messrs. Leete, Norman, & Edwards.

THE USHER BENEFACENCE, EDINBURGH.—The Town Council of Edinburgh have resolved to purchase for 30,000l. the site and buildings of the United Presbyterian Church Synod Hall and of some adjoining property in Castle-terrace, for the erection thereon of the Usher City Hall, which they had originally proposed to build at Atholl-crescent. The Synod Hall, formerly a theatre, has latterly belonged to the United Presbyterian Church, who, however, since their union with the Free Church, no longer need a separate meeting-place. The new Usher City Hall will have a capacity for about 3,500 people. The Usher Institute of Public Health in Warrender park, a gift of Sir John Usher, Bart., and built after the plans and designs of Messrs. Leadbetter & Fairley, of Edinburgh, has recently been formally committed to the charge of the University authorities in that city.

ST. GEORGE CHURCH, BOTOLPH-LANE, E.C.—Preparatory to the demolition of the fabric, measures have been taken for the removal of all human remains to other consecrated ground. The united benefices of St. George, Botolph-lane, and St. Botolph, Billingsgate, have been united with that of St. Mary-at-Hill, which has recently been constituted the church of the three united parishes. The tablets and monuments are to be removed to St. Mary-at-Hill Church from St. George Church, which was finished in 1874, at a cost of 4,500l., from plans and designs by Sir Christopher Wren. The design, whilst devoid of any striking architectural features, presents a typical specimen of Wren's work for the less important churches of London, embracing a tower, square on plan, that rises at once from the

ground, with a solid, unbroken basement story for the body of the church.

INCORPORATED CHURCH BUILDING SOCIETY.—This Society held its usual monthly meeting on Thursday, the 17th inst., the last of the present session (to be resumed in November), at the Society's House, 7, Dean's-yard, Westminster Abbey, S.W., the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of the following objects, viz.:—Building new churches at Dalton-in-Furness, St. Margaret, Lancashire, 100l.; Haslemere, St. Christopher, Surrey, 120l.; Muswell Hill, St. Andrew, Middlesex, 300l.; Southampton, St. Barnabas, 75l.; and Stoughton, Emmanuel, near Guildford, 60l. In lieu of a former grant of 50l.; rebuilding the Church of St. Andrew, Stoke Damarel, Devonport, 100l. for the first portion; and towards enlarging or otherwise improving the accommodation in the churches at Compton Martin, St. Michael, near Bristol, 50l. in lieu of a former grant of 20l.; and Ratcliff, St. James, Middlesex, 40l. in lieu of a former grant of 25l. Grants were also made from the special Mission Buildings Fund towards building mission churches at Five Ways, St. John the Evangelist, near Cannock, Staffs., 50l.; Plumstead, St. Alban, Kent, 50l.; Primrose Hill, St. Matthew, near Rashcliffe, Huddersfield, 50l.; and Twerton Hill, near Bath, 25l. The following grants were also paid for works completed:—Weston-super-Mare, All Saints, 240l.; Blackham, All Saints, near Withyam, Tunbridge Wells, 40l.; Stourton Claude Parish Church, near Sherborne, Dorset, 25l.; Princetown, St. Michael, Devon, 60l.; and Addiscombe, St. Martin, Croydon, 50l. on account of a grant of 80l. In addition to this the sum of 220l. was paid towards the repairs of eleven churches from trust funds held by the Society. The Society likewise accepted the trust of a sum of money as a repair fund for the Church of St. Mary and All Saints, Palfrey, near Walsall, Staffs.

POLICE-COURT EXTENSIONS, BRISTOL.—An inquiry was held at the Council House on the 16th inst. by Mr. H. Percy Boulnois, Inspector of the Local Government Board, into applications made by the Bristol Town Council for sanction to borrow 400l. for purposes of street improvement, 18,117l. for extensions of the petty sessions courts in Bridewell-street, and 7,605l. for the purchase of premises in Bridewell-street as a site for police offices.

ADMIRALTY BUILDINGS ARBITRATION CASE.—At the Surveyors' Institution, on the 18th inst. Mr. E. A. Gruning, sitting as arbitrator, resumed the hearing of the claim made against H.M. Office of Works by Messrs. Chessum & Sons, the contractors for the new Admiralty buildings, with respect to certain work over and above that specified in their contract which they alleged they had been called upon to do. The work in question had reference to the foundations for the new buildings and the underpinning and shoring up of the old buildings, all of which were stated to have been taken considerably below the contract depth. Mr. Cripps, K.C., and Mr. Hudson appeared for Messrs. Chessum, and Sir R. Finlay (Attorney-General) and Mr. Askwith for the Office of Works. Sir Benjamin Baker said the underpinning work was done in a very unusual way, involving enormous extra cost. The subsoil should have been pumped clear of water, and the work then proceeded with. The Attorney-General, on behalf of the Office of Works, said the effect of the claim would be to get rid of the contract altogether. The architect and the clerk of the works were alleged to have ordered many things which they never ordered at all, or if directions were given with regard to them, were treated as being within the terms of the contract. As for the mode of carrying out the work in the first instance, he submitted that to clear the subsoil of water, as Sir Benjamin Baker had suggested, would have been to incur a risk that no architect would be justified in incurring. He admitted that the contractors were entitled to some additional payment for the extra pumping and piling below contract level. The inquiry was again adjourned.

UNIVERSITY COLLEGE HOSPITAL.—We are requested to state that the appointment of Mr. Hornblower as architect to University College Hospital, recently announced in the architectural journals, is not connected with the completion of the new buildings now in course of erection from the design of Mr. Alfred Waterhouse, R.A. On the retirement of Mr. Waterhouse in April last, Mr. Paul Waterhouse was appointed by resolution of the Hospital Committee to carry these important buildings through to their completion, a selection which was confirmed by Sir J. Blundell Maple, Bart., M.P., the donor of the entire fabric.

THE SCIENTIFIC ROLL.—It is difficult to classify this publication. Its full title is "The Scientific Roll and Magazine of Systematised Notes Conducted by Alexander Ramsay." The issue for May, 1902, is No. 5, Vol. 1, and the reader is informed that the number of subscribers is now fifty-five, and that, when these have increased to 200, the work will be issued monthly. The subject of bacteria occupies the whole of the May number, and (as far as we can gather) of all the preceding issues. Each number contains thirty-two pages of notes or abstracts of books, pamphlets, &c., arranged in annual groups according to the year of publication, those in each group being placed in the alphabetical order of the authors' names. There

is thus no classification of any value, but a good index may perhaps be contemplated. Of the thirty-two pages in this number, no fewer than twenty-three are occupied by a summary of Mr. R. T. Hewlett's work, and deal principally with the apparatus required by the bacteriologist and with the preparation of culture media. Judging from the May number, we believe that the compiler is chiefly interested in the bacteria present in vegetable food-stuffs and farm produce. There is little or nothing about the disease germs which affect human beings, and nothing at all about the changes which bacteria effect in sewage. The scope of the work is therefore limited.

LEGAL.

NEGLECT TO GIVE NOTICE TO DISTRICT SURVEYOR.

A SUMMONS was heard at the Clerkenwell Police-court before Mr. Bros., on the 17th inst., against Mr. A. Kendall, builder, of 30, Bloomsbury-road, Burdett-road, E., for giving notice to an addition to a factory in Great Sutton-street, Clerkenwell, without first having given the District Surveyor notice as required by the London Building Act.

The defendant contended he was not the builder, because, although he found the labour, he did not supply all the materials. He also said the owner had undertaken to give the notice, and that, therefore, he was not answerable for the omission. The magistrate fined him 20s. and 22s. costs.

THE SALE OF NEW INN TO THE LONDON COUNTY COUNCIL.

MR. JUSTICE FARWELL, in the Chancery Division, on the 22nd inst., heard a petition by the Trustees of the Middle Temple as to the appropriation of the sum of money paid by the London County Council for the sale of New Inn for the purposes of the new thoroughfare between Holborn and the Strand. It appeared that in the year 1745 the Inn was leased to the Trustees of the Middle Temple to the Treasurer and ancients of New Inn for the term of 300 years at the annual rent of 4l. At the time when the London County Council (Improvements) Act, 1890, was before Parliament, an arrangement was come to between the Societies of the Middle Temple and New Inn that, subject to the life or other interests of the ancients of New Inn in chambers held by them, and to the occupation leases of tenants, the fee simple in possession of the Inn should be sold to the County Council, and that the purchase money should, after payment of costs, charges, and expenses of the parties to the agreement, up to the sum of 150,000l., be divided in ascertained proportions between the Middle Temple and New Inn. Subsequently, after the Act was passed, it was agreed between the two Societies that the life interests of the ancients of the Inn in the chambers held by them, including their claims for compensation for disturbance and removal, should be included in the sale to the County Council, and that they should receive for the same the sum of 26,000l. After the County Council had served notices to treat for the acquisition of the Inn, it was agreed between the Middle Temple, New Inn, and the ancients on the one side, and the County Council on the other, that the amount to be paid by the County Council for compensation should be 157,500l. The Attorney-General in August, 1901, started an action at the relation of the Incorporated Law Society against the Treasurer and ancients of New Inn, asking for a declaration that a certain amount of the purchase money paid by the County Council as compensation for the purchase of the Inn as might be allotted and apportioned to the Society of New Inn, was a charitable or public fund to be applied for the purposes of legal education, and that a scheme for its regulation and management might be settled by the Court. It was proposed that the whole of the money should be put into Messrs. Child's bank, and the purchase effected according to the provisions of Section 53 of the London County Council (Improvements) Act, 1890, but the County Council declined to do this on the ground that the title to the Inn to sell the leasehold interest under the lease of 1745 was not satisfactorily made out. Accordingly the County Council, with the consent of the Middle Temple and of New Inn, purchased from the ancients collectively their life interests, including compensation for disturbance, for 26,000l., and also agreed to purchase from the Societies of the Middle Temple and New Inn their respective interests for 131,500l., and the County Council paid that sum into court. The Trustees of the Middle Temple now asked for an order that this money should be paid out to the respective claimants in the shares mentioned in the schedule.

In the result, Mr. Justice Farwell made the order as asked for.

Mr. Warrington, K.C., Mr. Badcock, K.C., Mr. Dauncy, and Mr. J. Henderson appeared for the Trustees of the Middle Temple; Mr. M. J. Parker for the Attorney-General; Mr. Christopher James for the Trustees of New Inn; Mr. F. Thomson for the London County Council; and Mr. T. T. Methold for the Incorporated Law Society.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

5,952.—COVERS FOR JOINT BOXES, SWITCHES, CUT-OUTS, &c.: *H. Hirst and T. H. Bacon*.—A water-tight cover is made up of two discs, having a layer of rubber or some such substance, which is compressed with a screw, interposed between them. In another shape the cover has a projecting lid, and a set of screws is used to compress an india-rubber packing-ring inserted into the space above another ring.

5,970.—AN APPLIANCE FOR FILTERING AIR: *S. Timbkhonitch*.—For ventilating rooms and buildings is devised a filter, which comprises a wire frame on which is stretched swansdown or some similar material, and adapted so as to form part of a cornice or of a double ceiling. The filter can also be applied to a flap-valve box, which is adjusted to a window-pane.

5,981.—A TESTING APPARATUS FOR FIRE-ALARMS: *G. H. Outway*.—For breaking a closed circuit the inventor attaches one end of a stretched wire to the edge of a disc. When the disc is pulled round with a cord the wire will assume the same amount of sag as that which a fire would produce, and so break or close the electrical alarm circuit. By the arrangement described the insulating ring joined to the wire will be lowered until the platinum contact-pieces become separated from the terminals. For a circuit-closing apparatus, contact may be effected through the differential movement of levers and pulleys which increases the virtual length of the hanging wire. *Confer also No. 21,818 of 1900.*

6,026.—IMPROVEMENTS IN PLUG-COOKS: *S. J. Tugsey and H. F. A. Edmonds*.—In order to minimise leakage by the provision of an increased area of plug surface, an inclined bore is fashioned in the plug-cock so as to fit with corresponding passages in the casing of the tap or valve.

6,038.—A PROTECTIVE AND WATERPROOFING COMPOUND: *C. L. V. Zimmer*.—A coating for surfaces of stone, wood, metal, and so on, consists of three or four parts of cotton-seed oil, one part of bitumen, and enough of caustic soda in solution to saponify the glycerides, raised gradually to about 200 deg. C., and then aerated. Other fats or oils, treated with sulphur or alkalis, and then with some bituminous substance, and afterwards heated, may be employed, with suitable solvents such as oil of turpentine or light tar oil. The compound is described as being capable of resisting the action of acids, alkalis, and fire, as well as of water.

6,107.—ELECTRICITY MEASURES: *A. C. Heap and W. O. Smith*.—For an instrument which has a coil that turns relatively to a stationary coil the latter coil is fashioned so as to be almost spherical externally, whilst the movable coil constitutes a ring that closely surrounds it. An instrument which will avail for measuring in amperes, volts, or watts, and for use with integrating or recording apparatus, has its stationary coil mounted upon a cylinder of ebonite that is held in a horizontal yoke carried by an arm of the base, the pivots of the movable coil turn in jewelled bearings, the coil has a pointer, three screw-threaded arms fitted with counter-weights and a conductive disc. The movement of the coil is checked with springs, the disc will move in the fields of permanent magnets which will make the instrument dead-beat, the magnets being shielded with a copper plate when it is employed with alternating currents.

6,115.—HOUSE CONSTRUCTION: *J. A. Brodie*.—For the expedient building of houses to meet the more immediate needs of the poor or the dispossessed, large sections or slabs are moulded in concrete with interlocking grooves and tenons, and may be strengthened with tie-rods and ribs, girders, expanded metal, &c. The ground-floor slabs are laid upon wall-footings and the lower wall sections have ledges that carry the first-floor slabs. Concrete steps are fashioned in one piece with a side wall, and are supported by a rib of the other side wall. The flues consist of freclay pipes embedded in the concrete, and chimney-breasts are moulded in one piece with wall slabs. The specification extends to a mould for making slabs with openings and projections for windows, doors, and so on, and for the openings are adopted plates, bars, and tapered cores attached to sheet-metal sides which are clamped on to channel-iron bars.

6,183.—JOINTING FOR SANITARY AND OTHER PURPOSES: *C. L. V. Zimmer*.—A chair, having angular spaces and made of cement, freclay, concrete, iron, &c., is devised for carrying the spigot end and the socket end of two pipes. Cement is filled in one of the spaces for making the lower portion of the joint, whilst the upper portion is made by attaching covers to the top having a section similar to that of the chair which will supply a firm bedding for the pipes.

6,199.—STRUCTURES OF IRON OR STEEL AND CONCRETE COMBINED: *G. E. Clark*.—The corners of the building are strengthened with angle-tees; corrugated vertical steel plates are tenoned to damp-proof base plates, and to wooden wall plates; corrugated and torqued plates are adopted for the windows, door sills, and lintels, and are inserted through slots in the vertical plates, and secured with tapered pins; corrugated plates, tie-rods (of which the lengths are adjusted with screwed sockets), and interlaced wire or expanded metal serve to strengthen the floors and walls. Slotted

bolts and tapered pins fasten the centre planks or sheet-metal moulding plates to one another. *Confer also No. 22,511, of 1899.*

6,220.—HEADS OF AUTOMATIC FIRE-SPRINKLERS: *J. C. Merryweather and C. J. W. Jenkins*.—The inventors make a strut for sustaining the valve, which is composed of two bell-crank portions having their horizontal ends joined and soldered together between two discs. A joint is formed, and the collapse of the strut is facilitated when the solder becomes melted by heat, by means of the insertion of a ball between the two bell-crank extensions.

6,221.—LADDER-SECTIONS: *J. Charnian*.—The sections can be extended in a straight line by means of pivots inserted through hinge-plates, or can be joined together so as to form a trestle or step-ladder, or to be folded for transport, by means of hooks set to engage with eyes. One plate of each pair of hinges has a flange, and is turned around the edge of one side of a section. For use by painters, window-cleaners, and other workmen, a tapered strut, pivoted to the sides, is to be fastened to one of the rounds with hooks, and has a groove to take the window stile or rail, &c. which keeps the ladder in its place.

6,235.—CHIMNEYS AND THEIR LININGS: *A. C. Custodis*.—Channels that communicate with the outer air and, by means of ducts, with the flue are provided by building up the linings in sections that repose upon interior corbels. For building round chimneys are employed blocks which have vertical openings and are laid in either one row, or two or more concentric rows, in accordance with the level of the structure.

6,241.—A FIREPROOF COMPOUND FOR CONSTRUCTIONAL WORK OF IRON: *I. Koslowsky*.—After the iron-work has been coated with a solution of alum, borax, sodium tungstate, and ammonium, magnesium, and ferrous sulphates in water, a paste made up of a paste made up of further supply of that coating with the addition thereto of sodium, silicate, woodash, chalk, and asbestos.

6,279.—TREATMENT OF SEWAGE: *J. Merrill*.—The flow of sewage in bacteria beds is regulated by an apparatus which includes a supply channel directed into a receiver, and having an orifice for the charging of the tank. When the tank is filled, the orifice will be automatically shut as the sewage continues to flow into a container, wherein it lifts a float which is joined to an axially-mounted vessel so set as to close the opening. In another form the float itself carries the closing vessel. By these means a set of beds may be filled in turn, the overflow from the tank is conveyed into a receiver and so up a tube into a tilting bucket which, when filled, will be discharged. As the sewage escapes through a trap, it works a siphon, and so empties the float chamber of the adjoining bed.

6,312.—FLUSHING APPARATUS: *H. L. Doulton*.—The chamber of a regulator-valve contains a double piston, a time-passage communicates from the supply-pipe to the upper end of the chamber to which a pressure-relieving valve is attached, a short cylinder takes the lower portion of the piston. When a flush is required the pressure over the pistons is relieved by the working of the relief-valve. The rising of the pistons opens the flushing valve, which will then be shut by the flow of water to the top of the chamber. The flush may be caused to exhaust a space between the two traps of the room closet, and provision is made for an after-flush.

6,341.—IMPROVEMENTS IN PILES: *Verenigte Maschinenfabrik Augsburg und Maschinenbaugesellschaft Nürnberg A. G.*—A thin tube under the pile is joined firmly to an intermediate piece which at first is attached with light pins to the shoe of the pile. When the tube has been driven home an inner iron support is thrust in so that its end shall bear against the shoe. When that support has been rammed down it will move through the tube with the breaking of the light pins. A washer on the flange of the intervening piece prevents water from entering the space between the thin tube and the iron support, and beton is filled into the space.

6,382.—WATER SUPPLY IN LAVATORIES, &c.: *F. Buley*.—The inlets of the hot and cold water-supply box have regulating valves, of which the spindles lie upon pivoted levers, cams upon a cross-shaft work the levers, and on turning the shaft one obtains a supply of hot, cold, or tepid water. In a variant form a single cam serves for working both of the two valve stems.

6,414.—AN AIR INLET VALVE FOR DRAINS AND SEWERS: *E. B. A. Barnett*.—The inlet of a valve to be fitted at the top of a ventilating shaft for a drain or sewer is protected with an inclined grating, and around it is fashioned a channel which when filled with sand and glycerine will form a seal for a dish-dish which a balance-weight in the shape of a plate maintains, normally, in the opened position; the valve will be closed, however, by the pressure of any back-draught upon the plate; a forked lever, having two cups for its fulcrums, carries the valve.

6,421.—A CONTRIVANCE FOR CLOSET-TRAPS: *H. Smith*.—The invention is intended for a system wherein several basins are connected to one and the same soil-pipe. In order to prevent unsealing, an air-chamber is formed in the crown of the trap.

6,479.—A COMBINED LEVEL AND BEVEL: *J. J. Robb*.—Two blades are fitted upon the rounded end

a level, to the sides of which they are fastened by wing-nuts in such a manner as to allow of being turned quite round. Linear and angular levels may be graduated upon the instrument, and screws provide for an adjustment of the spirit-level.

5,481.—SEWERAGE-TRAPS, &c.: *F. Butler & R. Smith*.—In order to obviate a back-flow of sewage, the inventors insert a pivoted and swinging ball-valve in front of the inlet of the valve and against the normal current impels the ball to swing into a recess in the casing, but the valve will close upon its seating to resist any back-flow.

5,542.—DOMESTIC WATER-SUPPLY: *F. Ruhling*. The inventor seeks to provide means for warming the water-closets or other rooms of a house, and for preventing the freezing of water in the indoor service-pipes. The supply pipe is fitted with a branch, whereof one is laid through a heater in its course to the continuation of the supply pipe, and is in communication with a pipe passing into and within the heater: thus steam can be conveyed into a coil of warming pipes in any other room. An arrangement of valves enables a supply of water, either directly to the taps or, in times of winter, through the branch inside the heater. Safety-valve and a level-indicator are fitted on to the tank.

5,570.—HOT AND COLD WATER SUPPLY (DOMESTIC): *T. W. Tunford*.—In order to render impossible the shutting of the cold-supply valve before that of the other, and the opening of the hot supply valve before that of the cold, the latter is provided with a shield is mounted, is attached to the handle of the cold-supply valve, the shield, which is as so as to normally shut the keyhole of the hot-supply valve, will be removed with the opening of a cold-supply valve, and so bring the hot-supply valve into play; one cannot shut the cold-supply valve until the other valve has been closed, because the shield is carried into the travel of the handle by the opening of the hot-supply valve.

RECENT SALES OF PROPERTY:
ESTATE EXCHANGE REPORT.

July 8.—By HATCH, WATERMAN, & SON (at Ashford).
Halden Windmill, house, and 3 a. 1 r. 13 p. f. 4,100
Interden, Kent.—Two freehold cottages, w.r. 130
Enclosures of land, 69 a. 3 r. 36 p. f. 1,600
Wentworth, Sussex.—Two cottages adjoining with 25
Skeere's Field, 3 a. 3 r. 35 p. f. 140
Two freehold residences 520
Wodchurch, Kent.—Cottage, orchard, and 0 a. 0 r. 26 p. f. 150
July 12.—By FENN & CO. (at Colchester).
Mersea, Essex.—The Firs farm, 108 a. 2 r. 34 p. f. 5,000
Wentworth, Sussex.—70 a. 0 r. 12 p. f. 1,200
Spring Field, 5 a. 3 r. 35 p. f. 910
Batter's Field and cottage adjoining, 6 a. 2 r. 36 p. f. 120
July 14.—By BATE & CO.
Wool, Isle of Wight. Moncrieff Farm, 109 a. 3 r. 29 p. f. 4,500
Wentworth, Sussex.—70 a. 0 r. 12 p. f. 1,200
Myrtle Cottage and 1 a. 3 r. 27 p. f. 400
Clarence-road, three freehold cottages. 250
Manor-rd., Malmesbury Cottages (two), f. 440
Wentworth, Isle of Wight.—Parsonage Farm, 82 a. 0 r. 35 p. f. 2,800
SEWELL, BARNES, & BREBTON (at Norwich).
Iham St. Mary-the-Virgin, Norfolk.—The Rectory, 10 a. 0 r. 12 p. f. 2,070
Iham St. Mary Magdalen, Norfolk.—Bassingthwaite's Farm, 130 a. 2 r. 29 p. f. and c. 1,975
July 14.—By BATE & CO.
John's Wood, Surrey.—Beech Lodge, 1 a. 48 yds., g.r. 65, e.r. 65f. 300
Wentworth, 61, Hall-pl. (S), ut. 36 yds., g.r. 77, w.r. 54f. 128
Wentworth Hill—39, Colbourne-rd. (S), ut. 61 yds., g.r. 9f, w.r. 65f. 500
By ALLAN BOOTH.
Walloway—34, Carleton-rd., ut. 60 yds., g.r. 15f, D. 15f. 1,575
Hamden Town—193, Camden-rd., ut. 36 yds., g.r. 6f, 8f, D. 5f. 680
Wentworth, Bucks.—Bath-rd., freehold building land, 12 a. 0 r. 3 r. 29 p. f. 7,000
Inkfield, Berks.—Box Farm, 29 a. 1 r. 33 p. f. 1,600
Wentworth, Sussex.—Highgate, freehold building site, 6 a. 2 r. 18 p. f. 1,250
By H. J. CHIFFINS.
Wentworth, 39, Colbourne-rd. (S), ut. 61 yds., g.r. 9f, w.r. 65f. 500
Two plots of grass land, 1 a. 1 r. 30 p. f. 125
Three freehold fields, 4 a. 1 r. 6 p. f. 150
Wentworth, 119, Lordship-rd., ut. 72 yds., g.r. 10f, e.r. 75f. 815
Wharfedale, Surrey.—Marsden Farm, 37 a. 1 r. 1 p. f. 1,500
Wentworth, Sussex.—Lanaway's Cottages (two) and 5 a. 2 r. 25 p. f. 500
Wentworth, 39, Colbourne-rd. (S), ut. 61 yds., g.r. 9f, w.r. 65f. 500
Freehold cottage residence, y.r. 15f. 420
By T. W. OFFIN.
Wentworth, Essex.—Pond Meadow, 5 a. 0 r. 8 p. f. and c. 3 r. 31 p. f. 130
By WEATHERALL & GREEN, f.
Wentworth, 21, East-rd., area 4,900 ft., y.r. 25f. 4,600
By MESSRS. BALLS (at Clare).
Wentworth, Suffolk.—Church Farm, 111 a. 3 r. 10 p. f. 2,670

Bench Barn Farm, 155 a. 0 r. 1 p. f. 1,570
The Leys Farm, 164 a. 2 r. 25 p. f. 1,660
Chilton Field, &c., 19 a. 3 r. 29 p. f. 400
High-st., a freehold house 370
High-st., three residences with engineering premises adjoining, f. 780
Nethergate-st., Clare House, f. 640
Bridewell, six freehold cottages 130
Little Wrapping, Suffolk.—Allotment field, 4 a. 2 r. 0 p. f. 120
Freehold cottage and 1 acre 100
By M. P. PAGE and J. A. 29 p. f. 100
Wootton Bassett, Wilts.—Lower Greenhill Farm, 142 a. 3 r. 11 p. f., y.r. 22d. 4,250
July 15.—By DAVID BURNETT & CO.
Edmonton—26, Grosvenor-rd. (S), f. y.r. 32d. 700
By DEBENHAM, TEWSON & CO.
City of London.—178, Upper Thames-st., f. y.r. 145f. 3,000
Ponder's End—Hertford-rd., part of the Westfield Estate, 16 a. 0 r. 32 p. f., D. 4,500
Kensington—North End-rd., the Clarence Hotel, an improved rental of roof, for 63 yds. 2,400
Tottenham—20, High-rd., f. D. 950
By NOTLEY & CO.
Pimlico.—14, Hanover-st., ut. 31 yds., g.r. 6f, e.r. 45f. 415
By F. C. SQUIRE & CO.
Sydenham—104, Sydenham-rd., f. y.r. 36f. 605
106, Sydenham-rd. (S), f. y.r. 40f. 555
107 to 114 (even), Sydenham-rd. (S), f. y.r. 94f. 1,100
Sydenham-rd., plot of building land, area 28 poles, with stabling and erections thereon, f. y.r. 28f. 330
By JOSEPH STOWERS.
Stoke Newington.—23, Midland-gr., ut. 59 yds., g.r. 7f, y.r. 34f. 370
Kilburn.—59, Carlton-vale (S), ut. 62 yds., g.r. 7f, y.r. 34f. 500
Brighton.—80, Grand-parade, f. y.r. 90f. 1,750
Hackney.—12, Lower Clapton-rd., f. y.r. 56f. 1,000
Walthamstow—Blackhorse-lane, cottage and plot of building land, area 7,000 ft., f. 450
Blackhorse-lane, freehold cottage and 1 r. 7 p. f. 450
By HARRISON & SON (at Ipswich).
Haughley, Suffolk.—The Mere Farm, 129 a. 3 r. 1 p. f., y.r. 110f. 1,500
By MORRIS, MARSHALL, & POOLE (at Newtown).
Newtown, Montgomery.—Black Hall Farm, 158 a. 0 r. 4 p. f. 4,675
Cil Haul Villa, two cottages and 4 a. 1 r. 27 p. f. 575
Caeffili Farm, 142 a. 2 r. 21 p. f. 1,800
The Dingle Cottage and 2 a. 1 r. 29 p. f. 530
Llandanwg, Montgomery.—The Moat Farm, 236 a. 1 r. 1 p. f. 3,100
Llanwrog, Montgomery.—Gillfach Farm, 274 a. 1 r. 12 p. f. 2,500
Oerffrwyd Farm, 179 a. 1 r. 25 p. f. 1,000
Bryncau Hill land, 19 a. 0 r. 31 p. f. 100
By FLEURET, SONS, & ADAMS (at Masons' Hall Tavern).
Stamford Hill.—Seven Sisters-rd., the Woodbury Hotel, ut. 55 yds., g.r. 108f. 8s., with good-will. 39,600
City of London.—Old Chancery the Crown and Sceptre p-h., ut. 24 yds., y.r. 140f., with goodwill. 1,990
By KILAND & SONS (at Slough).
Langley, Bucks.—Windor-rd., &c., the Lea Building Estate, 32 a. 2 r. 24 p. f. 4,500
Farnham Royal, Bucks.—Beaconsfield-rd., &c., two plots of land, f. 240
July 16.—By H. DONALDSON & SON.
Dalston.—58, Queen's-road, ut. 21 yds., g.r. 5f, e.r. 42f. 335
By HAROLD GRAY.
Lambeth.—30 and 27, Vauxhall-walk, ut. 19 yds., g.r. 10f, y.r. 83f. 45f. 200
Battersea.—40 and 42, Wye-street, ut. 59 yds., g.r. 7f, w.r. 90f, 108f. 410
44, Wye-street, f. y.r. 29f. 18f. 345
By W. H. ALLETT & CO.
Notting Hill.—86, Bevington-rd., ut. 64 yds., g.r. 7f, e.r. 44f. 300
80, Golbourne-rd., ut. 69 yds., g.r. 8f, y.r. 45f. 450
By MARK LIEBL & SON.
Whitechapel-rd.—No. 249 (building site), ut. 270 yards, g.r. 15f. 790
Leyton—18, Station-rd., ut. 75 yds., g.r. 6f, e.r. 35f. 220
Forest Gate.—79, Earham-grove, f. e.r. 65f. 775
By MULLERT, BOOKER, & CO.
Hyde Park.—28, Cambridge-square, ut. 33 yds., g.r. 28f, p. 2,500
By RUTLEY, SON, & VINE.
Euston-rd.—7, 8, and 3, Diana-pl., y.r. 98f. 1,760
Holway—38, Grove-rd. (S), ut. 47 yds., g.r. 8f, y.r. 40f. 165
Finsbury Park—16 and 18, Osborne-grove, ut. 64 yds., g.r. 10f, 108f, y.r. 64f. 610
By SEGWICK, SON & WEALL.
Eastcote, Middlesex.—Field End House and 91 a. 0 r. 24 p. f., D. 6,200
Field End-rd., Freehold-cot., w.r. 61 f. 250
1 to 8, Field End-villas, f. y.r. 170f. 3,100
By HUMPHREY & PLIMPTON.
Leydsland, Isle of Sheppey.—Vicarial Redeemed Land Tax of 61 8s. 125
Whitfield, Kent.—Archer's Court Estate, 161 a. 2 r. 35 p. f. 1,150
A freehold building estate, 66 a. 3 r. 22 p. f. 1,800
Enclosures of land, 4 a. 0 r. 14 p. f. 160
Parsonage Farm, 43 a. 1 r. 8 p. f. 1,150
Chubb Farm, 21 a. 0 r. 6 p. f. 1,100
Ickham, Kent.—Bay House and 1 a. 1 r. 37 p. f., y.r. 35f. 750
Bay Lands Hop Garden, 21 a. 0 r. 31 p. f. 1,550
Brain-rd., 2 cottages and 0 a. 1 r. 5 p. f., y.r. 128f. 275
Henne Bay, Kent.—Broomfield, 2 cottages and 0 a. 0 r. 38 p. f., y.r. 14f. 250
Henne, Kent.—Little Ruckinge Grove, &c., enclosures, 107 a. 2 r. 21 p. f. 2,550
Hernhill, Kent.—Waterham Farm, 128 a. 2 r. 24 p. f. 2,500
Little Waterham Farm, 44 a. 3 r. 15 p. f., f. 1,400
Enclosure of arable land, 13 a. 1 r. 34 p. f. 400
Milsted, Kent.—Rectory Cottage and 11 a. 1 r. 25 p. f., y.r. 22f. 485

Sittingbourne, Kent.—Bell-road, Glover's House and 6 a. 0 r. 6 p. f., p. 3,750
High-street, &c., f.g.r.'s 25f., reversion in 9 yrs. By P. M. TUCKERSON (at Bath). 3,350
Wellow, &c., Somerset.—The Hassage Estate, 332 a. 2 r. 22 p. f. 4,500
Townsend Enclosure, 4 a. 2 r. 7 p. f. 115
By FLEURET, SONS, & ADAMS (at Masons' Hall Tavern).
Commercial-road East.—Nos. 416, 418, and 420, also 49, Havering-street, ut. 204 yds., g.r. 50f, w.r. 157f. 108f. 1,360
By HUSSEY & SON (at Holsworth).
Black Torrington, Devon.—Lana and Forda Farm and Garlands Moor, 419 a. 2 r. 31 p. f. 3,310
Six cottages, also coach-house and stable, f. 130
By SHINTER & WINTER (at Vaton).
Wrighton, Somerset.—Nutscale, otherwise Cowslip House, and 8 a. 3 r. 18 p. f. 1,725
Paradise Farm, 121 a. 1 r. 39 p. f. 4,250
Hailstones Farm, 131 a. 2 r. 15 p. f. 2,300
Corner Pool Cottages (four) and 1 a. 0 r. 4 p. f. 620
By SEWELL, BARNES, & BREBTON (at Harleston).
Weybread, &c., Suffolk.—Leftley's Farm, 100 a. 3 r. 38 p. f. 1,000
Weybread, Suffolk.—Improper title rent charge of 21f. 300
Wilby, Suffolk.—Prospect Farm, 68 a. 1 r. 10 p. f. 775
July 17.—By H. J. BROMLEY.
Penge.—13, Beckenham-rd. (S), ut. 73 yds., g.r. 15f, e.r. 60f. 360
By ELDRIDGE, SONS, & CO.
Penge.—Croydon-rd., f.g.r.'s 22f., reversion in 95 yrs. 520
By E. W. HARRIS.
Beckenham.—17, Barmmed-rd., ut. 80 yds., g.r. 8f, y.r. 52f. 550
By C. C. T. MOORE.
Stratford.—4 and 6, Earl-st., w.r. 57f. 45f. 500
Wanstead.—1 to 6, East-Cottages, ut. 58 yds., g.r. 10f, w.r. 98f. 155f. 570
Forest Gate.—6 to 17 (odd), Tower Hamlets-rd., ut. 57 yds., g.r. 10f, w.r. 81f. 185f. 390
Plawton.—10 and 11, Alma-terrace, ut. 65 yds., g.r. 10f, w.r. 31f. 108f. 150
Hackney.—18, Gore-rd., ut. 51 yds., g.r. 10f, y.r. 65f. 775
Ilford.—23, Richmond-rd., ut. 99 yds., g.r. 6f, e.r. 42f. 430
83, Grosvenor-rd., ut. 99 yds., g.r. 4f. 45f. 255
By NEWSON, EDWARDS, & SHERRARD.
Hamstead, Lambolde-rd., i.g. rents 50f., ut. 61 yds., g.r. 1f. 990
Muswell Hill.—Palace Terrace, f.g.r.'s 30f., reversion in 81 yrs. 615
Canonbury.—24, St. Mary's-rd., ut. 43 yds., g.r. 10f, e.r. 90f. 700
Caledonian-rd.—Nos. 165 and 167 (S), ut. 38 yds., g.r. 60f, y.r. 160f. 1,190
No. 189 (S), ut. 38 yds., g.r. 25f, y.r. 80f. 555
Fulham.—274, 276, and 278, North End-rd. (S), ut. 7 r. 88f. 880
8 and to Coomer-rd., f. w.r. 67f. 700
By INMAN SHARP, HARRINGTON, & ROBERTS.
Chelsea.—14, Walpole-st., ut. 38 yds., g.r. 1f, y.r. 65f. 960
3, Markham-rd., ut. 22 yds., g.r. 7f, 108f, y.r. 55f. 395
By ALFRED SQUIRE.
Holloway.—38a and 38b, Eden-grove, ut. 64 yds., g.r. 6f, y.r. 158f. 1,680
8, Grove-st.; also the Norfolk Arms b-h., adjoining, ut. 55 yds., g.r. 10f, y.r. 55f. 960
By STIMSON & SONS.
Lambeth.—140 and 142, Lambeth-rd., f. y.r. 72f. 1,005
152, Lambeth-rd., f. q.r. 60f. 800
174, Lambeth-rd., f. y.r. 57f. 108f. 800
175 and 59, York-st., f. y.r. 90f. 1,375
York-st., g.r. 10f, reversion in 52 yrs. 380
66, York-st., ut. 21 yds., g.r. 6f, 108f, q.r. 45f. 400
Clapham Common.—61, The Chase, ut. 664 yds., g.r. 12f, y.r. 50f. 420
Wood Green.—3, Granville-rd., e.r. 30f.; also corner plot of land in rear, f. 455
Croydon.—13 to 23, Union-st., ut. 83 yds., g.r. 24f, 108f, w.r. 193f. 230
Bloomsbury.—21, Mecklenburgh-sq., ut. 7 yds., g.r. 7f, 75f, y.r. 115f. 420
By HENRY MANLEY & SONS (at Crewe).
Nantwich, Cheshire.—The Brine Baths Hotel, Brine Baths, and Shrewbridge Hall Farm, 68 a. 2 r. 33 p. f. 15,500
Wellington-rd., freehold stables, coach-house, and land, area 1,977 yds. 1,500
By CASTLE, SON, & BOOTH (at Banbury).
Greatworth, &c., Northants.—The Greatworth Hall Estate, 289 a. 3 r. 18 p. f. 6,500
July 18.—By R. A. ENRIGHT.
Anerley.—127 to 141 (odd), Croydon-rd., ut. 95 yds., g.r. 74f, e.r. 400f. 3,610
By J. H. MALLFIELD.
Weybridge, Surrey.—Dorchester-rd., Norfolk House, f. y.r. 42f. 725
By SCOBELL & LAKE.
Chertsey, Surrey.—Guildford-st., Burwood House and 4 a. 0 r. 39 p. f., y.r. 14f. 250
84 and 86, Guildford-st. (S), f. w.r. 34f. 108f. 250
By TUTTLE & APPLETON.
Wandsworth.—25, Bolingbroke-grove, f. e.r. 110f. 1,700
By FRED VARLEY & SONS.
Finsbury Park.—142, Tollington-pk., ut. 61 yds., g.r. 21f, 28f, e.r. 70f. 675
Highbury.—34, Sotheby-rd., ut. 86 yds., g.r. 8f, 108f, e.r. 62f. 565
By WINDRUM & CLEAVE.
Bow.—43 to 69 (odd), Sherwood-st., ut. 62 yds., g.r. 44f, 108f, 22d, w.r. 43f. 88f. 2,550
Limehouse.—11, 13, 15, 17, 19, and 21, Beccles-st., g.r. 68f. 185f. 755
Poplar.—111, St. Leonard's-rd. (S), ut. 37 yds., g.r. 26f, 108f, y.r. 36f. 300
22 and 23, Manchester-rd., ut. 48 yds., g.r. 10f, w.r. 57f. 45f. 275
By A. J. SHEFFIELD.
Poplar.—1 and 3, Portec-st., ut. 71 yds., g.r. 8f, 108f, w.r. 62f. 88f. 500

not to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under notice, unless in some exceptional cases and for special reasons.]

* Denotes accepted. † Denotes provisionally accepted.

ABERGELE (N. Wales).—For the erection of stables, coachhouse, &c., Tan-y-Bryn, for Colonel J. E. Mellor. Messrs. J. Eaton, Sons, & C. nrell, architects, Stamford-street, Ashton-under-Lyne:—
Albert Emmett, Dukinfield, Cheshire.... £2,250

ASHBY-DE-LA-ZOUCH.—For the erection of five shops and temperance hotel, for Mr. W. Trussell, Burton-on-Trent. Mr. F. S. Antill, architect, Draycott, Derby. Quantities by architect:—
Vickers & Son.... £3,907 0 | H. Vernon.... £2,739 0
W. Moss.... 3,853 0 | Lowe & Son, Bur-
ton-on-Trent.... 3,604 0
A. Faulks.... 3,743 10

AXBRIDGE (Somerset).—For additions to National School, for the Managers. Mr. C. Brown, architect, Wells, Somerset:—
C. Addicott.... £320

BODMIN.—For alterations, &c., to business premises, for Messrs. Marshall & Son. Mr. W. J. Jenkins, architect, Bodmin:—
Boscombe Bros.... £1,132 | Ham Bros., Bodmin.... £974
Brown & Son.... 1,040

BUTLER'S CROSS.—For the erection of the Ellesborough Parish Hall. Messrs. Barrett & Driver, architects, 53, Blomfield-road, Maidstone:—
Webster & Co., Parsons.... £795 0
Cannon.... £1,060 0 | W. Morton.... 685 0
G. Darlington.... 918 0 | Senior & Clarke,
H. J. Wright.... 859 16 0 | Wendover*.... 660 16 6

CARDIFF.—For additions and alterations to offices, Charles-street, Cardiff. Messrs. Veall & Sant, architects:—
Lacey & Co.,
Ltd.... £1,007 17 0 | Allan & Son.... £712 0 0
F. Small.... 898 0 0
Thomas & Co.... 997 0 0 | Knox & Wells.... 883 0 0
D. W. Davies.... 971 0 0 | Shepton & Son.... 875 0 0
Beames.... 910 0 0 | J. Thomas.... 865 0 0
Nephew.... 945 0 0 | Melhuish Bros.... 850 0 0
G. Griffiths.... 945 0 0 | Symonds & Co.*.... 845 2 6

CARDIFF.—For the erection of a church, Barry Island. Messrs. Habershon, Fawcner, & Groves, architects, 14, Pearl-street, Cardiff:—

	Front	Back	Boundary.
G. Hallett.... £1,705 0 0	£45 10 0	£83 5 0	
J. W. Davies.... 1,160 0 0	34 19 6	35 0 0	
J. W. Davies.... 1,009 0 0	40 0 0	35 0 0	
Geo. Haywood.... 1,076 0 0	15 0 0	36 0 0	
T. J. Martyn.... 1,054 16 2	41 2 6	79 4 11	
C. Rendell.... 1,050 0 0	33 0 0	73 14 0	
J. Jenkins.... 1,010 16 0	22 8 0	86 5 0	
D. Hopkins.... 928 16 0	30 8 0	60 2 3	
Gibby & Cleake, Barry*.... 795 0 0	34 10 0	65 10 0	

CARDIFF.—For the erection of additions at Roath asphalt, Cycle-street, for the Corporation. Mr. W. Harpur, C.E., Town Hall, Cardiff:—
Williams & Co.,
Hoare.... £395 5 0 | G. Griffiths.... £332 17 0
D. W. Davies.... 392 10 0 | Knox & Wells.... 377 0 0
[All of Cardiff.]

HALLIFORD.—For the erection of a small bungalow on the river side, Halliford, for Mr. James Parker Ayres. Mr. H. Fuller-Clark, architect, 39, John-street, Bedford-row:—
Simpson & Co., Walton-on-Thames*.... £245

HENGOED (Cardiff, Wales).—For the erection of twenty houses, for the Building Club. Mr. P. Vivian Jones, architect, Hengoed, Cardiff:—
F. J. Howells.... £3,990 | J. H. James, 73, Kin-
Davis & Co.... 3,920 | coar-street, Car-
D. Williams.... 3,902 | diff*.... £3,800

HINCKLEY (Leicestershire).—For Board Schools. Messrs. R. J. & J. Goodacre, architects, Leicester:—
Hall & Son, Hinckley.... £6,165

LITTLEPORT (Cams).—For the erection of a cemetery chapel, for the Parish Council. Mr. H. G. Martin, surveyor, Littleport, Ely:—
Scates & Robins.... £395 0 | T. H. Summerlee.... £286 10
R. Rust.... 357 10 | Drake & Loftis,
J. W. Collins.... 320 0 | Littleport*.... 260 0
Thomas Purdy.... 298 0

HENDON.—For fully making up Milton-road, Hendon, under Section 150 P. H. Act, 1875, and kerbing, channelling, and tar-paving works in Finchley-lane, Colm Deep-lane, and Hermitage-lane, for the Urban District Council of Hendon. Mr. S. Slater Grimley, Engineer and Surveyor:—

Milton-road.		Finchley-lane.		Hermitage-lane.		Colm Deep-lane.		Total.			
£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.		
T. Adams....	1,124	4	4	412	17	6	12	5	1,948	17	6
Meston & Hale....	1,007	4	0	410	17	6	157	0	1,984	17	6
Ballard, Ltd., Child's Hill*....	997	10	0	408	0	0	118	4	1,523	14	11
Surveyor's estimate....	1,110	14	0	369	6	9	140	7	1,826	11	5

LLANDRINDOD WELLS.—For the erection of a vicarage house, Llanbedr, Radnorshire, for Rev. J. T. Beynon. Mr. R. Wellings Thomas, architect, Llandrindod Wells. Quantities by the architect:—
R. E. Davies.... £1,420 0 | D. Meredith.... £1,040 10
J. C. Evans.... 1,379 18 | E. M. Davies,
Talgarth*.... 987 0

LONDON.—For two houses on the site of the old Vale of Health Tavern, Vale of Health, Hampstead Heath. Messrs. Lowe & Goldschmidt, architects, 12, Southamptons-buildings, W.C.:—
A. W. Hudson, 87, Finsbury-pavement, London,
E.C., architects:—
J. & W. T. Inkpen.... £2,199 0 | Dabbs & Son.... £1,480 0
W. J. King.... 1,916 10 | A. Collins.... 1,175 0
Sheffield Bros.... 1,197 0

LONDON.—For rebuilding shop and premises, No. 119, Broughton-road, S.W., for Mr. A. R. Bockoc. Messrs. Blangy & Van Baars, architects, 12, Southamptons-buildings, W.C.:—
Leslie & Co.... £2,860 | Adamson & Sons.... £2,290
Langdale & Hallett.... 2,700 | F. W. Green.... 2,283
Limp & Co.... 2,486 | Syme & Duncan*.... 2,250
Lisle & Lightfoot.... 2,418 | Turtle & Appleton.... 2,220

LONDON.—For the erection of a house, stables, and laying-out garden in Frogland-lane, Hampstead, for Mr. T. Blake Frost. Messrs. Barrett & Driver, architects, 53, Blomfield-road, Maidstone:—
Blomfield-road, Maidstone:—
Clarke, 4, Queen's-square:—

House.		Stables.		Garden.	
Garrett & Sons....	£6,196 10	£1,384 0	£1,131 0	£8,911 0	
Miskin & Sons....	7,810 0	1,328 0	1,069 0	8,207 0	
Gough & Co....	5,825 0	1,316 0	983 0	8,124 0	
Lawrence & Sons....	5,721 0	1,300 0	1,075 0	8,096 0	
Simpson & Son....	5,604 0	1,300 0	1,131 0	8,005 0	
G. & I. Waterman....	5,644 0	1,300 0	1,043 0	7,970 0	
Holloway Bros....	5,550 0	1,280 0	1,120 0	7,950 0	
Geo. Neal....	5,589 0	1,212 0	1,040 0	7,841 0	
Whitehead & Co., Ltd....	5,450 0	1,250 0	1,100 0	7,800 0	
W. T. Out....	5,193 15	1,200 12	1,058 4	7,552 11	
Wallis & Co., Maidstone*....	5,130 0	1,120 0	948 0	7,248 0	

LONDON.—For the manufacture, delivery, and erection of four 35 in. and four 25 in. centrifugal pumps, hydraulic accumulator, and all accessories complete, at the new pumping-station in Lots-road, Chelsea, for the London County Council:—
Troughton & Co.... £7,380 | John Cochrane.... £6,650
Drysdale & Co.... 7,170 | Gwynne & Co.... 6,380
J. & H. Gwynne,
Ltd.... 6,887 | Easton & Co., Ltd.*.... 6,545

LONDON.—For heating works at No. 29, Charing Cross-road, for the London County Council:—
Kinnett & Co.... £430 0 | Wontner Smith &
G. & E. Bradley.... 710 10 | Co.*.... £107 15
Comyn, Ching, &
Co.... 137 10

LONDON.—Scavenging, &c., at Blackwall Tunnel, for the London County Council:—
J. Toms & Son*.... £240

LONDON.—For the reconstruction of Beckenham-lane Bridge over the river Ravensbourne, near the junction of Beckenham-lane and Bromley-road, for the London County Council:—
Fasey & Son.... £1,250 4 3 | Kavanagh &
Co.*.... £1,034 1 6

LONDON.—For the reconstruction, for electrical traction, of the tramways between (a) Camberwell Green and near Vauxhall Bridge; (b) St. George's-circus and the junction of Kennington-road with Westminster Bridge-road; and (c) Kennington Park-road and Brixton-road—capital expenditure, 73,800—for the London County Council:—
White & Co., at prices based upon those in their existing contract for the reconstruction of the Westminster to Tooting, &c., lines.

LONDON.—For two new steel cables for the Streatham cable tramways, for the London County Council:—
30,000 Feet Cable.

D. H. & C. Haggie....	£994 0 4
Dennis & Co....	878 8 0
Latch & Batchelor, Ltd....	870 0 0
Brown & Co. (Bankhall), Ltd....	800 0 0
Bullivant & Co., Ltd....	780 0 0
Wilkins & Co....	683 7 9
Newall & Son, Ltd.*....	668 0 0

9,400 Feet Cable.
J. & E. Wright, Ltd.... 346 0 0
D. H. & C. Haggie.... 290 5 2
Allan, Whyte, & Co.... 282 2 0
Dennis & Co.... 276 0 0
Hartlepool Ropery Co., Ltd.... 268 5 0
W. D. Houghton.... 235 0 0
Bullivant & Co., Ltd.... 235 0 0
Latch & Batchelor, Ltd.... 227 0 0
W. G. Glover.... 220 0 0
Brown & Co. (Bankhall), Ltd.... 209 15 6
Wilkins & Co.... 209 15 6
Newall & Son, Ltd.*.... 209 15 6

LONDON.—For the reconstruction, for electrical traction, of the Tramways between Westminster and Tooting, &c. (laying of stoneware ducts for electric cables), for the London County Council:—
Mowlem & Co.... £7,457 0 0 | Clift Ford.... £6,820 0 0
Kavanagh & Co.... 7,248 7 6 | Reid Bros.... 6,693 7 4
White & Co.... 6,999 12 6 | J. A. Ewart,
Paddington*.... 6,173 5 0

LONDON.—For alterations of and additions to the car-sheds at the Balham depot (reconstruction of Tooting tramways for electrical traction), for the London County Council:—
Martin, Wells, & Co., Ltd.... £2,763 0 0
J. McManus.... 2,400 14 6
Roberts & Co., Redhill*.... 1,990 0 0

LONDON.—For the erection of dwellings on the Preston-road and Norfolk-street sites, Poplar, for 1,304 persons, for the London County Council:—

	For all six blocks a reduction of	per cent.
Barker & Co....	£7,470	nil.
Holloway Bros....	17,394	1
Spencer, Santo, & Co....	17,250	Not stated.
Holliday & Green-wood (informal)....	16,892	nil.
F. & H. Higgs....	16,400	nil.
B. E. Nightingale....	15,807	nil.
Stimpson & Co....	15,078	nil.
F. & T. Thomas....	14,959	3½

MAIDENHEAD.—For the erection of a riverside villa on the Fishery Estate, for Mr. F. H. Grove, Messrs. Palgrave & Co., architects, Westminster:—
Belcher & Co., Ltd., St. Andrew's-hill,
Queen Victoria-street, E.C.*.... £1,600

OLD TRAFFORD.—For the erection of public baths, Old Trafford, for the Streftord Urban District Council:—
Ernest Woodhouse, architect, 88, Mosley-street, Manchester:—
Robt. Holland.... £9,465 15 0 | S. Warburton.... £8,076 2 10
P. Hodgkinson.... 9,000 0 0 | J. Bland.... 8,032 0 0
Johnson & Co.... 8,850 0 0 | Southern*.... 8,015 0 0
Ramsbottom.... 8,795 0 0 | Wm. Healey.... 8,000 0 0
Brown & Son.... 8,780 0 0 | H. Matthews.... 7,905 0 0
G. A. Fillett.... 8,760 0 0 | R. Carlyle.... 7,744 0 0
Young, Sinker, & Young.... 8,539 0 0 | Sons.... 7,695 0 0
T. & W. Mea-
dows.... 8,305 0 0 | Burgess & Galt.... 7,570 0 0
Wm. Shaw.... 8,235 0 0 | Wm. Thorpe,
J. & D. Blunn,
Ltd.... 8,208 10 0 | Old Trafford,
Peters & Sons.... 8,083 0 0 | Manchester*.... 7,448 0 0

ROCHFORD (Essex).—For the erection of a laundry at the workhouse, for the Guardians. Messrs. Greenhalgh & Brockbank, architects, Southend. Quantities by Mr. C. T. C. Wright, 3, Great Winchester-street, London:—
E. West.... £7,331 | J. Band.... £2,190
S. E. Moss.... 2,115 | W. E. Dowsley.... 2,170
Davis & Leaney.... 2,320 | F. & E. Davey,
H. Potter.... 2,213 | Southend*.... 2,005

THORNTON (Leicestershire).—For Board schools. Messrs. R. J. & J. Goodacre, architects, Leicester:—
Faulks, Loughborough.... £1,680

WEST HAM.—For the erection of farm buildings at asylum, Chadwell Heath, for the Town Council. Mr. J. C. Morley, Borough Engineer, Town Hall, West Ham:—
Dupont & Co.... £6,870 | Works Manager.... £6,281
Gregor & Son.... 6,416 | S. Farmer, Brain-
H. Carter.... 6,350 | tree*.... 5,933
C. North.... 6,287

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following lists of tenders. Mr. T. J. Bailey is the Board's Architect:—

* Recommended for acceptance.

CLEANING BOILERS AND PROVIDING NEW FIATERS.—Head Offices of the Board:—
Duffield & Sons.... £3,900 | The Brightside Foundry and Engineering Co., Ltd.*.... £279
Cannon & Sons.... 285
J. Esso.... 285
J. & F. May.... 283

CONVERTING COOKERY CENTRE INTO A HOUSEWIFERY CENTRE.—Lower Chapman-street School, St. George's-in-the-East:—
Gibb & Co.... £339 0 | F. & F. J. Wood.... £316 0
A. E. Symes.... 395 0 | G. Barker*.... 249 10
Vigor & Co.... 325 0

DRAINAGE AND SANITARY WORKS.—Basnett road School, Lavender Hill:—
J. & M. Pat-
rick.... £3,997 0 0 | J. Carmichael.... £2,360 0 0
Maxwell Bros.,
Ltd.... 2,868 0 0 | R. P. Beattie.... 2,355 11 5
Martin, Wells,
& Co., Ltd.... 2,325 0 0 | Whitehead & Co., Ltd.... 2,310 0 0
G. & Co., Ltd.... 2,700 0 0 | J. & C. Bow-
yer.... 2,370 0 0
C. Neal.... 2,508 0 0 | J. Peattie*.... 2,100 0 0
Lathby Bros.... 2,493 0
Falkner & Sons.... 2,437 0
Stimpson & Co.... 2,380 0 0

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

[See also next page.]

See also next page.

Repairs on Schedule (Greenwich, Groups 1, 2, 3, and 4).—The percentages under "a" are for repairs, measured work, under "b" for sanitary measured work (executed under the orders of the Sanitary Surveyor); and under "c" for day work generally, i.e., wages and materials:—

	Group 1.			Group 2.			Group 3.			Group 4.		
	a	b	c	a	b	c	a	b	c	a	b	c
J. & C. Bowyer .....	..	..	..	..	..	..	20	20	15	15	15	15
H. Groves .....	..	..	..	..	..	..	15	20	5	15	20	5
F. & H. F. Higgs	12½	12½	12½	12½	12½	12½	25	10	12½	25	10	12½
Holliday & Greenwood, Ltd.	12½	17½	7½	12½	17½	7½	12½	17½	7½	12½	17½	7½
W. J. Howie	20	25	10	20	25	10	20	25	10	20	25	10
Johnson & Co.	15	15	10	15	15	10	15	15	10	15	15	10
T. D. Leng .....	..	..	..	..	..	..	17½	22½	17½	17½	22½	17½
Thomas & Edge	17½	17½	17½	17½	17½	17½	17½	17½	17½	17½	17½	17½

SPECIAL SCHOOL.—"Chaucer" School, Tabard-street, Borough. Plans of the proposed Special School, consisting of two classrooms to accommodate twenty children each, were passed by the Committee on April 21.—
Bulled & Co. £3,271
Holliday & Greenwood, Ltd. 3,862
F. & H. F. Higgs .. 3,197
W. Downs .. 3,699
J. Appleby .. 3,696
Treasure & Son .. 3,045
Johnson & Co. 5,993

TOOTING GRAVENY.—Repairing fourteen Boyd's stoves:—
Wontner Smith, J. Bond .. £31 10
Gray & Co. £80 10
Landers, Ltd. 37 0
Cannon & Sons .. 35 0
Coultes & Sons .. 34 0

VARIOUS CENTRES. Berner-street (Site of Old Rice Mills), Whitechapel.—The old buildings in the possession of the Board at Berner-street, Whitechapel (which were formerly used as Rice Mills), and are situated nearly opposite to the Graded School, are at present being temporarily used for the purposes of cookery and laundry centres. It is now proposed to pull down these premises, and to erect on the site a special school consisting of two class-rooms accommodating twenty children each, with a cookery and laundry centre over it, and a yard on the top of the building; and also to erect, as a separate building (on arches), a manual training centre for twenty boys, with a room for the science demonstrator. A covered playground will thus be formed for boys underneath:—
Rice & Son .. £3,709
F. & H. F. Higgs .. 8,465
Gregar & Son .. 8,395
J. Greenwood .. 8,276
Outhwaite & Son .. 8,075
Treasure & Son .. 7,846

MOVABLE SCREENS on a running contract:—
Screens for flat floors. Screens for steeped floors.
Winch & Sons .. each £6 5 0
General Builders, Ltd. 4 12 0
Hammer & Co., Ltd. 4 0 0
Galbraith Bros. 3 19 6
Educational Supply Association, Ltd. 3 10 6
Wake & Deary, Ltd. 3 4 0
H. Bouneau* .. 3 0 0

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General Builders, Ltd. 25 0
H. Bouneau .. 13 6
Winch & Sons .. 13 6
London School Furniture Co. 19 0
T. Cruwys* .. 10 9

WORKS TO OFFICES (Dalmain-road School, Forest Hill):—
Rice & Son .. £1,437
Maxwell Bros., Ltd. 1,421
C. Parker .. 1,990
Falkner & Sons .. 1,245
W. Downs .. 1,220

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The Builder.

VOL. LXXXIV.—No. 3104.

AUGUST 9, 1902.

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"Bryanston," Dorset: The Saloon and the Staircase	Mr. R. Norman Shaw, R.A., Architect.
Architectural Association Excursion Sketches.....	By Mr. W. Curtis Green.
Clarence Wing, St. Mary's Hospital, Paddington	Messrs. Florence & Satchell, Architects.
Houses on the Grosvenor Estate, Buckingham Palace-road, S.W.	Mr. J. J. Stevenson, F.R.I.B.A., Architect.

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Architectural Subjects in Parliament.



On the long debate on "Supply" which occupied the House of Commons on Tuesday evening—a kind of debate in which all kinds of heterogeneous subjects spring up for consideration, we had one of those discussions on matters connected with architecture and building which occur but rarely in the House (the subject being for the most part regarded as not worth the serious consideration of legislators), and which, if they lead to nothing further, are of interest as indicating what are the prevalent ideas and the average knowledge or perception of the House in regard to architectural subjects.

In the present instance, though nothing to any very good purpose arose from the discussion, its tone was less unsatisfactory than is usually the case, since it served to show that in Lord Balcarras we have at all events one member of the Lower House who really understands something about Art, and who considers it a subject worthy of serious attention; an attitude of mind which is only too rare among public men in this country. Lord Balcarras took the opportunity of the Supply debate, probably the only opportunity open to him, to call attention once more to the unsatisfactory arrangement for the proper carrying out of the late Mr. Brydon's design for the large block of Government offices adjoining Great George-street. He briefly recapitulated what had been done, in the appointment of Sir John Taylor assisted by one of the late Mr. Brydon's draughtsmen, and urged again that a thoroughly competent architect ought to have been appointed to carry out Mr. Brydon's work; and he again brought forward the fact, which does not seem to be denied in any quarter, that there are no full-size details left by the late architect with the exception apparently of two details of woodwork, which were made in order to assist the surveyor in making out his quantities.

We presume the fact is that these represented details which would be carried out in a multiple form, and that any mistaken appreciation of the character of work required in them would represent a very considerable sum, in excess or defect of the estimate, over the whole building. As reported in the *Times*, however (where his remarks may have been abbreviated) Lord Balcarras seems not to have made any definite attempt to explain to the House of Commons what we have reason to believe he quite understands himself, viz. that great part of the architectural quality of a building consists in the manner in which the full-size details are worked out. This is what it seems quite impossible to get the Office of Works or the average Parliamentary man to understand; they think that because they have got all the architect's general working drawings—plans, sections, and elevations—therefore they have the whole of his intentions on record; whereas the most delicate part of the work, and that which specially requires the artist's hand, consists in the working out of the full-size details, and the manner in which the details of mouldings and ornament are (as they constantly are) modified and remodelled in the process, as the architect is led to consider more closely their effect in relation to the whole and to each other. The indications given on general contract drawings in regard to details of mouldings and carved or other ornament are, in most cases, in reality no indications at all, except sufficient to enable the quantity surveyor and the contractor to estimate what amount of work is indicated and can be claimed. Whether it would be possible to get the First Commissioner of Works, or any appreciable number of Members of the House of Commons, to understand the importance of this point we do not know; but the attempt might have been made, and the opportunity for doing so seemed to have been missed by Lord Balcarras, however excellent his intentions. Consequently the answer of the First Commissioner, practically the same as we have heard from him several times before, is merely that Sir John Taylor had a specially intimate knowledge of the requirements of Public Offices, which is

probably true, and that no variation whatever would be made in Mr. Brydon's external elevations, which we have no doubt is an honest promise intended to be kept, but which is of no value, because the small scale contract drawings do not show what were the original architect's intentions, except in regard to general design and mass; they really show nothing of the details, and it is exactly those that we are anxious about. The statement which has again been made, that the Government could not find any eminent architect willing to carry out the building according to Brydon's designs, is one we cannot understand. We presume the First Commissioner must have some reason in his own mind for repeating this statement; but we find it impossible to believe that there are not eminent men in the architectural profession, especially among Brydon's numerous friends, who would be glad to do their best to carry out the work of a deceased architect in the way that he would have wished it to be carried out.

In regard to some other points touched upon in the discussion, we may thank Lord Balcarras for having told the first Commissioner and the House the plain truth about the architectural character of the new block of the Record Office, which has been quoted in the public Press as an object-lesson as to the capabilities of the Office of Works, whereas it is in truth, as Lord Balcarras said, one of the ugliest modern buildings in London, a piece of commonplace cast-iron Late Gothic. That there may be reason in the claim that the Office of Works officials understand best what is wanted in the internal arrangement of Government buildings we do not deny; at all events, the interior of the Foreign Office is not a happy example for architects to quote; it is a very unpractical building. When the First Commissioner referred to the fact that some of the rooms in it had their windows close to the floor, to suit the elevation, with the worst results as to lighting and ventilation, Lord Balcarras answered that "that was because the Office of Works interfered so much with the architect"; but we are afraid the retort, smart as it was, will not bear investigation. We have been in the rooms

referred to, and there can be no question that the floors are got in on a level with the sills of the windows, in order to leave the exterior arrangement of the windows as the architect wished it. That is no argument for the present day, because the importance of practical convenience in a building, except with a certain clique of architects, is much more fully recognised now than it was fifty years ago; and it is only fair to Scott to remember that he was not so much asked to make a convenient building as to make a grandiose one. Such were our ideas in those days; we wanted stately Government buildings even at the cost of convenience. Now we have gone to the other extreme, and we want convenient ones even at the cost of architecture. It is quite possible to combine the two; but we do not think the Office of Works is the quarter from which to expect such a combination.

We owe thanks to Lord Balcarras also for having told the House the plain truth about what he called "that remarkable forgery at the west end of Westminster Abbey," on which we have already commented; and which, as we supposed, is an Office of Works idea. What is really wanted to bring about a better state of things is the appointment of a permanent Minister of Architecture and Arts selected for his knowledge and culture in these subjects, instead of appointing a succession of First Commissioners who are selected for merely political reasons. The system is perfectly absurd, and no good can ever come of it. The dislike to the Office of Works, of which Mr. Akers-Douglas complains, is simply the dislike of persons who understand a subject to officials who do not understand it, but who are nevertheless placed in control over matters they do not understand. As long as this goes on there will be dissatisfaction on the part of that minority of the public who do understand.

Among other subjects touched on in the discussion was the exceedingly dangerous wooden stand in close proximity to the National Gallery, which was erected in preparation for the expected Royal Procession in June, and which Mr. Ashton, the Member for Luton, stigmatised as being, considering the value of the national collection in the building, an act of "criminal folly." These are, perhaps, rather too bitter words, but we certainly think it was a most foolish and improper thing to be allowed, and are glad to notice that the stand has at all events been removed without much delay. We hope such an erection close to the National Gallery will never again be permitted. As to the subjects of the South Kensington Museum, the Queen Victoria Memorial, and the opening of the Mall into Charing Cross, on all of which questions were asked, we get nothing beyond the usual answer—want of funds; except that models of Mr. Brock's monument and Mr. Aston Webb's architectural screen round it are in process of being made, and will be publicly exhibited when they are completed. This is all quite right, and the models, when complete, will no doubt attract much interest. It is to be hoped, however, that some commencement will really be made with the Queen Victoria Memorial within a short time. It will hardly be creditable to us as a nation if such a scheme is allowed to be postponed for an indefinite period.

LESSONS FROM THE CITY FIRE.

AFTER a protracted inquiry of twelve days the Queen Victoria Street fire inquest has come to an end, and the verdict given by the jury, which comprises the answers to numerous questions put by the Coroner, contains much that is of the utmost importance to London. The ground covered by the verdict and the many questions raised by this fatal fire are of such extent that it would be almost impossible to deal with them in one article; but in general it might be said that the inquiry has shown that our methods both for preventing and extinguishing fire are inadequate, and that much must be remedied both from the Building Act point of view, from the Factory Act side, and as far as the Fire Brigade is concerned.

Dealing with the Fire Brigade first, the inquiry has borne out what we have so frequently said, that this force is badly organised, badly managed, and insufficiently equipped, the only bright spot being the courage always displayed by the individual men. The force is also undermanned, it has not a sufficient number of stations, nor has its staff grasped the technical side of their calling. The remedy does not lie merely in a selection of further fire-appliances, the addition of a few fire-escapes, or the engaging of a few additional men. It is a question of doubling the present force, having a far larger number of new stations, and modernising many of the old ones. Further, it is a question of re-equipping the entire force with different forms of life-saving apparatus, and augmenting its present steam fire engines by chemical engines for light work, and heavy motor engines for serious work. As to life-saving work, the hook ladder and the pneumatic long ladder are positively the best suited for London, and should be adopted. Then there is also the question of training the men, of providing a corps of officers something of the type and standing of the present second officer, who, as a practical fireman and former borough surveyor, very nearly reaches the ideal training a fire chief should have. And lastly, there is the question of putting the brigade into better touch with the public by an extended system of fire-calls and automatic fire alarms.

This remodelling of the force will require a chief officer of eminence, backed by a Fire Committee equipped with substantial funds. It is imperative that the matter should be taken in hand immediately, as the feeling of insecurity that prevails in London at the present time is distressing in the extreme. There is ample home talent to do this work of modernisation thoroughly; but if it came to the worst the authorities should not be afraid of going to the United States or the Colonies, or even the Continent, to find the right advice and the right appliances. Manufacturers have often had to do this upon finding their managers to be mere amateurs, and their machines antiquated.

Taking next the Factory Act question, it is evident that there is a lack of control and also a lack of logic in the administration of the Act. Of course, we are aware that the Factory Act, though nominally administered by the Home Office, is really in the hands of the London County Council. This dual control and the division of responsibility are in themselves fatal. Besides this, the actual

requirements of the Act and the regulations made under the Act are not sufficiently far-reaching nor sufficiently retrospective. The Factory Act requires amendment, and its administration alteration. We are, however, fully aware of the great difficulty of combating the vested interests which this Factory Act must necessarily interfere with. The remedy is, however, extremely simple so far as the opposition of vested interests is concerned. Make the factory employer personally responsible for the safety of his employees, and the whole of the opposition will cease.

This question of personal responsibility of the owner would also, in like manner, materially influence the administration of the Building Act, which, besides requiring amendment and bringing up to date, should really give the District Surveyors greater powers; which powers would, however, be again most energetically opposed by the vested interests, unless the question of personal responsibility were made clear. The Building Act should do everything to encourage modern forms of building construction. The famous Schedule II. of fire-resisting materials requires to be augmented, subject to such testing operations as are conducted by the British Fire Prevention Committee or other independent bodies. The classification of warehouses, shops, and such other buildings, requires revision and sub-division; and we should also be in favour of a Building Act (such as will at present be found in Vienna, in Berlin, and in some of the American cities), where the Act differentiates according to the "zones" or districts, and distinctly discriminates between different classes of buildings. To put a shop in the City, in Hampstead, in the West End, and in Dulwich, all under one identical rule, is impractical; and a block of flats in the suburbs requires different treatment to a block of flats in the West End. The vertical protection of windows, the use of impregnated wood, and other minor matters, all require most careful consideration.

Instead, however, of having, as we have now, preventive and protective methods against fire, inadequately controlled by numerous Acts, administered by numerous bodies, and generally handled in a cumbersome and unwieldy manner, we think the time has come when the structural portions of the Building Act and of the Factory Act, together with the London Fire Brigade Act, should be brought together, remodelled, and dealt with as one Fire Act under one authority. Whether this authority be the London County Council, the Home Office, or some new statutory authority, is almost immaterial, so long as the whole matter be dealt with by one authority and one set of officials. The sanitary portions of the Building Act should be embodied with the existing Public Health Act, whilst the technical portions of the Factory Act, with such other minor Acts as relate to explosives, oil, &c., should be dealt with in an enlarged Factory Act proper. Theatre regulations of a structural character would come under the new Fire Act. This would be a logical separation of legislation, authority, and administration, by means of which many mistakes and also much expense could be avoided.

We fear, however, that we shall have to wait for some very great catastrophe before the necessary reforms are carried out. That

a catastrophe will occur is only to be expected, and in all probability it will be annexed with some theatre or similar of public entertainment. We shall only too surely find how the Building the theatre regulations, the Factory and the Fire Brigade authorities will, their inappropriate requirements and dual irresponsibility, collectively have in preventing some great calamity; when the outcry comes that "some ought to be hanged," we shall find, as that no one is responsible. It is hoped that the day when this occurs is still far off, but since last safeguard, *i.e.*, the Fire Brigade, has given way, as has been seen fortunately at the Barbican and Queen Victoria-street fires, the evil day can scarcely be postponed. Formerly the Londoners used to say that, no matter what was going there was in fire-preventive matters, the fire brigade would turn up at the last moment and save the situation. Since our experience, however, in the various unfortunate fires we have had during the present management, even this sense of security has been taken away from us.

It may sound pessimistic, but the Victoria-street fire with its loss of life is quite plainly foretold at the Barbican inquest by one of the witnesses, and we have to attribute it to good fortune that it was not a worse scandal found at the Telephone Exchange, London-wall, where the fire fortunately, however, broke out when the employees were absent. If in that case there had been no one to save in broad daylight, there would have been a far more terrible tale to tell of fire inefficiency than in the case of the Queen Victoria-street fire.

As we have said above, it is impossible to go into detail with the many questions raised out by the Queen Victoria-street fire, but we can only give a short general indication of the unfortunate state of affairs.

It would, however, take this opportunity to add a few words as to the conduct of the inquiry. These inquiries, held under the Inquest Act of 1888, have a number of points but also some equally bad. To begin with, the Coroner, however conscientious and painstaking, probably has not in his mind, and to put the examination-in-chief into his hands is a mistake. The examination-in-chief throughout this inquiry was a failure, and the Coroner's position was only retrieved by the excellent summary which he prepared and presented to the jury in the form of an address. The summary properly rested with the City Coroner, who, attending on behalf of the Corporation, might be said to have taken the place of prosecuting counsel. His cross-examination was brilliant, and brought out the main facts of the case. The counsel led by the London County Council tactfully took up the position of counsel for two of the defendants, and tried to refresh the Fire Brigade and the London County Council Fire Brigade's Committee. Particularly, the General Electric Co.'s counsel most tactfully handled his client's somewhat unfortunate case) was practically useless for another defendant. Another counsel representing the parents of one of the deceased, again acted as a prosecuting counsel. On the top of all this there was a very inquisitive jury with a somewhat

irrepressible foreman. No doubt this all had its advantages, but the fact remained that out of twelve days' hearing quite six were superfluous. Then again, the jury showed a quaint desire to investigate matters on their own account out of court, and we even hear of their being entertained to a fire demonstration at the Metropolitan Fire Brigade headquarters under the guidance of Captain Wells, which—to say the least—seems rather irregular. A far more judicial inquiry was really necessary, as in the case of the Barbican and Cripple-gate fires. A different class of jury was also necessary. A strong legally trained coroner should have been retained, and outside evidence should have been taken to a far greater extent. The result of this inquiry will cost the ratepayers of London many millions of money, or to put it quite plainly, the unfortunate state of our buildings and factories has been so accentuated by the Fire Brigade mismanagement of recent years, that it becomes imperative for the Government to step in with severer legislation and heavier Fire Brigade expenditure, by which means the ratepayers' pockets must naturally suffer. For these reasons alone, surely, a very different form of inquiry is desirable.

Probably this inquiry to which we refer will not be the end of the matter. There is talk of a Royal Commission or a Parliamentary inquiry; and if this is the case we can only say that further investigation can but be an excellent preliminary to the remodelling of legislation and the modernisation of our fire-fighting forces.

It is, however, the remodelling of our legislation and modernisation of our fire brigade which even this preliminary inquiry has shown us to be much in need of, and everything that can now be done to obtain a rapid and thorough alteration and improvement should be welcome throughout London.

NOTES.

Commons and Footpath Preservation Society.

THIS active and most valuable Society has issued no detailed Report of its work for three years past; but the period that has elapsed since then has included more important work than in any previous period of its existence. The last Report was issued shortly after the amalgamation of the Society with the National Footpath Preservation Society. Since then the cases referred to the Society for advice and assistance have amounted to more than a thousand, and a great increase has taken place in every department of the Society's work. The Report just issued gives a good idea of the extended and valuable work which the Society has performed in securing public rights in land the enclosure of which has been threatened. They have especially secured a success in dealing with the subject of what are called "Fuel Allotments" in commons land, and in obtaining from the Charity Commission a formal admission that the Commissioners are not entitled to sanction the sale, or letting on building lease, of any part of an allotment falling under the definition of "Fuel Allotments." The nature of the influence which the Society has exercised in other cases may be typically represented by the following extract from their reports on special cases:—

"Hoylake and West Kirby Improvement Bill, 1900.

—This Bill, as introduced, was in effect an enclosure scheme, for, out of an area of 398 acres of common land known as Great Meols Common, Hoylake, Cheshire, the District Council proposed to maintain only about twenty acres for recreation grounds. They further proposed to construct a sea-wall and embankment with a promenade, and other works, 2,130 yds. in length; to make four streets on another portion of the common, and to sell or allot the whole of the remaining area for building purposes. The Bill was strenuously opposed by the Society, and it succeeded in transforming a most objectionable scheme into one which it confidently expects will be of great advantage to the neighbourhood and the public generally. While retaining the powers as to the sea-wall, new streets, and recreations grounds, which were all in the nature of public improvements, a clause was inserted, at the instigation of the Society, providing for the vesting in the Birkenhead Corporation of fifty-four acres of the common—the land being dedicated for the use and recreation of the public as an open space. Only forty-six acres out of the 398 acres affected were allowed to be absorbed."

A Society which secures such results assuredly merits the support of the public.

The Height of London Buildings.

THE recent fire in the City has drawn attention to some of the dangers attaching to high buildings in London. There is, however, another side to the question which is daily becoming more obvious as large buildings are from time to time erected in parts of London some distance from the City, and where one is accustomed to sufficient light and air. An example of this tendency may be now seen in the blocks which have recently been erected at Knightsbridge, at the commencement of the Hammersmith-road and nearly opposite the barracks; they give the road an appearance of something almost akin to a tunnel, reminding one very strongly of some of the American streets. But the United States can stand high buildings much better than this country, where the aggregate amount of light is much less than in the clear atmosphere across the Atlantic. It is becoming increasingly obvious that both from the point of view of safety from fire as well as from that of health and of aesthetic considerations, an independent inquiry should be made as to the increasing height of London buildings.

The Fire and the Factory Act.

THE jury have found the premises of the General Electric Co. to be a workshop, and if this finding is right in law, the company is liable to a fine, under Section 136 of the Factory and Workshop Act, not exceeding 100*l.* It is somewhat curious to find that under the Factory and Workshop Act, 1901, if this building is a workshop, again in this respect the London County Council would seem responsible for not having been aware that the building was not provided with adequate means of escape under Section 14 of the Act. That section provides, as regards workshops of which the construction was not commenced before January 6, 1896, that "it shall be the duty of the Council to examine every such workshop," and to give a certificate; and in respect of workshops not within the above provision, "from time to time to ascertain whether all such workshops within their district were provided with such means of escape" as the Act requires; and although in Section 14 the District Councils were denominated, by Section 153 these duties and powers are placed in the hands of the

London County Council as regards the Administrative County of London. Protective legislation such as that contained in the Factory and Workshop Act, unless it is rigorously enforced, only tends in the wrong direction, since it diminishes the personal responsibility of the private individual; and it is a question of the greatest public importance to accurately ascertain in the present case whether there has been an evasion of the law, and, if so, how this evasion has been possible.

THE Borough of Falmouth, in 1899, suffered from a serious epidemic of enteric fever, and

Dr. Buchanan has been deputed by the Local Government Board to visit the town again and make a special report, which has just been issued, on the measures which have been taken to improve its sanitary condition. It shows that there is a great deal to be done before Falmouth can be considered in a sanitary state. "Sewage disposal," says Dr. Buchanan, "was being effected exactly as in 1899. The Market Stand sewage tank continued to leak, and the state of the whole foreshore of the harbour was as objectionable as ever. It was satisfactory to find, however, that the necessity of an adequate scheme of sewage disposal had at length become generally recognised in Falmouth." Since 1899 the Inspectors of Nuisances have applied the smoke test to the majority of the house drains in Falmouth, with the result that they were nearly all found more or less leaky, and that serious defects were the rule rather than the exception. A good deal has been done, we gather, to remedy these defects, and Dr. Buchanan pays tribute to the public spirit of many of the inhabitants in their readiness to carry out improvements and to bear their share of the cost. At the date of his recent visit two-thirds of the inhabited houses in Falmouth had been put into a better sanitary condition. In regard to the public water service Dr. Buchanan points out probable sources of pollution in the gathering ground. The Report sums up to the effect that considerable progress has been made, but that "there remain a variety of important public health questions which call for serious and substantial effort."

DR. WHEATON'S Report to the Local Government Board on the recent prevalence of diphtheria at Fishguard and Goodwick (Haverfordwest Rural District) reminds one only too much of the pictures drawn by Kingsley, more than half a century since, in "Two Years Ago." Fishguard seems to be absolutely without sanitation of any kind. "The sewage runs into the harbour, accumulating on the foreshore, the effect of the tide in removing it being almost *nil* owing to the landlocked character of the harbour." Excrement disposal is chiefly effected by means of pail privies, the contents of which are allowed to overflow and accumulate on the floor, and when removed are frequently thrown over a wall, or on the piece of waste ground traversed by the sewage of the town on its way to the harbour. A number of dwellings in the town have no privies; the inhabitants use pails inside the houses, the contents being thrown down in the nearest

available place since they have no garden ground.

"Water is supplied from a number of wells, springs, and roadside spouts. Some of these sources are so circumstanced that there is risk of the water furnished by them being fouled by collections of filth in their neighbourhood, especially in the case of springs and wells, and from drains and sewers in their vicinity. The Fishguard Water Company have obtained powers to supply this place and Goodwick, but have not furnished any supply up to the present."

The conditions reported at Goodwick are an almost exact repetition of the same story. The Report was made in December last (the Reports to the L.G.B. are not generally published till a good while after date). We do not know whether anything has yet been done to remedy this unhappy state of things.

A REPORT made to the Local Government Board by Dr. Darra Mair, on a temporary outbreak of enteric fever at Coventry, is an interesting example of the manner of hunting down the causes of disease by a systematic analysis of the statistics. We have not space to give a sketch of the argument, for which we refer the readers to the Report*; it is sufficient to say that a well in one of the courts was one of the causes suspected, although analysis of the water showed nothing injurious; yet the numerical proportion of patients who had drunk of the water of this well pointed to it as a cause of the disease. At last it was discovered that the date of outbreak of the disease, and of its prevalence, almost exactly coincided with the laying of some new water-mains in the neighbourhood of the well, forming temporary trenches through which unwholesome matter must have percolated into the well. When the work was done and the trenches filled up, the enteric subsided. It is a curious story in sanitary inspection, and shows how necessary it is to be careful what is done with ground in the vicinity of a drinking-well.

THE Church of St. Bride, Fleet-street. The repair of the upper portion—about 55 ft.—of the steeple of St. Bride's Church has now been completed by Messrs. J. Thompson & Sons, of Peterborough, and the scaffolding is taken down. After an examination of the structure by Mr. R. C. Murray (architect to the vicar and churchwardens), who made a report upon its condition, the repairs were carried out under Mr. W. D. Caröe's directions and supervision. It was found that some of the masonry had become decayed, and that the jointing was much corroded by the use of iron clamps. For the latter have been substituted clamps of copper; the worn stones have been replaced with new ones, whilst care was taken to follow exactly the lines of Wren's design. Whilst the height of the steeple suffered no diminution on the present occasion, the spire was diminished to the extent of 8 ft. by Sir William Staines in 1764, when, having been greatly damaged by lightning on June 18 of that year, 85 ft. of the stonework was removed and rebuilt, at a cost of about 3,000l. The steeple was struck also in 1803, and again on July 15, 1887; in the summer of

* All these Reports, to which we refer from time to time, can be obtained from Eyre & Spottiswoode, London; Oliver & Boyd, Edinburgh; and E. Ponsonby, Dublin.

1888 the exterior of the fabric and the tower and steeple were repaired. Two scientific treatises upon the catastrophe of June, 1888, will be found in the *Philosophical Transactions* for that year. An interesting account of it, written by E. Delaval, F.R.S., to B. Wilson, F.R.S., is preserved in the Soane Museum. The church, built in 1180 and the tower and steeple, built in 1764, cost 11,430l. The tower, with its parapet, rises to 120 ft.; the ball of the vane is 226 ft. above the ground.

LETTER FROM PARIS.

The arrangement of the Art Museum in Petit Palais, somewhat retarded by financial difficulties, will enter on a new phase owing to the legacy of M. Dutuit, a well-known collector who has recently died at Rome, and has left to the Museum a large collection of bronzes, Greek and Roman, of ivories, faïence, carved furniture, pictures, and engravings. Besides this collection, valued at 4,000,000 fr., and which, by the terms of his will, must on view before January 11 next year, M. Dutuit has also left to the City of Paris 3,000,000 fr. in money, which will materially assist in the completion of the Museum. The Municipal Council of Paris, the session which is formally over, will hold a special meeting to accept and give orders as to the unexpected legacy.

During the recess, the Service des Beaux-Arts is occupied with the completion of the Hôtel de Ville decorations. In the Council Library the fine allegorical ceiling by Picard has been fixed in position. It represents "L'Etude et la Pensée s'élevant vers la Lumière." In a chamber adjoining the Salle des Fêtes the decorative paintings by Cheret will, in a few days, be surrounded by their framework of decorative design in wood and gold; and in the Salle du Budget the large paintings by M. Detaille, exhibited in the last Salon and already described in these columns, will be fixed in position before the reassembling of the Council.

Before separating, the Council has decided something to repair the neglect, up to this time, of one of the finest recent buildings in Paris, the Mairie of the Xth Arrondissement, the principal façade of which has been illustrated in these pages, and which is at last to receive the decorative sculptures without which it is incomplete. These are to consist of statues, executed in stone, personifying the Industries of the district, and a sum of 140,000 fr. has been voted for the decoration of the building, which is the last work of its architect, M. Rouyer. In addition to the sculpture, various ceiling and wall paintings will adorn the interiors; and the commencement of their next session the Municipal Council will proceed to select artists who are to carry out these works, and also to complete the panels in faïence commenced some years ago by Theodore Duret for the grand staircases of the Hôtel de Ville. Probably during the same session the Council will take up the question of the Mairie of the VIIIth Arrondissement, at present inadequate for its purpose, and which it was once proposed to instal in the Hôtel de Paiva. It is now proposed to rebuild the Mairie on the present site, after a public competition. The cost is estimated at 1,000,000 fr.

As to the Hôtel de Paiva, in spite of its artistic character and the important work which decorate it, it will disappear like many other fine buildings, among which is numbered the sumptuous mansion built by Queen Christine of Spain, not far off, in the Avenue des Champs Elysées, and which is recently occupied by the Duchesse d'Ursula. Thus one more historic house will pass away to be replaced by "maisons de rapport" of enormous dimensions.

Among the official decorations conferred on July 14, we may mention especially the one of "Officier" of the Legion of Honour conferred on M. Selmersheim, Government architect and "Inspecteur-Général des Monuments Historiques." He is an artist of much taste and a learned scientific architect, and every way worthy of the distinction accorded him.

The new buildings of the Académie de Médecine, in Rue Bonaparte, are rapidly approaching completion under the direction

R. Rochet, the architect to the department of L'Assistance Publique, and the building will be opened in November. The works of engagement of the Musée and of the Conservatoire des Arts et Métiers are also in active progress. At the Bourse the basement of the lateral wings is completed; and at the Conservatoire the new buildings in Rue Vaucauson and Rue du Vert-Bois are ready for the fitting up of the laboratories, which will probably be working order by the end of the year.

The Académie des Beaux-Arts has been employed in electing a member to fill the place of the late M. Benjamin-Constant. After four tours de scrutin, M. Ferdinand Humbert was elected by thirteen for M. F. Flameng, and one each for M. Toudouze and M. Albert Maignan. The new academicien was born at Paris in 1842, and was a pupil of Picot, Cabanel, and Fromentin. He received medals in the Salons of 1866, 1868, and 1869, and in 1878 the decoration of the Legion of Honour, in which he is to-day "Officier." He is professor of Drawing at the Ecole des Beaux-Arts. He commenced his career as a historical painter, but subsequently gave himself chiefly to portraiture. Among his works may be mentioned "La Fuite de Néron," "Ambroise aré et le Duc de Nemours," "St. Jean baptiste," "Christ à la Colonne," and decorative panels in the Mairie of the XVth Arrondissement, at the Paris Hôtel de Ville, and at the Panthéon.

The Commission du Vieux Paris has started an annual competition of photographs of the most and most interesting sites in Paris, with the view of preserving them as records in the Carnavalet Museum. The competition, the conditions of which will be shortly published, will probably attract a great many amateur photographers who have taken views of various neglected or little known corners of Paris, as well as on the river banks and in the Parisian markets, to the picturesque side of which the Commission has specially called attention. It is also proposed to recommend to the attention of competitors the sixteenth-century houses in Paris, of which a good many still remain, and their architectural and sculptural decorations.

The Cluny Museum has been presented with a fine carved table of early sixteenth-century date, the gift of Mr. G. Donaldson, who was Vice-President of the furniture section in the 1900 Exhibition.

The Louvre will shortly exhibit the Italian and Dutch pictures presented by the Comte de d'Andeuil, the grandson of Diderot. Among these are four belonging to the Early Venetian and Florentine schools of the fifteenth century, two of which are attributed respectively to Gian Bellini and Antonello di Messina. The other two, representing mythological scenes, are attributed to Piero de Cosimo. Among the Dutch pictures is a one of Bathsheba, by Cornelius Drost, one of the best pupils of Rembrandt.

The Grand Prix de Rome, in the section of painting, has been awarded to M. Paul Sieffier, a pupil of M. Gérôme; and in sculpture to M. Alphonse Terroir, pupil of Cavelier and of M. Barrias.

THE ARCHITECTURAL ASSOCIATION'S EXCURSION TO BANBURY.*

ON Wednesday morning the party drove from Banbury to Chacombe, in Northamptonshire, on the banks of the Cherwell, which divides the county from Oxfordshire. Here a stay of one hour was made, and most of the party settled like bees round the Priory porch, which proved to be about the most sketched subject. The house appears to date principally from the early seventeenth century, but has had late additions of side wings in rather questionable taste, the central projecting porch, with its curious scroll gables, reminding one of Dutch work, is interesting, and being the only part of the house with any architectural character, came in for an undue amount of attention. Not far from the house is the church, a rather pleasing example, with some good detail. A sketch of the porch was included amongst our illustrations in last week's issue. From Chacombe the drive was continued to Cropredy, a few minutes being spent "en route" at Williams-cote to see the House and old school. Cropredy has many historical associations with the wars between Charles I.

and his Parliament, and in 1644 a battle was fought here between the King and Sir William Waller, resulting in the defeat of the latter.

Cropredy Church is dedicated to St. Mary. It was restored some few years since by Mr. Ewan Christian. Fragments still remain of an early church which stood here in the thirteenth century, but since this date it has been almost entirely rebuilt, and now consists of a nave with four bays, clearstory, north and south aisles, south porch, a large chancel, with a vestry and priest's chamber at the north-east angle, and north and south chantries. The nave occupies the site of the earlier church, of which only the east wall remains. Above the chancel arch are very early remains of a fresco. In the south aisle wall are two arched recesses for tombs, and above is a fine thirteenth century window of three lights. The chancel was rebuilt about 1320, after which the remainder of the church was gradually rebuilt piece by piece, commencing probably about the middle of the fourteenth century with the south aisle of the nave. About the close of Edward III.'s reign the nave was entirely rebuilt, with arcades of two moulded orders, without capitals. During the latter part of the fourteenth century the north aisle was rebuilt and remodelled, being extended to form a north chantry, and the three-light windows are good examples of early perpendicular work. At the east end of both aisles are woodwork screens, that on the south is fourteenth century work, and is illustrated in Parker's "Glossary." There is also a very fine old brass eagle lectern. The present tower was commenced in the fifteenth century, and carried up to the belfry stage; the remaining portions were not completed until some years later, and are hardly so good.

The next place to be visited was Hanwell, where luncheon was taken under the shadow of the old castle buildings, which Leland describes as "the gallant house of Hanwell." Here was good material for the water-colourists of the party, who no doubt would like to have spent more than the two hours allotted. The Castle was formerly of some considerable importance; it was erected in the reign of Henry VII., and was a quadrangular building with massive towers at the angles, of which only one, with a portion of the south front, is at present remaining—now converted into a farmhouse. The church is dedicated to St. Peter, and was illustrated in our issue last week; it has several interesting features, and has fortunately been but little restored. The nave arcade has caps with figures not unlike those in Adderbury Church, though less refined and much inferior in execution. In the north aisle are the remains of a Decorated reredos, a series of small canopied niches and quaint, well-modelled figures of knights and ladies; this, together with the Jacobean font cover, we illustrated last week.

After leaving Hanwell a short drive brought the party to Wroxton Abbey, the old home of the North family. The house and garden were first inspected, after which the church was visited. The house is approached by a drive with lawns on either side, and appears to lie rather in a hollow. The building as at present, dates principally from the early part of the seventeenth century, and though interesting, can hardly be said to have great architectural qualities. It lacks the setting of a good garden, for lawns sweep up to the house on all sides. The abbey occupies the site of an ancient priory of Augustinian monks, founded in 1230 by Michael Belet, which flourished until 1538, when the property passed to Sir Thomas Pope, the founder of Trinity College, Oxford, who gave it to his new college. The old monastic buildings are said to have been destroyed by fire, and in their place the present building was erected by Sir William Pope in 1618.

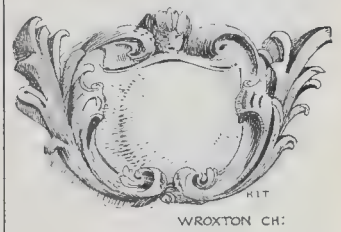
The estate came into the North family by the marriage of Lord Francis Guildford with Lady Frances Pope in the reign of Charles II., and at this date some alterations to the building were made, and in the last century, Francis the fourth Earl of Guildford, employed Smirke who designed the library and made other additions to the house. Some few parts of the old monastic buildings were preserved, including an arch, probably an entrance door, some of the passages in the lower part of the building, and some parts of the chapel.

The entrance porch is a curious, though not very beautiful example of Jacobean work. It adimits to the great hall, 45 ft. by 24 ft., at the south end of which is a music gallery sup-

ported on carved columns, and the hall is panelled in oak. There is a portrait of Sir Thomas Pope, said to be the work of Holbein, and other family relics. In the house are many very fine pictures, including several Holbeins.

The grounds surrounding the house consist principally of lawns and belts of trees, although on the east side are the remains of terraces; not far from the house is a good marble sundial, of rather unusual form, with a moulded circular table, supported by four draped female figures, standing on a square pedestal decorated with rams' heads and sprays of fruit and flowers; it shows marked Italian influence in its design, and indeed one would rather suspect its being an importation from Italy.

Not far from the house is the church, situate on high ground in the village. It contains many good monuments to the Pope, Guildford, and North families; but the most interesting feature in the interior is the tomb to Sir William Pope, who was created Earl of Downe by Charles I., and who died in 1631. It is on the north side of the chancel, close to the altar, and is surrounded by a good iron railing. It was made by Nicholas Stone, the master mason of Inigo Jones. At the date we may suppose it to have been executed, that is, shortly after Sir William's death, Stone was engaged on a number of such monuments in various parts of the country, and was doing work for Inigo Jones at Greenwich. Under



the guiding genius of his great master, he had received a training such as probably no other mason then possessed. He had been foreman mason to Jones at Whitehall in 1620, and since then had acted in a similar capacity on many works. Thus he had acquired a very intimate knowledge of good Classic detail, and it is interesting to note that when engaged on his own work he should revert to the traditional style of his youth, for although the mouldings, the proportion of the columns, and other points about the monument plainly show the classical training he had received, yet the character of the whole design is distinctly that of the Jacobean period. The figures of the two kneeling knights are very beautiful, and the tomb could hardly be excelled either as regards the composition or the execution. It is a type of work that might well be studied and measured, rather than the earlier examples of this period, which are not nearly so refined, as it forms one of the most important connecting links between the architecture of the Elizabethan period and that of Inigo Jones.

On Thursday morning the first place to be visited was Bloxham, where the church (see lithograph), with its grand spire, claimed all the attention. Some of the church is of very ancient date, and the earliest parts belong to the time of King Stephen, who, according to Skelton, the historian of Oxfordshire, built here a chantry and gave two fields, to say masses for the repose of the soul of his mother Adela, daughter of William the Conqueror. A considerable part of the existing church was erected during the reign of Henry VI. by Humphrey Duke of Gloucester and Henry Chicheley, Archbishop of Canterbury; the latter endowed it with lands and a priests' house. During the Wars of the Roses the church suffered considerably, and in the reign of King Henry VIII. Cardinal Wolsey is said to have repaired and beautified it, at the same time adding the steeple. The nave has well-proportioned pillars, and is in four bays. There are some very late brasses dating from the middle of the eighteenth century. The church is entered through the tower; it is 110 ft. long and 70 ft. wide, including the side aisles. The chancel is 20 ft. wide. There is an interesting capital on the west side of a chapel terminating the eastern extremity of

* Continued from last week, page 76.

the north aisle; in the centre is the head of St. George, and other saints are ranged round. On the south side is a chapel containing several monuments to the Thornycroft family, and close by is a stone font. The fourteenth-century windows have zigzag and other Norman ornaments made up at a later date. The tower and spire are both in construction and design among the finest to be met with. The interior of the tower at its base is 14 ft. 6 in. by 16 ft. 9 in., and the height to the top of the spire is 195 ft. The spire has repeatedly suffered from lightning, and, according to Skelton, was damaged in the great storm of 1703; it was again struck in 1770 and 1780, on which latter occasion it is said that the electric fluid was conducted by the chime wires to a chamber where the clock was placed, and forcing itself into the body of the church did considerable damage. But the most terrible catastrophe which befel the spire was on the morning of December 3, 1790, when it was again struck by lightning, which rent a large fissure in the western face near the top.

The west door of the church is very quaint. Here the Deity is represented above the arch under a rich canopy, on the seat of judgment, with a globe in his hand. On the right is the half figure of an angel upholding the cross, and on the left another angel with the spear and crown of thorns. At the feet of the Deity are angels sounding trumpets, awakening the dead to judgment, and on the outer curve of the arch are the twelve apostles seated within niches. On the right of the Deity the stone coffins are represented as opening, from which the dead arise to judgment. On the opposite side of the doorway is the entrance to hell, represented by the open jaws of a monster, into which the condemned are being hurled.

After leaving Bloxham, a short stay was made at Barford St. John, where the manor house and church were visited. The latter is quite a small building, and consists of a nave only. It was rebuilt in the reign of Edward III., and only a small part of the church which existed here before was retained. It has a tower at the south-west, open to the church. The nave windows are decorated. The font is early Norman.

The drive was now continued to Hook Norton, on the borders of Warwickshire; here the party took lunch, and after visiting the church (see lithograph) proceeded to Broughton, a drive of about six miles. On arriving there the old church was first inspected; it contains a few ancient tombs of the Saye and Sele family and some interesting window tracery. Broughton Castle adjoins the church on the south side. The house is completely surrounded by a broad and deep moat whose still waters reflect the grey old walls of the castle. (See lithograph plate in our last issue.) A stone bridge crosses the moat, and the grass court is entered through the old battlemented gatehouse of Edwardian days. Few houses have greater interest to the architect, for here are to be seen examples of three early periods of which there are but few remains to be met with. The earliest of these periods claims a large part of the present structure, for it was between the years 1201 and 1207 that John de Broughton built the original castle. The groined passage leading from the hall, the chapel, with its stone altar and curious window openings, the dining-room, the priests' room, armoury, and hospital all belong to this period. In 1369 the castle was bought by William of Wykeham, with a view of settling it upon his sister Agnes and her family. Thomas Wykeham obtained a licence to "crenellate his house at Broughton" from Henry IV. in 1406; he died, leaving an heiress, who married William, second Lord Saye and Sele, and in the hands of that family the property now remains; at present it is the residence of Lord Algonson Gordon-Lennox.

In the hands of the present occupant Broughton Castle has been very well looked after, and those of the party who could remember the former state of house and garden were much impressed by the great improvements since Lady Gordon-Lennox has devoted so much attention to the old place. Inside, the house has been carefully renovated, not restored; the plaster has been removed from old walls, and much that was formerly covered up is now revealed, including the beautiful groining in the passage leading from the hall. The dining-room, were it not for the sash windows inserted last century, has quite a Medieval appearance, with its early fourteenth-century vaulted roof, and linen panelling dating from



the time of Henry VII. The great hall, 55 ft. by 26 ft., is a fine example, though, unfortunately, the ceiling is sadly out of keeping with the rest of the room. An interesting relic here is the coat worn by Oliver Cromwell, which hangs on the wall. Leading from the hall is the magnificent oak-panelled drawing-room, 20 ft. high. The entrance-lobby to the room is a very fine piece of work, and the panelling is delicately moulded. The work was executed about the year 1603, and a replica of the room was recently exhibited in the Paris Exhibition. Above the dining-room is the boudoir with a very fine pendant ceiling, and adjoining is a long gallery, 90 ft. long by about 12 ft. in breadth, with oriel windows containing some old glass and many good pieces of sculpture, including an interesting marble medallion of Inigo Jones. A staircase leads on to the leads, from whence a fine view may be obtained over the gardens. The eastern side of the castle is the more ancient. This was erected by the De Broughtons. There is a small tower on the south-east angle with loop-holes for the discharge of arrows. The north front was principally built for the family of Fiennes about the year 1544. Those who have read the interesting diary of Celia Fiennes will remember several allusions to Broughton. Buck's view, drawn in 1722, shows that the castle and contiguous grounds were encompassed with embattled walls and towers. These are now for the greater part removed, but one of the old

walls still exists between the house and gatehouse. Some ancient buildings used as out-offices skirt the moat on the eastern side. These are probably coeval with the oldest parts of the castle.

The gardens form a very beautiful setting to the old house, and when we consider that they have been created quite within the last six years the result is little less than marvellous. Along the west front of the house is a gorgeous flower border with carefully combined masses of colour, showing much care and taste. On the broad space between the house and moat is a parterre with herbaceous plants, rather than the lines of lobelia and geranium that we may hope now belong to a past age. Close adjoining is the curious sundial, with its topiary gnomon telling the hours on figures laid out in box, round which is the motto, also in box, "Give light to them that sit in darkness, and guide our feet into the way of peace." The idea was doubtless borrowed from Wykeham's ancient garden at New College, Oxford, shown in the engraving in Logan's view of Oxford. On the south-west side of the house is a charming little rose garden laid out in a pattern of fleur-de-lis. In the centre stands a sundial raised on two grass steps, with the quaint motto:—

"I tell men howlie how the shadowes fly,
For men are shadowes, and a shadowe I."

The visit to Broughton will long be remem-



Compton Wyniat.

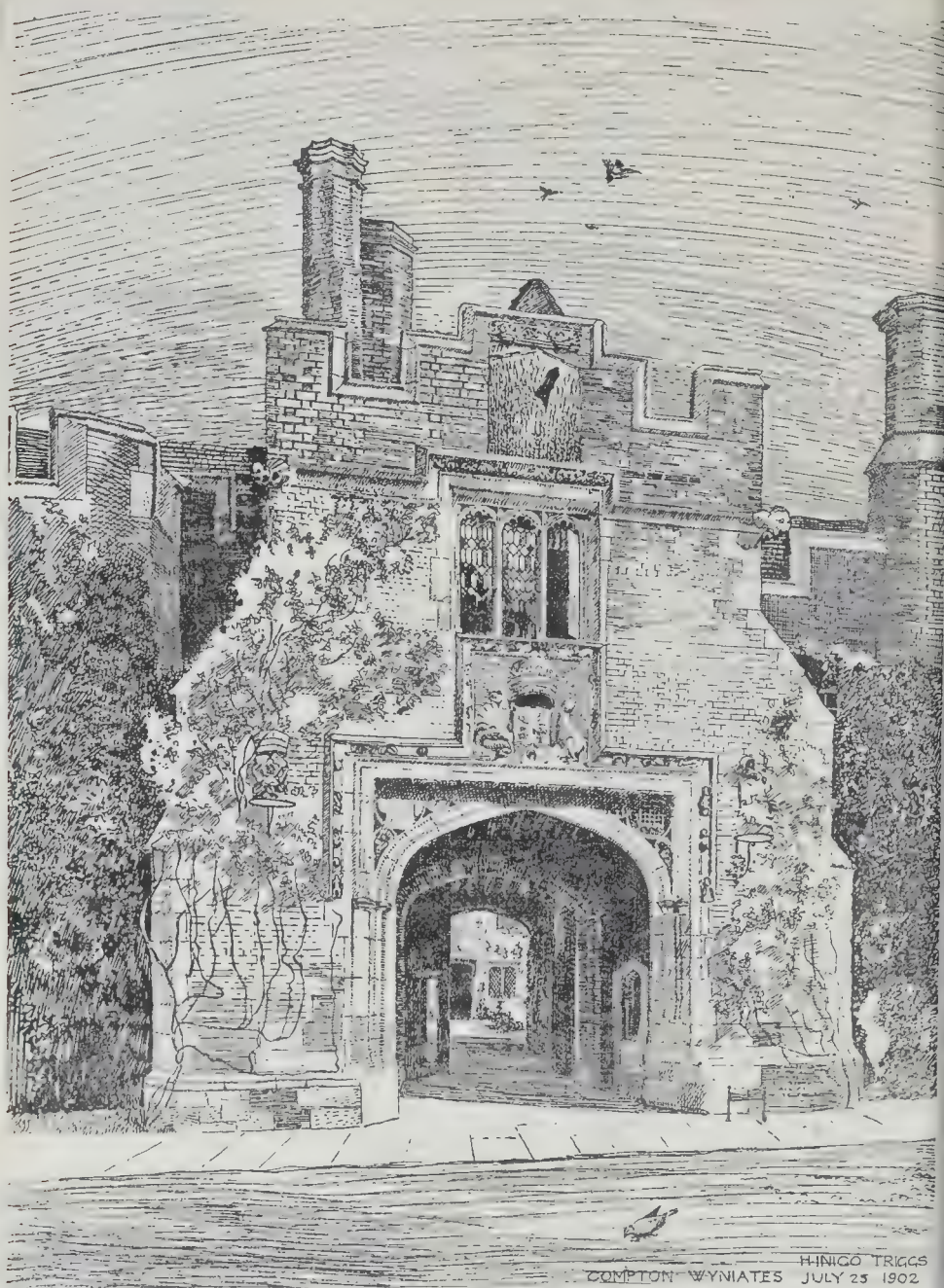
red by those who were fortunate to be present, and not a few good sketches were made during the three and a half hours allotted to the visit.

On Friday the first place to be visited was Shutford, a pretty village about five miles from Wymbury. On the way here the party were photographed, in accordance with annual custom. The church at Shutford is dedicated to St. Martin; it has a Norman arcade of two arches to the north side, and a pointed arch to the north transept beyond. It is quite a small church, the nave being about 17 ft. by 45 ft., and the chancel 20 ft. by 12 ft.; the chancel screen is simple Perpendicular; the lower levels are modern. Adjoining the churchyard is the old stone manor house, now used as a farm; it has a quaint arrangement of roofs, due to the staircase wing, which is surmounted by a saddle-back roof.

After leaving Shutford, an hour's drive over very hilly country brought the party within sight of Compton Wyniat, the glorious old house of the Marquis of Northampton. Seen from the hill, the house is beautifully situated amidst the surrounding woods, with its collection of irregular gables, twisted chimneys, embattlements, mullioned windows, and stone-slate roofs, making it as picturesque as the most romantic could desire. The delightful variety of colour and texture produced by the different materials used—brick, wood, stone, and plaster—makes this house one of the most alluring in England, and there is probably no finer or more complete example of Tudor work to be met with in the country.

In the early part of the reign of Henry VIII. Sir William Compton, who had been associated from early youth with the King, was appointed keeper of Fulbrooke Park with permission to

pull down some old buildings that already existed there and to utilise the materials for his new house at Compton Wyniat, and in 1519 he obtained a licence from the King to enclose a park of nearly 2,000 acres. The first building as it now stands was erected between the years 1509 and 1528, the date of Sir William Compton's death; the property then passed to his grandson, who was created Baron Compton. He died in 1580, leaving a son, William, the hero of a romantic and somewhat novel elopement. A certain rich London merchant, Sir John Spencer, had a beautiful daughter, with whom Lord Compton fell in love. Sir John by no means looked on the young nobleman as a desirable match for his only daughter, but Lord Compton was equal to the occasion, and coming to the house disguised as a baker, boldly carried off his lady-love concealed in his empty basket. He was met



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on the stairs by the worthy merchant, who rewarded him with sixpence for being so early. Sir John's anger when the truth was discovered can well be imagined, and his fury was not to be appeased until Queen Elizabeth herself intervened, and at her Majesty's request he consented to be the godfather to an infant in whom the Queen had some interest, and who, as he afterwards learnt, was his own grandson.

By this marriage Lord Compton inherited a

great fortune, and was created Earl of Northampton by James I., whom he entertained at Compton Wyniaties in 1617. He was succeeded in 1630 by his son Spencer, who fought so bravely, with three of his sons, at the battle of Edgehill. In June, 1644, Compton Wyniaties was captured by the Parliamentarians, after three days' siege, when the Earl of Northampton's brother, several officers, and about 120 men were seized, and, with much plunder, taken off to Banbury. The House was held

for the Parliament during the next two years, and when it again came into the hands of its rightful owners, required considerable renovation. James, Lord Northampton put the house into repair, and altered some of the windows. He was succeeded in 1727 by his son, who, in accordance with the custom of his day, endeavoured to modernise the old house, fortunately without doing very much damage. The present owners, fully realising the great historic value of such a fine example of

restic architecture, have done much in the way of judicious restoration of the fabric from time to time, and have, moreover, partly surrounded the building with good gardens.

The entrance front faces west and the buildings are grouped round a central quadrangle about 75 ft. square. The gateway, of which we give an illustration, is almost in the centre of this west front, and gives access to a green courtyard crossed with stone-flagged paths. Exactly opposite the entrance is a door leading into the great hall with its large oriel window and spacious minstrel gallery; a finely carved screen separates the hall from the library, staircase, and kitchens beyond. The screen is decorated with linen-pattern panels and a quaint series of carvings illustrating the deeds of Compton, with figures of knights on horseback. The hall extends to the full height of the house, and has a finely moulded timber roof, with richly carved cornice; it is supposed to have been brought here from Fulbrooke, and appears to have been designed to occupy a larger space. At the further end of the hall a door leads to the parlour, now used as a dining-room, panelled in oak and containing a handsome fireplace from Canonbury. On the south side of the courtyard is the chapel, where there are some curious carvings of the seven deadly sins, represented as knights in armour, each with an imp to urge him forward. A winding staircase leads through several interesting rooms to the priest's room, supposed to have been used as a chapel in the days of persecution; it is quite a small apartment, with a very handsomely carved door with trophies, birds, and little masks; it is very Italian in feeling, though it was probably made here. There are other interesting rooms about the house, including the bedroom of Henry VIII., with Tudor roses in the glass, and the council chamber, with sufficient staircases and emergency exits to satisfy the most fastidious county council of our own times.

The house retains part of the old moat on the north front, and the stew-ponds and old ecote adjoin. On the south side are the walled gardens, with brilliant masses of hardy flowers and yew hedges. Lawns now occupy a space where the moat formerly existed. Close to the house is the quaint little blue-aisled church, which belongs to a period when church architecture did not flourish. It was rebuilt between 1656 and 1665, which latter date appears on some of the stone spouts, together with the initials I. N. James, Lord Northampton. The two aisles are of equal length and breadth, and are separated by an arcade, which extends right to the altar. On the north side are fragments of many monuments rescued from the moat, into which they had been thrown during the Parliamentary occupation. In the churchyard are a few good eighteenth-century tombstones. A luncheon was taken under the shadow of the grand old elm trees in the park, and the duties of the place proved too enchanting for the Secretaries, and for once an extra half-hour was allowed above the four hours allotted on the programme; this left but little time for the two remaining churches, Brailles and Swalecliffe.

At Swalecliffe Church, which is dedicated to St. Peter and Paul, there is some interesting Norman pewing, and the south door is very reminiscent of the woodwork in the Convocation House at Oxford. The church is of various dates, from Early Norman to Late perpendicular. The entrance steps to the churchyard are well arranged. At the west end of the churchyard is a fine old tithe barn said to have been built by William of Wykeham.

A drive of about six miles, past Broughton Castle, brought the party to Banbury in time for dinner, and as this was the last evening of the excursion, it was followed by a smoking concert, at which the Mayor of Banbury honoured the Association by his presence. Proceedings were kept up until a somewhat late hour, long after most of the townspeople had retired to rest.

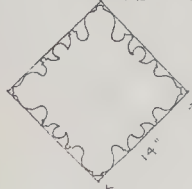
On Saturday several of the excursionists proceeded to Buckingham, from whence they drove to Stowe House.

And so ended the thirty-third annual excursion, which, although the weather might have been more propitious, was nevertheless a most successful tour. The programme was a very all round one, perhaps too full, including no less than nineteen churches, and the Association owes a debt of gratitude to the two Honorary

Secretaries, Mr. W. Talbot Brown and Mr. A. W. Hennings, whose untiring services made so enjoyable an excursion.



CAP TO N. AISLE ADDERBURY



MEETING OF THE ROYAL ARCHÆOLOGICAL INSTITUTE AT SOUTHAMPTON.

THE Royal Archaeological Institute has this year selected Southampton as the centre for its annual meeting. The proceedings began at noon on Tuesday, July 22, when the members and their friends, about ninety in number, were formally received in the Council Chamber of the Municipal Buildings by the Mayor of Southampton, Mr. Councillor Dunsford, who was accompanied by the Deputy Mayor and the Sheriff of Southampton. The chair was then taken by the President of the meeting, Lord Montagu of Beaulieu, who referred to the interest which the King had taken in antiquarian pursuits, and said he felt sure the members would wish to express their regret at the serious illness of the King, their patron, their admiration of the way in which he had borne it, and their pleasure and thankfulness at his recovery. Lord Montagu also referred to the treatment of the ancient walls and other ancient monuments at Southampton, and to the interest attaching to the various places and buildings to be visited during the meeting. After luncheon a visit was paid first to St. Michael's church, an early twelfth century cross church, much altered, where the architectural history was explained by Mr. C. R. Peers. A beautiful Elizabethan silver-gilt tazza forming part of the communion plate excited considerable interest. A move was next made to the Bargate, where Mr. R. M. D. Lucas explained a scheme drawn up by him for the preservation of the gate, which is in danger of destruction through the unwillingness of the Corporation to incur the expense of cutting proper openings right and left of it for the accommodation of the traffic which at present has to pass through it. Mr. Lucas's scheme (which was illustrated in the *Builder* of October 12, 1901), is to enlarge the present footways so as to allow of the passage of carriages, new footways being pierced beyond; but the carrying out of this proposal seems rather likely to endanger the stability of the gate. A tour of the town walls was then made under the guidance of the Rev. G. W. Minns and Mr. W. Dale. Some interesting remains of these, including one of the towers, have been needlessly destroyed in recent years by the Corporation, and a hope was expressed that a lately exposed portion of the Norman castle wall might not

share the same fate. The fine Tudor house and the remaining Norman house have been saved from destruction through the enterprise of Mr. Spranger and by the exertions of local antiquaries; the old guard chamber, adjoining the west gate, has also been saved and put into repair. At the evening meeting, Mr. W. Dale exhibited an excellent collection of flint implements found in the neighbourhood of Southampton. A paper was also read on the Roman site of *Claesentum*, at Bitterne, by Mr. Emanuel Green, who argued that it showed no signs of a military character, and not much even of a civilian occupation, but seemed to have been simply a large and well-protected depot for the export of western produce in the shape of tin and lead.

Wednesday was devoted to a visit to Winchester. A move was first made to the site of the Castle, where in the much-restored King's Hall Mr. W. W. Portal gave an account of its history and of the Round Table which is now its chief ornament. The subterranean passages that formerly led from the destroyed Norman keep to the Sally posts in the Castle ditches were also inspected. Carriages being in readiness, the party next proceeded to the ancient Hospital of St. Cross, where Mr. John Bilson gave a short account of its history, and pointed out the principal features of the late twelfth century church. He also indicated the former position of the buildings on the south side of the church, and showed that the curious "triple arch" in the angle of the transept and presbytery was merely the old entrance from the original cloister. The building at the south entrance of the transept is all that remains of the first buildings, and is of earlier date than the church, which is built up against it. After luncheon, Winchester College was visited under the guidance of the bursar, Mr. W. F. Kirby, who commented on the treatment of the chapel by the late Mr. W. Butterfield, and the consequent loss of all its old fittings and monumental brasses. The latter have since been renewed, from rubbings taken when he was a boy at school here, by Dr. Edwin Freshfield, to whose munificence the college is also indebted for the marble altar and painted windows in Fromond's beautiful chantry chapel in the middle of the cloister. Wolvesey Castle was next visited. Here the party was received by the Mayor of Winchester, and by the President (Mr. J. H. Oglander) and Committee of the Hants Field Club and Archaeological Society. Mr. N. C. H. Nisbett, with the aid of a large plan, described the remains of the episcopal palace built by Bishop Henry de Blois (1129-71), and the later buildings, including the chapel of Bishop Morley in 1682.

At the evening meeting a paper on "English Fortresses and Castles of the Tenth and Eleventh Centuries" was read by Mr. W. H. St. John Hope, who discussed the various references in the Anglo-Saxon Chronicle to the "geveorcs" and fastnesses of the Danes, the burhs or burges of the Saxons and English, and the "castles" of the Normans, and the views lately enunciated concerning them by Mr. J. H. Round, Mrs. Armitage, and Mr. G. H. Neilson, in correction of those put forth by the late Mr. G. T. Clark.

On Thursday the party proceeded first by train to Porchester. Here the very perfect remains of the Roman fortress, which is intact as to its walls and nearly all its towers, were perambulated under the guidance of Mr. St. John Hope. The church was next visited and described by the vicar, the Rev. J. D. Henderson, who showed that it was built for a priory of black canons founded here by Henry I. in 1133, but shortly afterwards removed to Southwick. Since then it had been used as the parish church. The Norman castle was afterwards inspected, Mr. Hope again acting as guide. He pointed out that the castle included the whole of the area of the Roman fort, and suggested that it first came into being after the removal of the priory to Southwick. The existing tower and the precinct wall of the inner ward were the work of Henry I. or Stephen, but the remaining buildings he showed from the account rolls to have been built in the reign of Edward III. and Richard II. The chapel, the great chamber, the hall and its porch, the kitchen, &c., dated from the concluding years of the latter king. The journey was next resumed, after luncheon, to Titchfield, where the chief features of the parish church and the tombs of the Wriothesley family were pointed out by the Rev. R. A. R. White. Mr.

C. R. Peers called attention to the lower part of the western tower and the west wall of the nave, which he claimed to be Saxon work of early date. A visit was next paid to Place House, built by Lord Chancellor Wriothesley in 1539, incorporating the remains of an abbey of White Canons, founded in 1231. Some interesting fragments of the abbey are left, as well as the great gatehouse, built by Wriothesley in the middle of the nave. The history of the Place was described by the Rev. G. W. Minns, but at such length as regards its owners that only a hurried glance could be taken of one of the stateliest Tudor gatehouses in the South of England. In the evening a *conversazione* was held at the Hartley University College by invitation of the Mayor of Southampton and the Hampshire Field Club. Among other objects exhibited were the maces and other municipal insignia, which were described by Mr. Hope.

Friday morning was devoted to a visit to the well-known ruins of Netley Abbey, under the guidance of Mr. J. T. Micklethwaite, who described the arrangements of the buildings and gave some account of the Cistercian Order, to which the Abbey belonged, and the daily life of the monks. He also called attention to the destructive ravages of the ivy which everywhere mantles the walls and conceals so much of the beautiful architectural features of the building. It was ultimately resolved, on the suggestion of Sir Henry Horwath, that the attention of the owner, Mr. Tankerville Chamberlayne, be called to the growth of the ivy, in the hope that something may be done to keep it within reasonable bounds. In the afternoon a visit was paid to the fine Norman church of the Benedictine Nunnery at Romsey, which was described by Mr. E. Doran Webb. Mr. C. R. Peers also contributed some remarks on the early apse discovered a short time ago under the central tower, and gave reasons for believing it to belong to the late Saxon church that preceded the existing building. At the evening meeting Mr. W. J. C. Moens read a paper, "The New Forest, its afforestation, ancient areas, and ordinances in the time of the Norman kings and their immediate successors, with special reference to the question of the devastation of the New Forest by William I. and his son, and of its previous afforestation, as shown by the evidence of Domesday Book, ancient charters and statutes, and perambulations." Mr. Moens wished his paper to be regarded as complementary to the able article by Mr. F. Baring in the *English Historical Review* of July, 1901. Mr. Percy Stone also read a paper on the "Domestic Architecture of the Isle of Wight from the Eleventh to the Sixteenth Century." Mr. Stone's paper was illustrated by an excellent series of measured drawings by himself.

On Saturday, July 26, the party went by steamer to Hythe Pier, where carriages were in readiness for a visit to Beaulieu Abbey. Before reaching Beaulieu, a halt was made at Hill Top to examine the remains of the thirteenth-century conduit-house which supplied the monks with drinking water. Lord Montagu briefly called attention to the shouldered doorway and vaulted circular tank, which had been lately cleared out and repaired by himself, and put in working order. The remains of the Abbey of Beaulieu were described by Mr. Harold Brakspear, who, by the aid of an excellent plan, indicated the disposition and arrangements of the principal buildings. He also described the remarkable plan of the church, the foundations of which had lately been re-examined by Mr. Hope and himself, through the kind help of Lord Montagu. After luncheon the journey was resumed to St. Leonards, where the remains of a late thirteenth-century chapel and a barn of unusual size, belonging to a grange of Beaulieu Abbey, were examined under the guidance of Mr. Brakspear. The party subsequently returned to Southampton.

ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—The summer meeting of this institution commences on August 11, the North-East Lancashire district being the locality to be visited, with Blackpool as headquarters. The meeting opens with an excursion to Barrow to inspect the works of the British Griffin Chilled Iron and Steel Co., the Barrow Hematite Steel Works, and the Kellner-Partington Paper Pulp Works. On Tuesday, August 12, after being

received by the Mayor of Blackpool, the party will visit the power station of the Blackpool and Fleetwood Tramroad Co. and the Lancashire and Yorkshire Railway Grain Elevator at Fleetwood. On the 13th an excursion will be made to Furness Abbey, Lake Windermere, &c., and on the 14th the members will travel to Preston to visit the Cotton Spinning and Weaving Works of Messrs. Horrocks, Crowlson, & Co., the Electric Tramway and Railway Carriage Co.'s works, and those of the English Electric Manufacturing Co. Friday, August 15, will be devoted to an inspection of the engineering features of the Blackpool Tower, &c., and in the evening the summer dinner of the Institution will take place at the Queen's Hotel, South Shore, Blackpool. Mr. F. S. Pilling, 39, Victoria-street, Westminster, has been appointed hon. local secretary of the meeting.

INVESTIGATION OF THE EFFECTS OF LIGHTNING.

THE following circular has been issued by the Lightning Research Committee, which has been organised by the Royal Institute of British Architects and the Surveyors' Institution:—

"Referring to the memorandum issued to observers last December, the Lightning Research Committee desire to intimate that they are now in possession of a large number of first-hand reports on cases of damage to buildings from lightning-stroke. As regards the general character of the injuries to which non-protected buildings are subject from this cause, the Committee consider that the information already collected by observers furnishes ample material for deliberation, and that it is unnecessary further to multiply observations as to the action of lightning-stroke on non-protected buildings.

Data to hand, however, respecting 'protected' buildings which have been struck are few, and generally meagre and unsatisfactory, and as the object of the Committee is to improve existing methods of protection, they propose for the future to confine their investigations to buildings which have been struck in spite of being provided with lightning conductors.

In order to determine the efficiency or otherwise of the conductor, the Committee are of opinion that it is necessary to scrutinise minutely the actual conditions of the building affected." They therefore suggest that observers should first ascertain whether the building struck is provided with a conductor, and if this be the case the structure should be carefully examined at once and on the lines suggested below, and a photograph taken of it before any repairs, temporary or otherwise, are effected."

Details additional to those indicated in the original form of questions are requisite to the more limited inquiry now contemplated. A general description should be given of the surroundings, especially of elevated buildings in the vicinity, and photographs should be taken in cases of importance; and if these elevated buildings are provided with lightning conductors, their positions and heights should be given.

The following further points, drawn up for the Committee by Sir Oliver Lodge, should, as far as possible, be attended to by observers in making a record of any case of damage:—

1. Any signs or indications of where the flash appears to have first struck, and an account of the damage done.

2. A specification and drawing of the metal-work of the building, paying special attention to metal of every kind which comes anywhere in the neighbourhood of the conductor, whether roof gutters, lead covering, rain-water spouts, sewer ventilators, telephone wires, bell wires, gas pipes, ornamental railings, &c., &c., carefully ascertaining whether any of these were either purposely or accidentally connected with the lightning conductor, and, if not, what their nearest distance was from it.

In the drawing, all metals may be indicated in red, no matter of what kind they may be; the hypothetical path of the lightning, as appears to the observer most probable, may be sketched in blue, remembering that bifurcation of path is not unlikely. Places of damage may be indicated by a blue swelling or patch, the size of the patch giving a rough idea of the relative damage, and an arrow

* The Committee wish it to be understood that they are prepared to defray actual out-of-pocket expenses, and also a moderate charge for the photographer's services, provided that complete details of the disaster be furnished within a few days after the occurrence, and that an account of the expenses incurred be sent in with the observer's report.

being employed when necessary to call attention to any small patches liable to be overlooked. The patches may be numbered, and the nature of the damage at each place stated in the description. Any place where fire broke out is to be specially attended to.

3. The nature and condition of the conductor, especially with reference to its continuity, its earth, and its elevation; also how fixed, and, if carried horizontally, its length as compared with the vertical height of its terminal above the ground, also note whether it made any sharp curves or loops round projections of the building, or took an indirect course. Cases of damage where there have been more than one or several conductors are specially important.

In the case of church steeples the wind vane should receive special attention, and the mode in which its rod terminates in the steeple should be ascertained.

In the case of chimneys any internal metal flue should be carefully specified. Likewise any indication that the flash took the column of hot air in preference to the conductor should be recorded, also whether the conductor was bent or curved over the mouth of the chimney or not.

In any case of importance the earth of the conductor should be specially examined, being, if possible, dug down to for this purpose; and a complete specification of the nature of the earth, the nature of the soil, and of any metal ramifications as well as of moisture in its neighbourhood, should be made.

Any signs that the discharge has entered the earth should be recorded; and if the conductor is at any point damaged or otherwise affected, this should be specified, and, when interesting, a sample of the damaged portion should be sent. If the conductor has recently been examined and tested, or otherwise reported on, the fact should be stated.

KILLINGWORTH HEDGES, Hon. Secretary.
G. NORTHOVER, Secretary."

BRITISH ASSOCIATION OF WATERWORKS ENGINEERS.

THE annual meeting of the British Association of Waterworks Engineers was held at Leicester on Tuesday, Wednesday, and Thursday, July 22, 23, and 24. Mr. Fredk. Griffith, C.E., Waterworks Engineer of Leicester, occupied the chair. In continuation of our report, immediately following the paper on "The Standardisation of Fittings" reported in our last issue,

Mr. E. G. Mawbey, of Leicester, as the representative of the Sanitary Institute, brought before the meeting proposals submitted by Mr. Middleton, of London, to the Institute, suggesting the formation of a Water and Drainage Board.

Mr. C. Middleton, London, explained that he had no idea of superseding the Local Government Board, but wished to establish Boards composed of representatives of the various Local Authorities for controlling water and drainage schemes within the area of their authority.

Major Frear, Clerk to the Leicestershire County Council, said the County Councils Association had had the matter under consideration, and had asked for a Parliamentary or Departmental Committee to be appointed to take evidence and to go into the whole question.

Mr. Percy Griffith, Secretary, explained that this Association appointed a Committee some years ago which, as a first step, was tabulating information as to the details of water supplies throughout the country.

Suspended Steam Pumps.

Mr. W. Price Abell then presented a paper on the application of suspended steam-pumps for the sinking of deep shafts. He explained that the object of the paper was to show that by means of pumps of this type pumping operations during sinking could be carried on with ease and expedition and at one-half of the old lifting-sets system, provided that suitable tackle and winches were installed.

Mr. Watts, Sheffield, said a pump which could be easily lowered to the floor of a well, and could be moved rapidly from one part of a shaft to another, was a very desirable acquisition.

Mr. J. S. Pickering, Nuneaton, said he had superintended the sinking of several deep wells, and the conclusion he had come to was that it was impossible to get a better sinking-pump than one of these suspended steam-pumps. They were only suitable for use as sinking-pumps, and would be uneconomical for permanent work.

Rural Water Supplies.

Messrs. J. Dewhirst and H. G. Keywood then presented a joint paper on "Rural Water Supplies," with special reference to the cost of the same, and the scale of rates necessary to maintain them. The authors gave details of water supply schemes in the Maldon and Elmford Rural Districts, feeling convinced that what had been done in rural Essex, which was probably nearer low-water mark as regarded prosperity than any other county in England, could be done in any other county.

Mr. Keywood, in supplementing his paper, suggesting that the time for repayment of the loans might be deferred until the completion of the works. It was a source of trouble in rural districts, where grumbling was at its very height, that they had to commence repaying loans directly they had received the money, before the district was receiving any benefit or obtaining any revenue. They thought the payment of any of the principal ought to be deferred until the works were in operation.

Mr. Whittaker, London, said as far as his experience went, it was in these small rural districts where the greatest difficulty arose in getting a proper water supply. He paid a high compliment to the work of Dr. Thresh, Medical Officer for Essex, who had done a great work in helping to obtain these water supplies, and to some extent resuscitated their faith in the water supply by showing where those waters did not be safely got.

Mr. C. H. Priestley, Cardiff, thought the time had gone by when baths and water-closets would be paid for as extras. It was their business to encourage cleanliness and consequently the health of the community to the best extent.

Mr. Jones, Leyton, said the extent of local indebtedness was alarming financiers, and he hoped no alteration would be made in the terms of the Local Government Board with respect to the borrowing of money by local authorities.

Mr. Watts, Sheffield, Mr. Gilby, Bath, Mr. Lynceux, Stockport, and others, took part in the discussion.

In the evening the annual Association dinner was held at the Museum, the President (Mr. Griffiths) in the chair.

Domestic Filtration.

The proceedings of the meeting were reported on Wednesday, when Dr. Priestley delivered a lecture on domestic filtration.

Dr. J. Priestley, M.D., Medical Officer for Lambeth, said they were all agreed that pure water was an absolute necessity. They were further agreed that the purity of a water supply was to be gauged chiefly, if not entirely, by the absence therefrom of pathogenic germs—bacteria which might cause disease in those persons or animals into whose bodies they might enter in an entrance through the medium of drinking water or in other ways. Nature had given them pure water; man in the past had done his utmost to contaminate it, and was now doing so in the present. Persons supplied from a particular water area were subjected to dangers from different sources before the water was brought within their reach, dangers affecting one and all, and dangers affecting which could only be successfully combated by water engineers. Could anything other be done by engineers, or by the consumers themselves, to afford still further protection? He thought it could in the way of still further purifying the water on the premises on which it was going to be drunk. What form of domestic filtration, if any, could be suggested with any prospect of success? The ordinary filters, such as most of them were in years gone by were to-day practically useless, of the past, or, at least, ought to be so, in principle upon which they depended for their vaunted excellences having been scientifically exploded. Spongy iron and magnetic

de iron, carbon in its various forms, asbestos cloth and fibre, cellulose, or any combinations of these were filtering media which had been much advertised for domestic filters in their day, but which were now practically regarded as interesting ruins of fools' paradises of the past. Bacteriologically such media were useless in that they did not prevent the passage of pathogenic germs, and did not therefore afford protection against infectious diseases. The Royal Colleges of Physicians and Surgeons in London were his authorities for making such a definite statement. Their prolonged and useful bacteriological investigations into the

efficiency or non-efficiency of every filter in general use showed that the verdict must be "not efficient." It was shown that the media were inefficient in that they did not prevent the passage of disease germs through them, but even at times added germs to the water which was passed through them for supposed purification! The filtering media generally employed for domestic filters were proved to be useless or even worse, and the natural question arises, "Is there any filtering medium not in general use that is trustworthy?" Here, again, they found an answer given definitely by the colleges as the outcome of bacteriological experiments. Porcelain (specially prepared) and infusorial earth (a patent) appeared from such experiments to meet the case and to offer a satisfactory filtering medium so far as scientific investigation went. In both instances the pores of the material were so fine that the pathogenic germs were unable to pass through directly from the unfiltered to the filtered water. He gave these facts as incontrovertible after the careful experiments that were carried out a few years ago in the laboratories of the Royal Colleges of Physicians and Surgeons in London by Drs. Sims-Woodhead and Cartwright-Wood. As the matter was then left, the summing-up was practically to the effect that there were only two filters worth anything—the Pasteur, depending for its efficacy upon a specially prepared form of porcelain, and the Berkefeld, depending for its efficiency upon infusorial earth, both in the form of bougies. The output in the Berkefeld was quicker than that in the Pasteur, but the Berkefeld tubes were much more fragile and somewhat more costly. The Pasteur filter had also proved itself efficient practically, as well as theoretically, if they could believe the reports presented to the President of the French Republic. For seven or eight years in some hundreds of thousands of quarters, Pasteur filters had protected the French army against typhoid fever, even when the civil population, drinking the same water (unfiltered), continued to suffer from that disease. The reputation of the Berkefeld filter depended mainly upon the results of laboratory experiments, and no records of actual practice were available to verify the efficiency thus ascribed to it. As regarded the Berkefeld filter, an important research by Dr. Horrocks, of the Army Medical Department, carried out in the laboratory at Netley, had now put the question beyond a possibility of doubt, and proved conclusively this filter was not independent of the character of the water used. Dr. Horrocks' experiments proved that infusorial earth (Berkefeld) filters allowed, if they do not actually favour, the passage of typhoid germs within a few days of use, unless they were regularly sterilised in the interval—a process which for practical purposes might be left out of the question, whilst the ordinary Pasteur-Chamberland filters similarly treated and used experimentally, in no case allowed the passage of typhoid germs. It had been suggested that in this fact was to be found at least a partial explanation of why the British army during the late South African campaign suffered from typhoid fever to such an alarming extent, the field forces being stated to have been equipped entirely with Berkefeld filters.

A vote of thanks was accorded to Dr. Priestley for his lecture.

Standardisation of Cast-iron Pipes.

The Secretary (Mr. Percy Griffith) read an interim report from the Committee appointed to consider the standardisation of cast-iron pipes. The Committee suggested that before adopting any definite scheme of standardisation the views of all those most intimately associated with the industry should be obtained, and the Committee thought the most effective procedure would be either by a general conference of all engineers and manufacturers interested in the matter, or should such a conference be impracticable, by some form of plebiscite.

The afternoon was devoted to a visit to the Leicester Corporation Waterworks at Cropstone. The Mayor (Alderman Wood), as Chairman of the Water Committee, entertained the members of the Association, and his colleagues on the Council, to luncheon at Cropstone.

The business meeting of the Association was concluded on Thursday, when papers by Mr. W. H. Humphreys, of York, on "Electrolysis in Water Pipes," and by Mr. C. Sainty, Windsor, Mr. C. G. Mason, and Mr. A. T. Walker, on "Turbine-Driven Pumps,"

The afternoon was devoted to visits to the Leicester Corporation Works at Swithland and the Loughborough Corporation reservoir at Blackbrook. On Friday a visit was made to the Northampton Corporation Waterworks.

METROPOLITAN ASYLUMS BOARD.

The fortnightly meeting of this Board was held on Saturday last week, Mr. Henson presiding.

The Asylums Committee submitted a plan, prepared by the foreman of works, providing for the addition of a parlour, with a bedroom over it, to the farm-bailiff's cottage at Leavesden Asylum. With this addition, the accommodation in the cottage will, they reported, consist of three bedrooms, parlour, kitchen, and usual offices—which is similar (except for the existence in this case of a larder) to that proposed for each of the twenty-two attendants' cottages. The Committee thought that the accommodation in the farm-bailiff's cottage should be equal, at any rate, to that provided for married attendants. The foreman of works estimates the cost of the work (including painting the whole of the exterior wood and iron work of the cottage) at 113l. 8s. The Committee recommended, and the Board agreed to give authority, subject to the approval of the Local Government Board, for the enlargement of the cottage according to the plan now submitted, and the execution of the work by the asylum staff.

The tender of Messrs. Entwistle & Gass, of Bolton, for the supply and fixing of laundry machinery and plant at the Joyce Green Hospital in the sum of 7,397l. was accepted.

The Works Committee reported that with a view to the better protection of the Board's property at High Wood School, Brentwood, which, owing to the anticipated sale of a strip of land between the northern boundary of the estate and the Ongar-road, is now only separated from the high road by a hedge, the Committee had obtained through the architects an estimate from the contractors for continuing the existing boundary wall to a point below and beyond the site of the new laundry building, and for erecting an unclimbable iron fence along the remainder of the line of boundary as far as the bottom of the field. They recommended the managers to sanction as an extra upon Messrs. McCormick & Sons' contract for the erection of the school buildings, the extension of the boundary wall, and the erection of an unclimbable iron fencing, at an estimated total cost of 445l. The amount of the contract was 84,567l., and the net extras previously reported 1,262l.

This was adopted.

The revised plans of Messrs. Newman & Newman for the erection of a house for female attendants at Leavesden Asylum were approved by the Board.

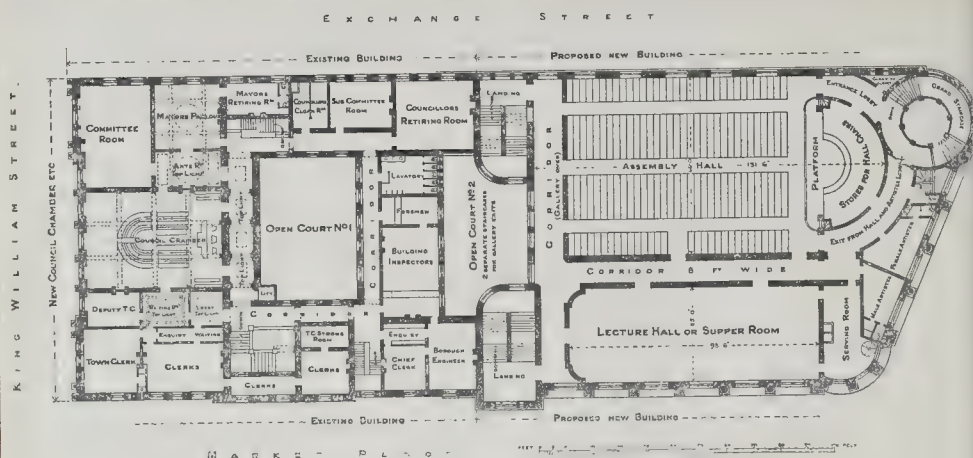
The Works Committee also reported:—

"Having advertised for and obtained tenders for the erection of the Southern Hospital, we recommend that the tender of Messrs. W. Johnson & Co., Ltd., for the erection, at the sum of 174,750l., of the Southern Hospital, in accordance with the plans and specification prepared by Messrs. Treadwell & Martin, architects, be accepted, and that the seal of the Board be affixed to the contract."

This was adopted. The other tenders were:—

McCormick & Sons, Essex-road, N., 179,777l.; Holliday & Greenwood, Loughborough Park Works, S.W., 184,444l.; F. G. Minter, Ferry Works, Westminster, 191,000l.; John Shillitoe & Son, Bury St. Edmunds, 103,000l.; Kirk & Randall, Warren-lane Works, Woolwich, 103,203l.; J. & M. Patrick, Wandsworth, 107,299l.; Palmou & Fotheringham, Ltd., Islington, 107,724l.; W. Wilcocks & Co., Wolverhampton, 108,873l.; W. H. Lorden & Son, Upper Tooting, 108,888l.; W. Wallis, Lincoln House, Balham, 201,139l. 10s.; Rudd & Son, Grantham, 201,214l. 10s. 7d.; Charles Wall, Chelsea, 201,328l.; and F. & H. F. Higgs, Station Works, Loughborough Junction, S.E., 214,000l. The architects' revised estimate was 207,702l.

The Works Committee, reporting upon the proposed chapel at the Joyce Green Hospital, stated that in January last the Managers approved of the plans prepared by Messrs. A. & C. Harston, architects, for the erection of a permanent chapel for the staff at this hospital, at an estimated cost, including seating and other fittings, of 1,900l., and these plans were duly forwarded to the Local Government Board for their formal sanction under seal. In returning the plans of the proposed chapel to the



Blackburn Town Hall: Proposed Extension of Plan.

Managers, with a request that they would reconsider the matter, the Local Government Board, in a letter dated February 15, pointed out that it would probably "rarely happen that there would not be some vacant ward available for this purpose in so large a hospital as that at Joyce Green; and even if all the wards were in use some temporary arrangement might be made." Subsequently the Managers instructed the Committee, upon the recommendation of the Hospitals Committee, to obtain from the architects a specification, with estimate of cost, for the erection of a wood and iron building for purposes of a staff chapel, as the Hospitals Committee were not convinced of the desirability of making use of the ward as suggested by the Local Government Board. Acting upon these instructions, the Committee directed the architects to submit plans and an estimate of a wood and iron building. This the architects had done, and they had recently had before them plans of a temporary chapel, the total cost of which, including seating and other fittings, they estimate at 875*l*. Having regard to all the circumstances, and seeing that the difference between the cost of the proposed permanent chapel and the suggested temporary structure would barely exceed 1,000*l*, the Committee thought the Local Government Board should be asked to reconsider their decision with regard to the erection of the permanent building.

A recommendation to this effect was adopted.

Illustrations.

BLACKBURN TOWN HALL.

WE publish in this week's issue Mr. Bromley's suggestion for the improvement and enlargement of the present Town Hall, which forms part of a report made by him for dealing with the municipal improvements of Blackburn.

The existing Town Hall is a substantial stone building situated at the corner of the Market Place and King William-street, as will be seen by reference to the plan, and is also shown on the left-hand side of the tower in the perspective, the tower forming part of Mr. Bromley's design for the new work.

We quote from his report of March, 1899, which will explain the situation:

"I have followed, as much as possible, the lines of my previous report, viz. —

1. As to adapting the present Town Hall so as to provide additional accommodation for the staff by removing the police station to some other site; and

2. As to the erection of an entirely new Town Hall.

After carefully inspecting the present building I am of opinion that unless it could be sold for the sum of 40,000*l*, exclusive of the

full value of the land, the question of an entirely new building should not be entertained. If this building, as it stands, were erected to-day, it would cost probably the sum of 70,000*l*. The existing structure is much too good to be discarded lightly, and without the very best reasons for doing so. It is, for the most part, thoroughly well built, and in some respects the materials, such as the roof timbers, would be difficult to replace with material so good.

Starting upon this as a basis, I have confidence in recommending the following schemes, viz. :—

(a) The removal of the police-courts to another site.

(b) The erection of a new assembly hall on the north-east side of the present Town Hall.

(c) New additions and improvements to the existing municipal offices."

By reference to the plan it will be seen that by the erection of a new assembly hall on the north-east side that the present assembly hall (which is now situated on the first floor and faces King William-street) is utilised for a new Council Chamber, Committee-room, Mayor's parlour, and Town Clerk's department, whilst the old police-court and offices on ground floor are used for the Treasurer's and rating departments.

As the outcome of this report, a limited number of architects were asked in competition to submit designs for new police-courts situated at the corner of North Gate and New Market-street West. Mr. Bromley was appointed assessor, and the design by Messrs. Briggs & Wolstenholme, and Stones & Stones was selected.

The scheme is at present in abeyance, but the Corporation are proceeding with the purchase of property for the site of the police-courts, &c.

"BRYANSTON," DORSET: THE SALOON AND STAIRCASE.

The exterior of this house, which is one of the latest of Mr. Norman Shaw's large mansions, was illustrated in our issue of August 5, 1899, as an accompaniment to the account of the excursion of the Architectural Association that year when they included in their programme visits to this and one or two other large modern houses.

We give now the views of the interior of the saloon and the staircase, which were taken at the same time as the exterior, with the intention of publishing them together, but the necessity of including many other places visited in the excursion prevented this.

The saloon forms a spacious and dignified centre to a great house, and has the dignity of style which we confessed to finding a little wanting in the exterior.

SKETCHES WITH THE ARCHITECTURAL ASSOCIATION EXCURSION.

This plate contains some additional sketches

by Mr. W. Curtis Green of buildings visited by the Architectural Association during their excursion last week, and which are referred to in our account of the excursion on another page.

COMPETITION DESIGN FOR MEMORIAL WING, ST. MARY'S HOSPITAL.

This is a design submitted by Messrs. Florence & Satchell in the competition that was instituted some time back for a "Clarence Memorial Wing" to St. Mary's Hospital Paddington.

We have not been able to obtain a plan to accompany the present publication, owing to Mr. Florence's absence on the Continent; but considered as an exterior only, it is a good example of the treatment of a hospital building so as to give some degree of architectural effect, without departing from the utilitarian character proper to such a building.

HOUSES, BUCKINGHAM PALACE-ROAD.

The drawing shows a terrace of houses of brick and stone, in the western portion of Buckingham Palace-road, a good way past Victoria Station.

While treated with simplicity and restraint in design, they show a good deal of interesting variety in their features, and we may particularly notice the manner in which the two end bays are treated so as to balance each other in general line, while differing in the details of their design.

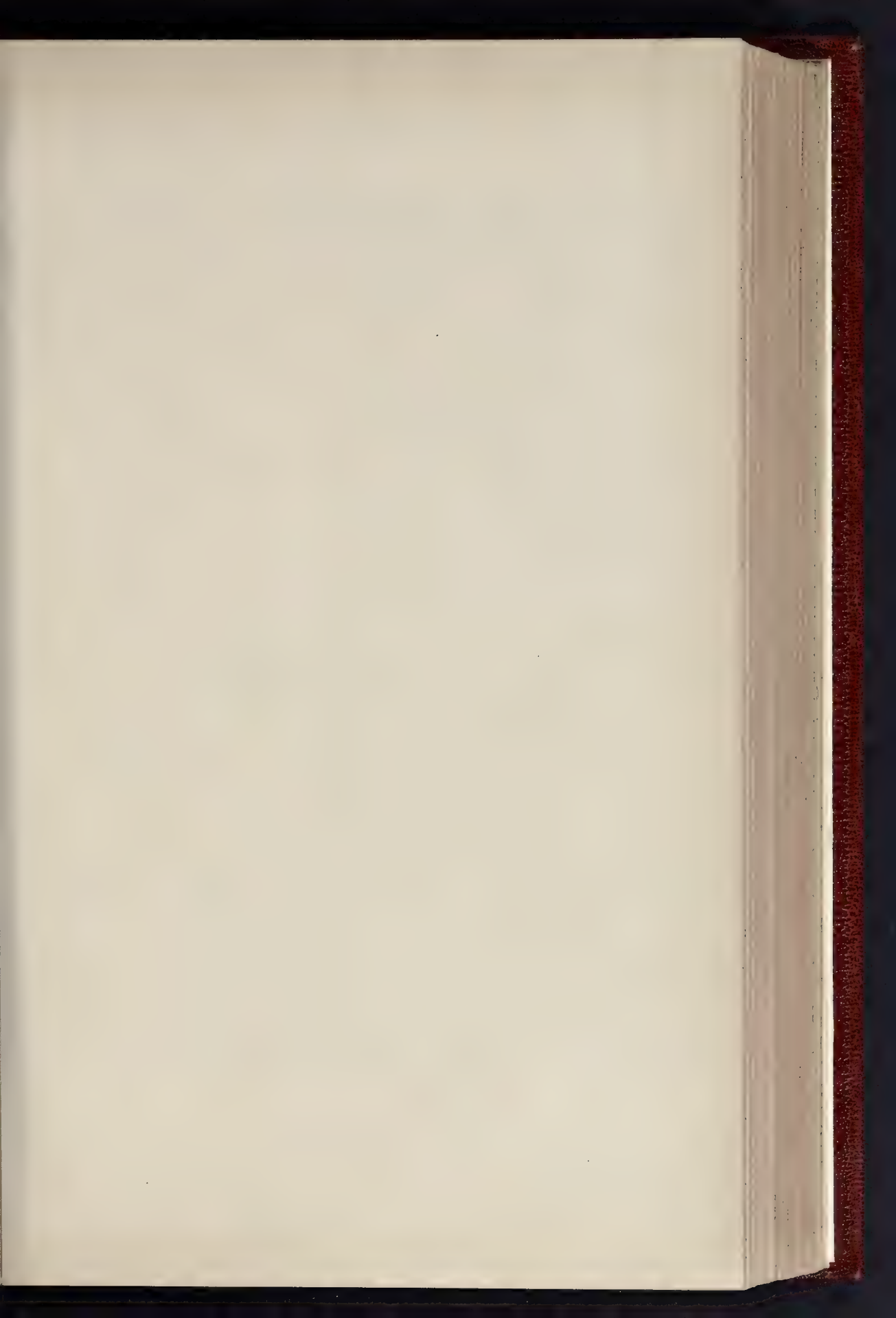
THE LONDON COUNTY COUNCIL.

THE last weekly meeting of the London County Council prior to the summer recess was held on Tuesday in the County Hall Spring-gardens, Sir J. M'Dougall, Chairman, presiding.

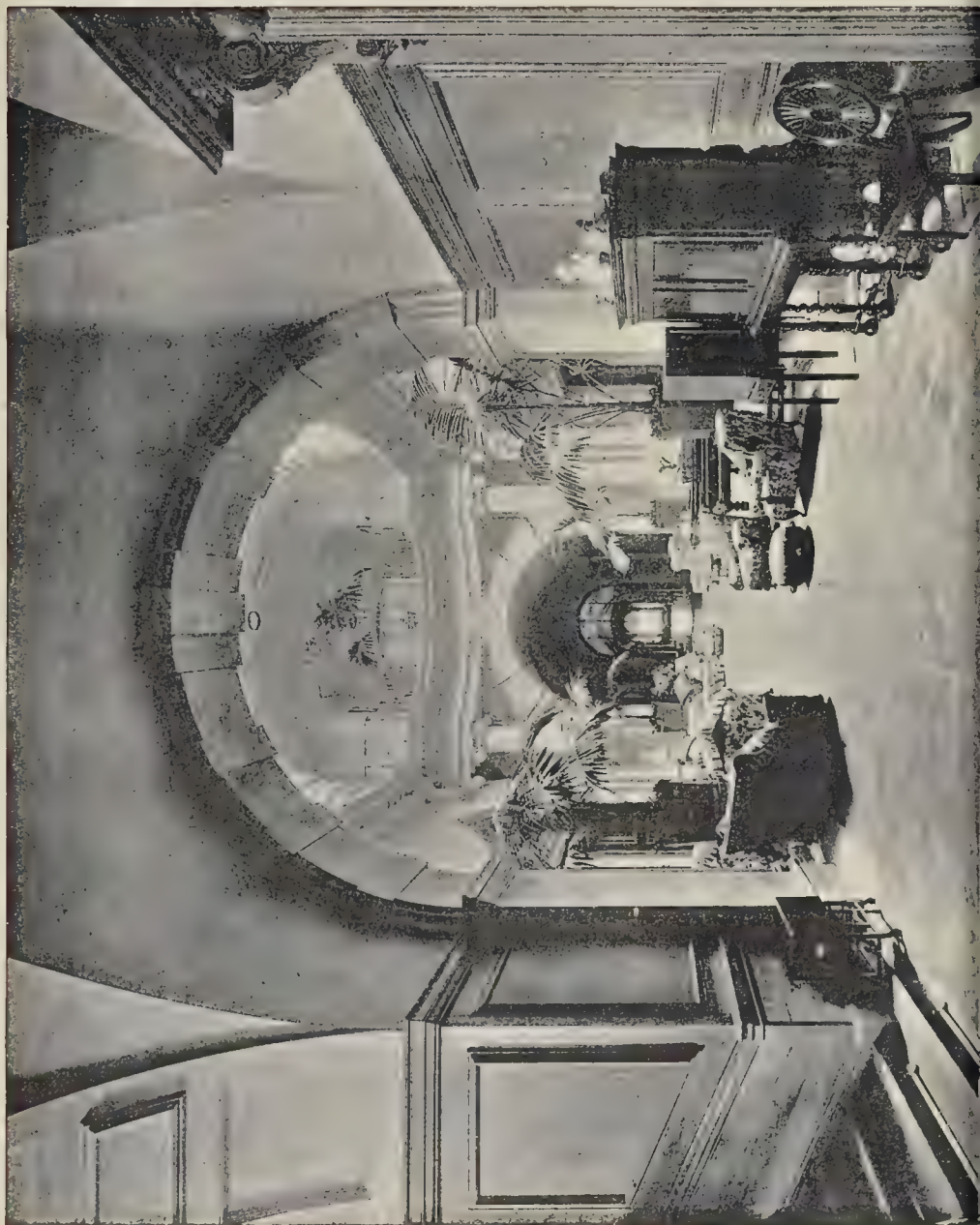
Loans—On the recommendation of the Finance Committee it was agreed to lend Camberwell Borough Council 4,000*l*. for the purchase of land for an extension of the Grove Vale depot, &c.; Bethnal Green Borough Council, 6,000*l*. for the extension of depot and erection of office; Poplar Borough Council, 28,170*l*. for electric light installation and meters; and 14,970*l*. for paving works and street improvements; Chelsea Borough Council, 6,825*l*. for street improvements; Woolwich Borough Council, 96,170*l*. for electric lighting and meters; Lambeth Borough Council, 3,755*l*. for paving works; Hackney Borough Council, 20,070*l*. for street improvements and paving works; Woolwich Borough Council, 23,600*l*. for electric light installation and dust destructor; St. Pancras Borough Council, 20,000*l*. for electric lighting purposes; Holborn Borough Council, 4,830*l*. for street improvements; Wandsworth Borough Council, 2,500*l*. for additions to public library; Battersea Borough Council, 455*l*. for works at baths; Hampstead Borough Council, 2,000*l*. for public

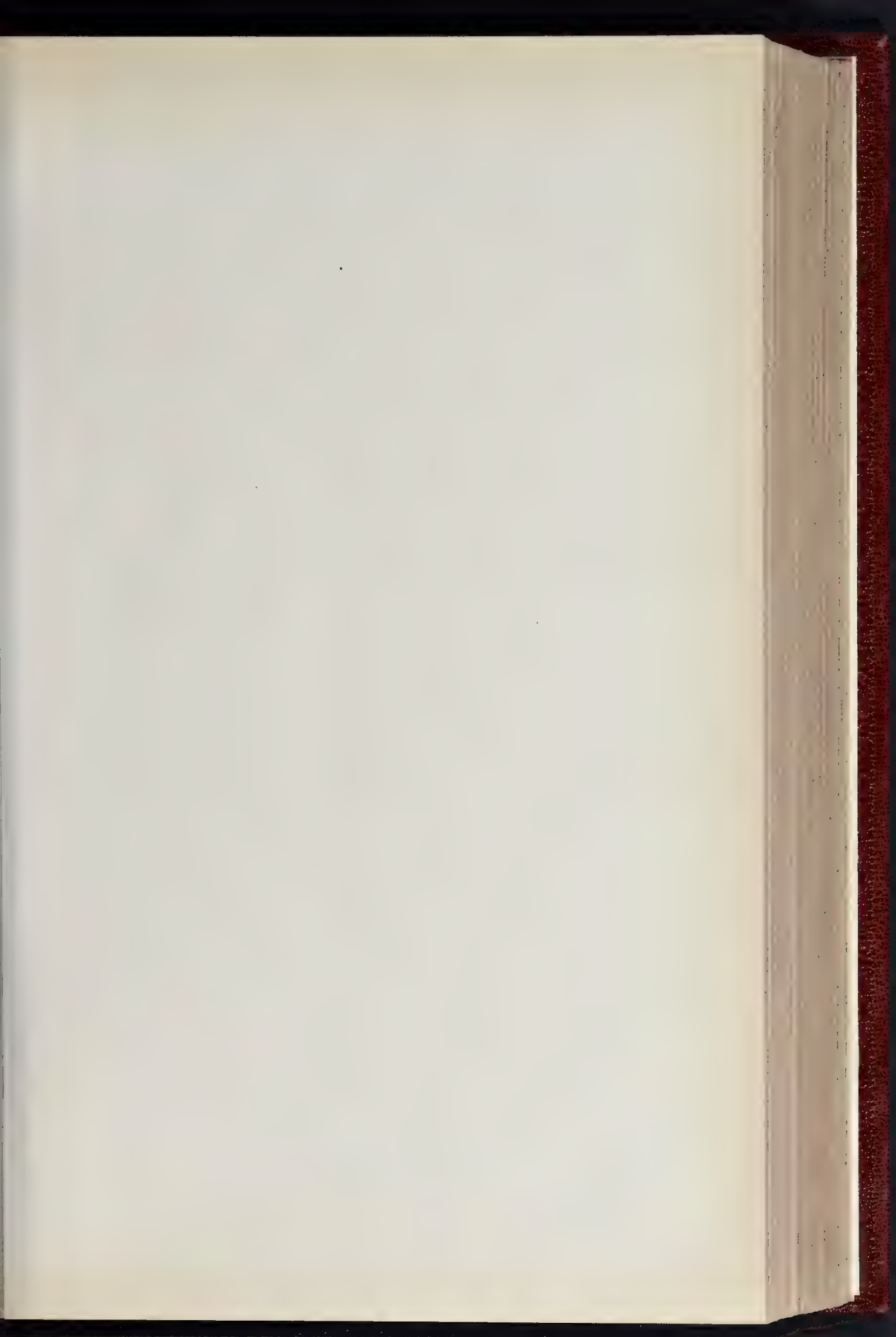


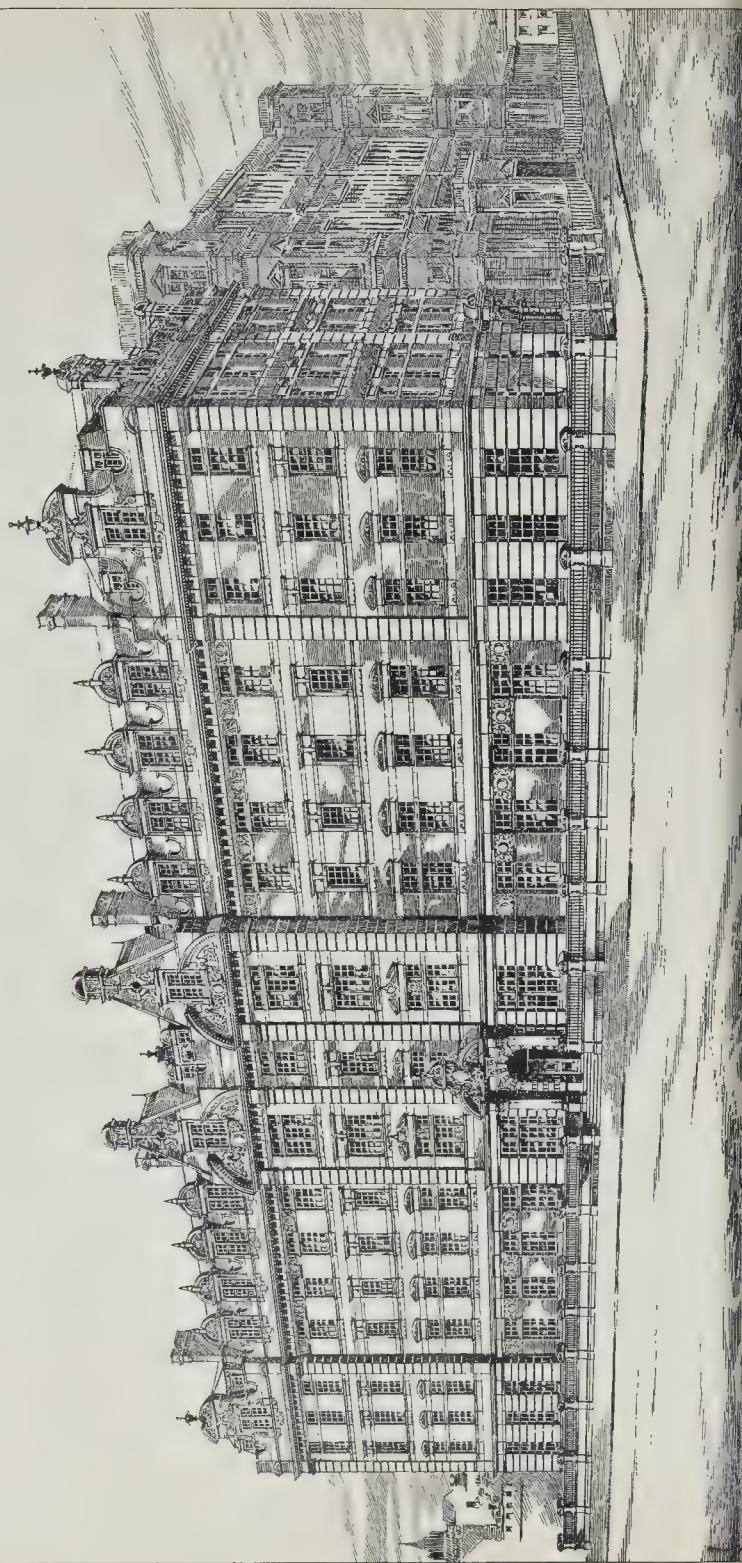
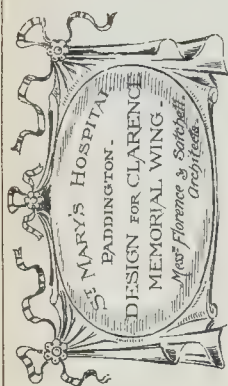
SUGGESTION FOR THE IMPROVEMENT AND ENLARGEMENT OF BLACKBURN TOWN HALL.—By Mr. A. N. BROMLEY, F.R.I.B.A.



THE BUILDING, AUGUST 7, 1902









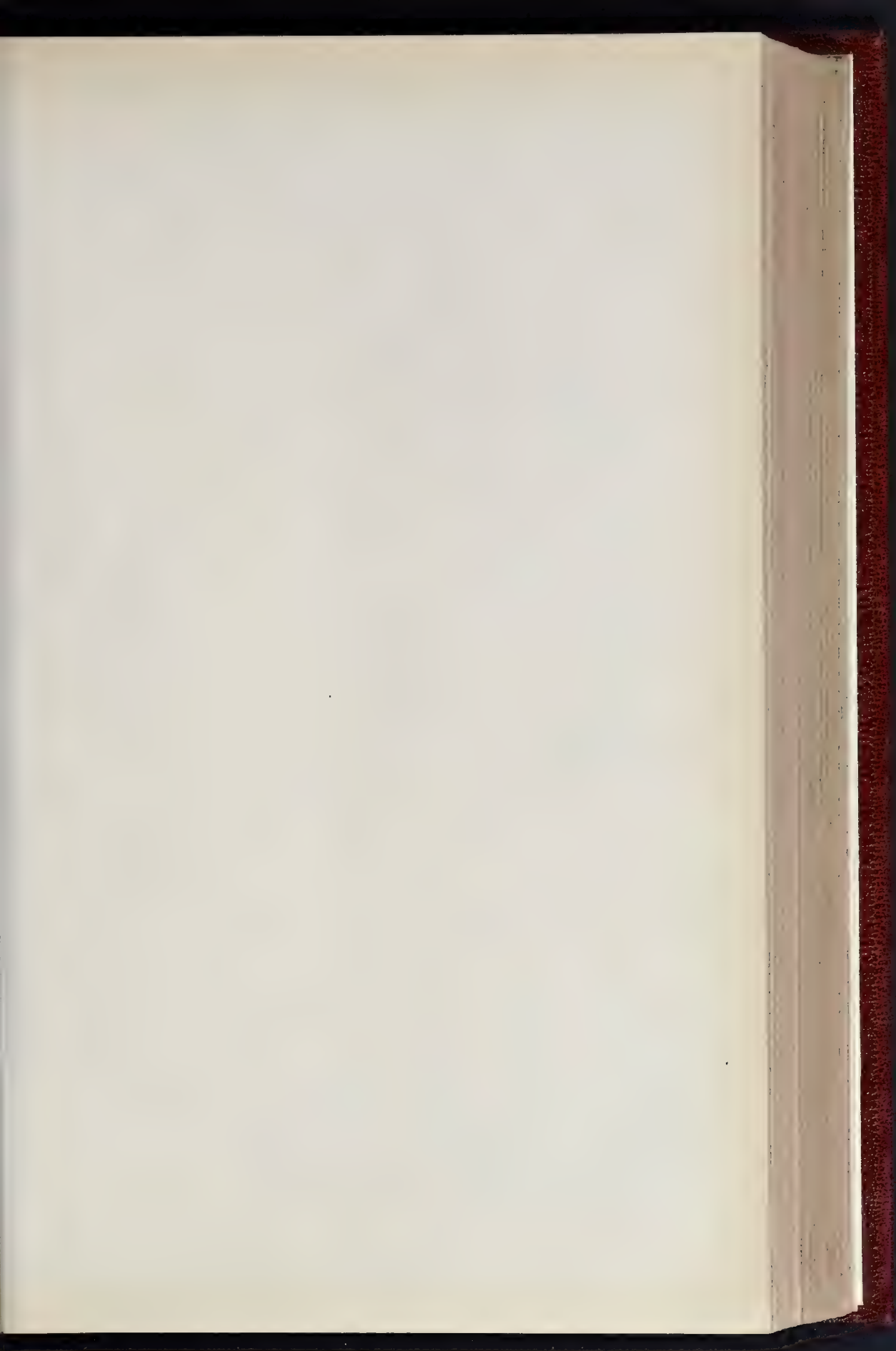
DESIGNED BY MR. J. J. STEVENSON, F.R.I.B.A., ARCHITECT.

HOUSES ON THE GROSVENOR ESTATE, BUCKINGHAM PALACE ROAD, S.W.—MR. J. J. STEVENSON, F.R.I.B.A., ARCHITECT.



PHOTOGRAPHED BY A. S. EAST HARDING STREET FETTER LANE, E.C.

"BRYANSTON," DORSET: THE STAIRCASE.—MR. R. NORMAN SHAW, R.A., ARCHITECT.





TRAILLY



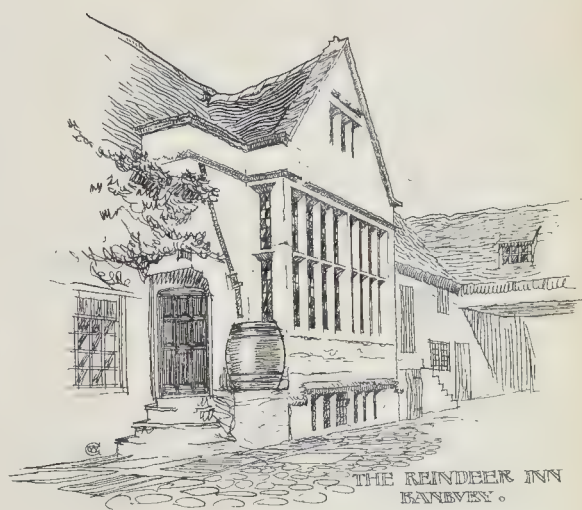
CHARACTERISTIC COTTAGE BUILDINGS



BLOXHAM



HOOK NORTON CHURCH



THE REINDEER INN
BANBURY.

PHOTO LITHO SPRAGUE & CO. 17 4 & 5 EAST HARDING STREET FETTER LANE E.C.

brary purposes and 5,100l. for electric light engines; Lambeth Guardians, 3,000l. for the purchase of land; the Woolwich Union, 11,265l. for homes for children; and Islington Borough Council, 6,500l. towards Highgate Archway improvement.

Conveniences, Telegraph Hill.—It was agreed to spend 1,050l. for the erection of conveniences at Telegraph Hill, the work to be carried out by the Works Department.

Additions to Manor Asylum.—It was also agreed to erect a block of buildings for the accommodation at the Manor Asylum of sixty male patients, at a cost of 9,300l., and to offer the work to the Works Department.

Reconstruction of Vauxhall Bridge.—The following recommendation of the Bridges Committee was agreed to:—

"That the estimate of 10,933l. submitted by the Finance Committee be approved, and that, subject to the terms of an agreement to be prepared by the solicitor, the above-named sum of 10,933l. be paid to Messrs. Petrick Brothers in full settlement of all claims for extras outstanding on April 30, 1902, and not included in any certificate already issued by the engineer, under their contract for the demolition of the old Vauxhall Bridge and partial construction of the new, and that such settlement be upon the distinct understanding that the contract is completed not later than December 31, 1902, and that the seal of the Council be affixed to the agreement when ready."

Fire Stations, &c.—The following recommendations of the Fire Brigade Committee were agreed to:—

"That the estimate of 11,815l. submitted by the Finance Committee in respect of the erection of the Streatham station be approved, and that tenders for the work be invited by public advertisement.

"That the estimate of 10,645l. submitted by the Finance Committee in respect of the erection of the Rotherhithe-street sub-station be approved, that, in the event of the Works Committee being satisfied of the sufficiency of the Architect's estimate, the work be executed by the Council without the intervention of a contractor. That, in the event of the Works Committee not being satisfied of the sufficiency of the Architect's estimate, tenders be invited by public advertisement.

"That an expenditure of 9,700l. be authorised in connexion with the establishment of the Vauxhall Bt-station. That, in the event of the Works Committee being satisfied of the sufficiency of the Architect's estimate, the work be executed by the Council without the intervention of a contractor. That, in the event of the Works Committee not being satisfied of the sufficiency of the Architect's estimate, tenders be invited by public advertisement.

"That an expenditure not exceeding 200l. be authorised in connexion with the provision and location of a street-station at Maida-vale, and that the chairman and the vice-chairman of the Fire Brigade Committee be authorised to accept a tender for the work.

"That the supplemental estimate of 1,150l. submitted by the Finance Committee be approved, and that a further expenditure of that amount be authorised in connexion with the construction of a new ver wall and a grid at Pageant's Wharf, Rotherhithe-street sub-fire-station.

"That the estimate of 1,448l. submitted by the Finance Committee in respect of steam fire-engines be approved. That the offer of Messrs. Shand, Agn, & Co. to supply for 362l. each six steam fire-engines, to be adapted for the use therewith of oil, be accepted.

"That, in the event of the Works Committee being satisfied of the sufficiency of the Architect's estimate of 250l. (such sum being part of the sum of 9,700l. which the Council is recommended to authorise in connexion with the establishment of the Vauxhall Bt-station), the work of constructing the vaults of such station be executed by the Council without the intervention of a contractor.

"That an expenditure not exceeding 200l. be authorised for the provision of a new shed for the long engine at the chief station; that the work be executed by the Council without the intervention of a contractor.

"That an expenditure not exceeding 300l. be authorised for drainage, paving, and other work in the ables at the chief station; that the work be executed by the Council without the intervention of a contractor.

"That an expenditure not exceeding 250l. be authorised for the provision of a shed for the long engine at the Whitefriars station; that the work be executed by the Council without the intervention of a contractor.

"That the tender of Messrs. G. & E. Bradley to execute for 74l. certain hot-water work at the Whitefriars station be accepted.

"That an expenditure not exceeding 491. 15s. be authorised for the provision of an additional bath and lavatory at the Clerkenwell station, and at the work be carried out by the Works Department as a jobbing work.

"That an expenditure not exceeding 200l. be authorised for the provision of a covering over part of the yard of the Clerkenwell station; that the work be executed by the Council without the intervention of a contractor.

"That a further expenditure of 133l. 15s. be authorised for external painting at fire-stations; that the work be executed by the Council without the intervention of a contractor.

Acquisition of Small Dwellings.—The Council adopted a series of regulations under the Small Dwellings Acquisition Act, 1899, with a view to making advances to borrowers.

Public Clocks.—Poplar Borough Council asked the Council to promote legislation enabling Borough Councils to provide for the maintenance of public clocks. An unfavourable report by the General Purposes Committee was sent back.

Tramways, &c.—The following recommendations of the Highways Committee were agreed to after considerable discussion:—

"That the estimates of 145,000l. and 478,500l. respectively, approved by the Council on February 19, 1901, in respect of buildings, rails, machinery, generating-plant, electrical cables and other equipment, and rolling stock in connexion with the reconstruction for electrical traction of the London County Council Tramways between (a) Westminster Bridge-road and Upper Tooting-road, (b) Kennington Park-road (at its junction with Kennington-road) and the terminus at Blackfriars-road, and (c) St. George's-circus and the terminus at Waterloo-road be cancelled. That the estimates, amounting in all to 981,497l., submitted by the Finance Committee be approved; and that the expenditure on capital account of sums not exceeding, in all, that amount be authorised in respect of the works specified in the above resolution.

"That the estimates, amounting in all to 644,350l., approved by the Council on January 28, 1902, in respect of the reconstruction for electrical traction of certain portions of the London County Council Tramways, be cancelled to the extent of 92,000l., being the amount included therein as provision for car-sheds and other buildings.

"That the estimate of 152,000l. submitted by the Finance Committee be approved; and that the expenditure on capital account by the Highways Committee be authorised of sums not exceeding that amount in connexion with the reconstruction for electrical traction of the London County Council Tramways in respect of (1) the erection of car-sheds, workshops, and a sub-station on land at New Cross-gate to be acquired for the purpose by the Council from the Haberdashers' Company; and (2) the erection of a sub-station at the Camberwell tramways depot.

"That application be made, in the next session of Parliament, for powers for the Council to run omnibus services along the routes of any tramways while under reconstruction for electrical traction, for a period not exceeding twelve months from the commencement of the work.

"That the estimates, amounting in all to 31,000l., submitted by the Finance Committee, be approved; and that, subject to the London County Council (Tramways and Improvements) Bill, now before Parliament, becoming law, the expenditure on capital account be authorised of sums not exceeding that amount, for the acquisition of the properties specified in the Bill, and adjoining, respectively (a) Greenwich depot, and (b) the Clapham depot, of the London County Council Tramways.

"That the erection of the chimneys for the electricity-generating station to be established at Greenwich for the electrical working of the London County Council tramways, be carried out without the intervention of a contractor; and that the drawings, specification, and estimate of 16,750l. be accordingly referred to the Works Committee for that purpose.

"That in the event of the Works Committee being prepared to carry out, for the amount of the architect's estimate, the work of forming the foundations of the electricity-generating station to be established at Greenwich for the electrical working of the London County Council tramways, the work be carried out without the intervention of a contractor, but that, should that Committee not be prepared to accept the work at the architect's estimate, tenders be invited during the recess from firms selected by the Architect, with the approval of the chairman of the Highways Committee.

"That the work of erecting the sub-stations at (a) Clapham, (b) Brixton, and (c) near the Elephant and Castle, required in connexion with the electrical working of the London County Council Tramways, be carried out without the intervention of a contractor; that the drawings, specifications, bills of quantities, and estimate of 22,500l. be referred to the Works Committee for the purpose of the work being carried out on the basis of the priced bills of quantities under which that Committee are now carrying out the erection of the fire brigades station at Clapham, and that any prices not included in those bills be mutually agreed between the Highways Committee and the Works Committee.

"That Messrs. W. A. Jones & Sons be allowed to sublet to either Messrs. Watts, Johnson & Co. or Mr. B. E. Nightingale the general contractors' work in connexion with the erection of the engine-house

for the temporary electricity-generating station to be established at Loughborough Junction.

"That the tender of Messrs. J. Hitchen & Son for the supply, delivery, and erection, for the sum of 1,447l. (a) of a twenty-five-ton electric crane for use at the temporary generating-station to be erected at Loughborough Junction; and (b) of three ten-ton hand-crane for three of the sub-stations to be established in connexion with the reconstruction, for electrical traction, of portions of the London County Council Tramways, be accepted. That Messrs. J. Hitchen & Son be allowed to sublet (a) to Messrs. C. C. Dunkerley Ltd., Manchester, the manufacture of certain parts of the crane-girders, and (b) to the British Thomson-Houston Co., Ltd., the manufacture of the electrical equipment for the crane to be erected at Loughborough Junction.

"That the tender of Messrs. Dick, Kerr, & Co. be accepted for the supply, for the sum of 47,686l., of eighty double-deck, single-truck, electrically-equipped cars, required for use on the Streatham section of the London County Council Tramways. That Messrs. Dick, Kerr, & Co. be allowed to sublet (a) to the J. G. Brill Co., Philadelphia, U.S.A., the manufacture of the car trucks; (b) to the Electric Railway and Tramway Carriage Co., the manufacture of the car-bodies; (c) to Messrs. J. G. White & Co. the manufacture of car-ploughs; and (d) to the English Electric Manufacturing Co. the manufacture of the electrical equipment and motors for the cars specified in the contract.

"That application be made in the next session of Parliament for powers for the construction by the Council of the undermentioned new tramways:— 1. Hampstead-road (tramways terminus), across Euston-road and along Tottenham Court-road, to a point near Oxford-street.

2. Edgware-road, via Sutherland-avenue, to Harrow-road (tramways terminus).

3. Hammersmith Broadway, via Bridge-road, to and across Hammersmith Bridge.

4. Trafalgar-road, Greenwich (L.C.C. Tramways) via Blackwall-lane and Blackwall Tunnel, to the Council's (Northern) Tramways in East India Dock-road.

5. Westminster Bridge-road (L.C.C. Tramways terminus) via Westminster Bridge, to the Victoria Embankment.

6. Harlesden (near the county boundary), via Scrubbs-lane, Wood-lane, Shepherd's Bush-road and Brook Green-road, to Hammersmith Broadway.

7. Shepherd's Bush-road, via Westwick-gardens, Netherwood-road, Richmond-road, Holland Park-avenue, High-street, Notting Hill, and Bayswater-road, to a point near the Marble Arch.

8. Edgware-road (from a point near the Marble Arch) to the county boundary at Cricklewood.

9. Deptford (L.C.C. Tramways), via Blackheath-road and hill and Shooter's Hill-road to Herbert Hospital, Woolwich.

10. New Cross-road (L.C.C. Tramways), via Lewisham High-road and Loampit-hill and vale to the South-Eastern Metropolitan Tramways (L.C.C. lines).

11. Battersea Park-road (South London Tramways Company's lines), via Battersea Bridge-road, Battersea Bridge, Chelsea Embankment, Chelsea Bridge-road, and Commercial-road, to a point in Buckingham Palace-road near the Grosvenor hotel.

12. Tooting-broadway (L.C.C. tramways terminus), via Mitcham-road to Tooting Junction Railway Station.

13. Garratt-lane, Wandsworth (authorised L.C.C. Tramways), via Wimbledon-road to the county boundary.

14. Rushey-green (L.C.C. late S.E. Metropolitan, Tramways terminus), via Bromley-road to the county boundary near Bromley-hill.

The total length of the proposed new lines is twenty-six miles, and the estimated cost, 1,307,917l.

Improvements.—On the recommendation of the Improvements Committee, it was agreed to make application to Parliament in the Session of 1903 for powers in regard to the following proposals:—

To widen Brook Green-road and Scrubbs-lane.

To widen Richmond-road.

To widen Edgware-road.

To widen Shooter's Hill-road.

To widen Lewisham High-road, Loampit-hill, and Loampit-vale.

To widen Battersea Bridge-road.

To widen Mitcham-road.

To widen Wimbledon-road.

To widen Bromley-road.

To acquire the necessary property and to set back the western side of Southampton-row 10 ft. between Vernon-place and a point opposite Fisher-street, in order to secure a total width of 100 ft. for the portion of the thoroughfare between Fisher-street and Theobald's-road.

To acquire all the interests in the properties on the western side of Southampton-row, between Vernon-place and Bloomsbury-place, needed for widening that portion of Southampton-row to 70 ft.

That a clause or clauses be inserted in the Bill to provide that the London County Council (Subways) Act, 1893, shall be so extended as to apply to any

subway or subways which may be constructed by the Council in connexion with the foregoing improvements, and also a clause or clauses to provide that in all cases where, in connexion with the foregoing improvements, pipes have to be altered in consequence of the construction of the subway or the widening of the thoroughfare, the Council shall have power to require the companies to move into the subway the pipes already existing in any of the said thoroughfares.

Roads and Sewers, Norbury Estate, and White Hart-lane, Wood Green.—The Housing of the Working Classes Committee recommended, and it was agreed,

"That the estimate of 6,850*l.* submitted by the Finance Committee in respect of the construction of the sewers and the formation of roads with temporary surfaces on section A of the Norbury estate be approved.

"That the estimate of 4,900*l.* submitted by the Finance Committee in respect of the construction of the sewers and the formation of roads with temporary surfaces on Section A of the White Hart-lane estate, be approved."

The work is to be offered in each case to the Works Committee, but tenders are to be invited in the event of the Committee not caring to accept the work at the amount of the architect's estimate.

Housing.—The same Committee recommended, and it was agreed,

(a) That standing order No. 336 as to the erection of dwellings be suspended so far as may be necessary to enable the erection of two blocks of dwellings on a site in York-road, Battersea, to be proceeded with at once.

(b) That the estimate of 26,720*l.* submitted by the Finance Committee, together with the working drawings, specification, and bills of quantities in respect of the erection of two blocks of dwellings on a site in York-road, Battersea, for the accommodation of persons to be displaced by the York-road and Garratt-lane and Merton-road improvements be approved; and that the Housing of the Working Classes Committee be authorised to invite tenders for the erection of the dwellings.

Weights and Measures Office, &c., Greenwich.—The Public Control Committee recommended, and it was agreed—

"That the estimate submitted by the Finance Committee be approved, and that an expenditure of 6,731*l.* be authorised for the erection of a weights and measures office and coroner's court at Greenwich; and that advertisements be issued inviting tenders for the execution of the work."

Proposed Purchase of Open Space at Eltham.—On the recommendation of the Parks and Open Spaces Committee, it was agreed—

"That the estimate of 25,200*l.*, submitted by the Finance Committee, be approved; that the expenditure of that sum be authorised for the purchase of the Avery Hill estate, at Eltham, for the purpose of a public open space, or for such other purpose as the Committee may decide upon."

The Building Act.—The Building Act Committee called attention to the action of the Receiver of Police in causing a police-station at Bow-road to be advanced 19 ft. beyond the building line, and expressed their regret at the attitude of the police authorities as compared with other Government departments.

Dr. Longstaff pointed out that the railway company began the encroachment. Of course, the Government were exempted from the Building Act, but many satisfactory agreements had recently been made with some of the Government departments as to the building line.

Mr. Dew and others protested against passing the matter over.

Dr. Longstaff said he would see what could be done by personal representation in the matter.

Fall of Coping at All Souls' Church, Langham-place.—The same Committee reported as follows:—

"In connexion with the fatal accident, which occurred on July 10 at Langham-place through the falling of a piece of coping from the parapet of All Souls' Church, Langham-place, we desire to call attention to the riders which the jury added to the verdict of 'accidental death' which they returned at the adjourned inquest which was held on the 18th inst., namely—

(a) The jurors further say that not sufficient care was taken in fixing the rope to such a structure, they being of opinion that the structure should have been examined by an expert before fixing the rope."

(b) The jurors are also of opinion that authority should be given to the London County Council or Borough Surveyors to examine buildings or struc-

tures before ropes are allowed to be fixed for extending across the roadway."

We have accordingly given instructions for the recommendations of the jury to be noted for consideration in connexion with the general question of the amendment of the London Building Acts. We may also state that the structure has been surveyed by the District Surveyor in pursuance of the powers conferred by Part IX. of the London Building Act, 1894, which deals with dangerous structures, and that we are informed that arrangements are being made for the removal of the greater part, if not the whole, of the balustrades, and for replacing them in Portland stone."

Appointment.—On the recommendation of the Highways Committee, Mr. E. L. Pope was appointed as distribution engineer in the Tramways Department.

Alterations and Additions, Parker-street Lodging-house.—The Housing of the Working Classes Committee recommended, and it was agreed:—

"That the estimate of 3,095*l.* submitted by the Finance Committee and the working drawings, specification, and bills of quantities in respect of alterations and additions to the kitchen and lavatories at the Parker-street lodging-house, Drury-lane, be approved.

Brickmaking, Norbury Estate.—The same Committee recommended and it was agreed:—

"That the estimate of 4,500*l.* submitted by the Finance Committee for the making of bricks and the burning of ballast on the Norbury Estate during the year 1902-3 be approved, and that the Housing of the Working Classes Committee be authorised to continue the employment of a foreman brickmaker under the architect on the same terms as those on which he was appointed, and to take all necessary steps for the purchase of such plant and materials and the payment of such wages, within the amount of the estimate, as may be required during the year."

Central Garden, Millbank Estate.—It was agreed, on the recommendation of the same committee, to lay out the Central Garden on the Millbank estate.

Main Drainage Extension, &c.—The following recommendations of the Main Drainage Committee were agreed to:—

"That the construction of section C (commencing at a point about 220 ft. west of Abbey Mill lane and extending 4,500 ft. eastwards to the junction with section A) of the two additional lines of outfall sewers between the Abbey Mills pumping-station and the Barking outfall be carried out without the intervention of a contractor; and that the drawings, specification, and estimate of 163,585*l.*, including 13,585*l.* as provision money, be accordingly referred to the Works Committee for that purpose.

That an agreement be entered into between the Council and the London and South Eastern Railway Co. providing that the existing spans conveying the northern outfall sewer over the railway at West Ham shall be reconstructed by the Council at the sole cost of the Company.

That an agreement be entered into between the Council and the West Ham Corporation providing that the existing bridges conveying the northern outfall sewer over Manor-road and Abbey Mill lane shall be reconstructed, with a span of 40 ft., by the Council at the sole cost of the Corporation; that the solicitor be instructed to prepare the agreement.

That the estimate of 500*l.* submitted by the Finance Committee be approved; and that the offer of Messrs. Crossley Brothers, Limited, to supply two independent air-compressing engines and two hydraulic pumping engines complete for an additional payment of 761*l.* in lieu of those originally specified in the contract, be accepted.

That new wrought-iron fencing, 4 ft. 6 in. in height, be erected for a length of about 2,000 ft. along the boundary of the land adjacent to the northern outfall sewer, between Blind-lane and Prince Regent's-lane, West Ham, at an estimated cost of 200*l.*; and that the work be carried out by the Works Department."

Statue, Victoria Embankment Gardens.—The Parks and Open Spaces Committee reported as follows, the recommendation being agreed to:—

"We have received from a Committee formed to commemorate the late Sir Arthur Sullivan a request to be permitted to place a bust (double life-size) in the Victoria Embankment Gardens, as near to the Savoy Theatre as may be practicable. A sketch of the proposed statue has been submitted by Mr. Goscombe John, A.R.A. At our request Mr. George Frampton, R.A., has been good enough to inspect the sketch, and has pronounced it to be a very beautiful design, and has stated that it will be a great acquisition to the garden. We recommend that permission be given for the erection of the proposed memorial to Sir Arthur Sullivan in the Victoria Embankment Gardens, subject to the exact site therefor being approved by the Parks Committee."

Fielder's Meadow, Bishop's Park.—The same Committee recommended, and it was agreed,

"That the estimate of 12,000*l.* submitted by the Finance Committee be approved, and that the Council do agree to contribute that sum towards the cost of laying out the 8½ acres of land known as Fielder's Meadow, and adjoining Bishop's Park, Fulham, such contribution to be made upon the condition that the Council of the Metropolitan Borough of Fulham undertakes to maintain the ground as a public open space, and to complete the work of laying out, including the construction of the river embankment wall, within a period of two years from May 13, 1902."

After transacting other business, the Council adjourned to October 7, after a sitting of six hours.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The annual meeting of this Association is fixed for September 15 to 20. The ground to be covered by this year's Congress is defined as including "Westminster and the Home Counties." The detailed programme is not yet made out.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Kensington, South.—An iron and glass shelter at the entrance to No. 19, Bolton-gardens, Kensington (Messrs. W. T. Allen & Co. for Mr. L. Samuel).—Consent.

Leisham.—A variation from the plan approved on June 10 for the erection of two buildings on the site of Gloucester House, Rushey Green, Catford, as far as relates to the erection of bay windows at the first-floor level in front of such buildings (Messrs. Norfolk & Prior for Mr. S. S. Brush).—Consent.

Marblebone, West.—The retention of an iron and glass shelter in front of the entrance porch at No. 1, Marlborough-hill, St. John's Wood (Mr. F. M. Elgodd for Mr. E. Hinton).—Consent.

Wandsworth.—Buildings on the Tottenham estate, Tooting, with portions projecting in advance of the main frontage of such buildings (Mr. H. Robertson, for the Housing Committee of the Council).—Consent.

Westminster.—One-story shops and entrance porches in front of Nos. 147, 149, and 151, Victoria-street, Westminster (Messrs. Z. King & Son for Mrs. M. Hiscox, Mr. J. T. Hiscox, and Mr. R. T. Raikes).—Consent.

Paddington, South.—One-story shops in front of Nos. 60 and 62, Westbourne-grove, Paddington (Mr. A. Young for Mr. J. Rossdale).—Refused.

Kensington, South.—A projecting sign, to overhang the public ways in front of No. 11, Church-street, Kensington (Mrs. Keightley).—Refused.

Chelsea.—An iron and glass covered way in front of No. 13, Fernshaw-road, Chelsea (Messrs. Weeks & Co. for Col. W. H. Roberts).—Refused.

Width of Way.

Bethnal Green, South-west.—A three-story workshop and a one-story cart-shed on the west side of Hollybush-gardens, Bethnal Green (Mr. E. Brown for Mr. J. Joseph).—Consent.

Westminster.—The re-erection of the rear portion of No. 6, Buckingham-gate, Westminster, to an increased height, with the external walls at less than the prescribed distance from the centre of the roadway of Stafford-place (Mr. T. Kissack for Mr. H. Beaumont).—Consent.

Space at Rear.

Westminster.—Deviations from the plans certified by the District Surveyor so far as relates to the proposed rebuilding of the rear portion of No. 6, Buckingham-gate, Westminster, abutting upon Stafford-place (Mr. T. Kissack for Mr. H. Beaumont).—Consent.

Width of Way, Lines of Frontage, and Projections.

Hackney, North.—Two blocks of two-story flats on the west side of Church Path, Stoke Newington at the rear of Nos. 68 to 74, Albion-road (Mr. A. P. Osmont).—Consent.

Marblebone, East.—Additions at No. 17, York-terrace, Regent's Park, St. Marblebone (Mr. W. Woodward for Mr. J. B. Millar).—Consent.

Westminster.—An oriel window at the rear of No. 6, Buckingham-gate, Westminster, to abut upon Stafford-place (Mr. T. Kissack for Mr. H. Beaumont).—Consent.

Marblebone, East.—Additions at No. 22, York-terrace, Regent's Park, St. Marblebone (Messrs. Kidner & Berry for Mr. J. A. Maitland).—Consent.

Southwark, West.—A porch and two bay windows

front of St. Peter's Church Vicarage-house, inner-street, Southwark (Mr. A. H. Ryan-Tenison for the Rev. W. A. Corbett).—Consent.
City.—An iron and glass shelter over the goods entrance at the rear of No. 6, Bouverie-street, City, abut upon Lombard-street (Messrs. G. Trollope Sons).—Refused.
St. George, Hanover-square.—Two three-story oriel windows to two houses proposed to be erected on the site of Nos. 8, 9, and 10, Eolton-street, Piccadilly (Mr. W. Wonnacott for Mr. E. Davidson).—Refused.
Marylebone, East.—A steel shelter at the Left Luggage Office, Marylebone Station, Great Central Railway, to overhang the roadway of Boston-place (Mr. C. A. Rowlandson for the Great Central Railway Co.).—Refused.

Width of Way and Construction.

Paddington, South.—An external iron staircase and landing in front of No. 7, Polygon-newsouth, Porchester-place, Paddington (Mr. T. Shaw for Mr. Evento).—Consent.
Southwark, West.—Two one-story buildings at Blackfriars Bridge Wharf, Upper Ground-street and inner-street, Southwark (Messrs. Waring & Nicholson for Mr. C. Murrell).—Consent.

Formation of Streets.

Wandsworth.—That an order be issued to Mr. C. Radford sanctioning the formation or laying-out of new streets for carriage traffic out of Gwendolen-avenue, Putney, and in connexion therewith, the widening of portions of Gwendolen-avenue, May Park-lane, and Howards-lane (for Mr. J. T. Reader and Mr. S. Taylor).—Agreed.
Lewisham.—A variation from the plan approved for the formation of new streets for carriage traffic at of Laleham-road, Catford, on the site of the Catford Sports Ground (Messrs. H. and G. Taylor).—Consent.

Means of Escape from the Top of High Buildings.

Westminster.—Means of escape in case of fire proposed to be provided on the fifth, sixth, seventh, and eighth stories of Park Mansions, Albert Gate, Knightsbridge, for the persons dwelling or employed therein (Mr. G. D. Martin).—Consent.
Strand.—Means of escape in case of fire on the eighth story of an addition to Nos. 173-179, Strand, and No. 2, Norfolk-street, on the site of No. 3, Norfolk-street, for the persons dwelling or employed therein (Messrs. White & Co. for the Law Land Co.).—Consent.

. The recommendations marked † are contrary to the views of the Local Authorities.

Correspondence.

THE FALLEN CAMPANILE.

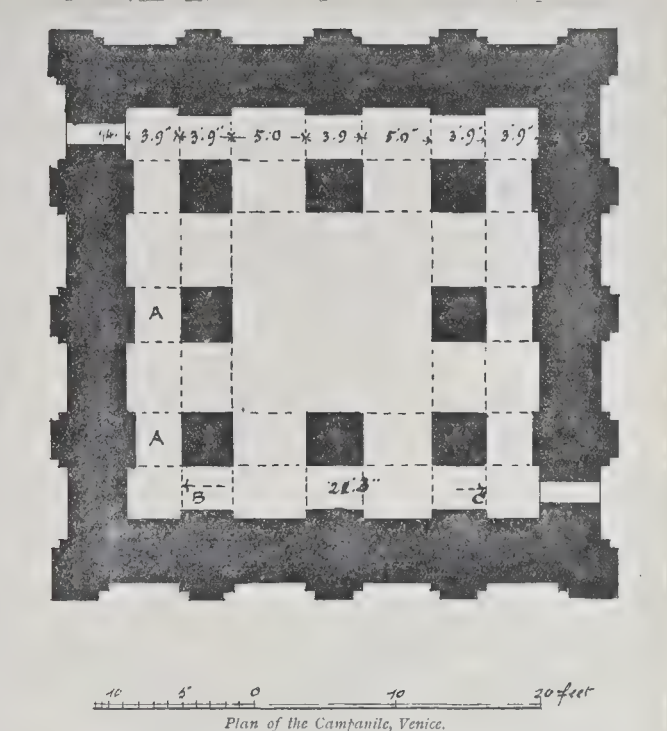
SIR,—I send herewith a plan of the Campanile of St. Mark's, Venice, made from measurements which I took in 1875. I made several memoranda at the time, and noted several serious cracks in the structure, which I attributed to the decay of the bond timbers which tied together the outer and inner walls of the structure. This bond was made of timbers 11 in. by 6 in., and was placed over the arch at the points A A on plan. In many cases the timbers have been cut out, probably on account of their having decayed, but in some parts they were apparently showing no signs of decay. It is my firm conviction that the collapse of the Campanile was mainly attributable to the bond having been cut out and not replaced, thus causing an unequal pressure on the outer and inner walls. As is generally known, there was no staircase, but the Campanile was ascended by an inclined plane, which I measured, and found that from the points B to C, which is about 11 ft., the rise was 5 ft. I shall never forget viewing a gorgeous sunset over the Lagoon from the summit of the Campanile, and the whole of Venice seemed bathed in colours of red and gold.

W. HILTON NASH.

COMPETITION REFORM SOCIETY.

We have received the following communication from the Competition Reform Society:—

Proposed new Wesleyan Church and Schools at the Park-road and Lawson-road, Kirkley.—It may be of interest to your readers to learn that architects have been invited to submit designs in competition for the above proposed buildings. From information received from the Secretary of the Royal Institute of British Architects, who has been in communication with the promoters, with the object of persuading them to revise the conditions, which are unsatisfactory, the Society has notified its



members that they are requested to refrain from competing according to their agreement of membership. The principal points objected to were:—
1. No assessor, and no guarantee to employ the author of the best design.
2. No premium.
3. Amount of work asked for excessive, inasmuch as roof and foundation plans, details of lighting and heating, and details and complete specification are asked for.
4. Competitors had to assure themselves as to correctness of site plan accompanying conditions.
The only points which were conceded by the promoters were:—
1. A premium of 10l. was offered.
2. Drawings might be drawn to one-eighth or one-sixteenth scale at the option of the competitor.
Biddford Proposed Municipal Offices, Library, &c.—The Society has received information that certain alterations have been made in the conditions, especially with regard to the appointment of an assessor, which is now definitely agreed upon. The attention of the promoters was also drawn to other details, which it is understood will be submitted to their Committee.
HENRY A. SAUL, Hon. Sec.

. The conditions of the first-named competition are of course preposterous, and no architect who respects himself ought to send in for it.—ED.

THE "SCIENTIFIC ROLL."

SIR,—Your reviewer has made an honest attempt to describe my work, but he passes judgment on the whole work on the strength of the May number only (No. 5). You have had all the numbers, 1 to 5, and a list of headings indicating roughly the contents of the proposed volumes on Bacteria. If you were to look at these, and then were to compare them with your last five lines, you would form a different opinion; and if you had the whole work before you (which will probably extend to some 2,000 or 3,000 pages), I imagine you would alter it still more. Further, you must bear in mind that all these 2,000 or more pages are about bacteria only, and about bacteria of all kinds; but the "Scientific Roll" deals with a large number of other subjects. No doubt it is "limited," but so are the powers of one individual. My work represents the labour of the spare time of over forty years, and although limited, the limits are, in my opinion, rather wider than you seem to consider them.

A. RAMSAY.

A TOUR IN NORMANDY.

SIR.—In answer to Mr. R. E. Stewardson's letter in your last issue, I would say that there is more than enough in Normandy for many tours, all of

which I have managed at separate times. I give him two routes for choice:—

1. To cross to Dieppe, visiting the two churches there, the Castle, and the Manoir d'Ango, and the Church and Castle of Arques. In the neighbourhood, the Château and Church of Mesnières, the Churches of Neuchâtel-en-Bray, Gournay, Gisors, Vernon, and Rouen; the fine glass at Conches, the Church at Bernay, and the Cathedrals of Evreux and Lisieux, and the old houses at the latter town. Louviers is also worth seeing, to say nothing of Château Guillard and the Churches of Grand and Petit Andelys.
If he prefer to go further west he should cross via Cherbourg, or Caen, and go to Mont St. Michel, Coutances, Falaise, Lisieux, and Bayeux, and if his time permitted, see St. Lô, and specially, Caudebec-en-Caux.
These are both truly "happy hunting-grounds" from start to finish. The inns are inexpensive and homely, and either tour would give him, as to myself, entire delight, and, I hope, some profit.
E. SWINPEN HARRIS, F.R.I.B.A.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

5.—MODERN MORTARS—ACTIVE SILICA IN SAND AND LIME—THE SETTING OF MORTARS—WET BRICKS AND STIFF MORTAR versus DRY BRICKS AND SLOPPY MORTAR.

MORTAR or Lime Mortar is a mixture of lime and sand or sand substitute converted into a coherent mass by admixture with water.

Cement Mortar is a mixture of cement and sand or sand substitute converted into a coherent mass by admixture with water.

The cementitious value of lime mortar is dependent upon (1) the proportion of active silica and alumina in the lime; (2) the proportion of active silica in the sand; (3) the physical condition of the inert portion of the sand; and (4) the proportion of lime to sand, and the completeness of the mixing operation.

The value of cement mortar is, of course, largely dependent upon the value of the Portland cement, the properties of which will be discussed in a subsequent chapter.

Active Silica in Sand.—It has already been

stated that the sand used for building usually contains a small proportion of silica in a form which is capable of entering into chemical combination with lime. This active silica is probably present in a form closely resembling flint. Flint is composed of colloidal silica together with a certain proportion of crystalline silica and small quantities of iron and lime. The colloidal silica is insoluble in hydrochloric acid, but is readily dissolved by caustic soda. It differs, therefore, from the silica in Portland cement, which, present as calcium silicate, is readily soluble in hydrochloric acid; and also from quartz silica, which is not appreciably soluble under ordinary conditions in either hydrochloric acid or caustic soda.

Samples of builders' washed sand and of crushed flint subjected to successive half-hour boilings with fresh quantities of 10 per cent. caustic soda solution gave the following results:—

Matter soluble in		Builders' Sand, per cent.	Flint, per cent.
10 per cent. soda	1st boiling	2.00	14.60
"	2nd "	1.50	15.25
"	3rd "	0.85	not continued.

In neither case was any appreciable quantity of silica soluble in hydrochloric acid present. There is therefore a great difference in the action of soda upon flint sand and quartz sand respectively, and there is little doubt that a similar difference exists in the action of lime upon the two sands, although the lime is slower in its action than soda. It is probable that the strength of old flint rubble walls is partly due to a chemical reaction having slowly taken place between the lime and the flint surfaces, calcium silicate having been formed.

Landrin's Hydraulic Silica.—As long ago as 1883 Landrin observed that a form of silica insoluble in acids, but having the property when mixed with lime of setting under water, can be produced by ignition of the silica obtained by the action of an acid upon potassium silicate. Silica in this form he called "hydraulic" silica. Although the silica was originally insoluble in acids it was found that after it had been mixed with lime and water and allowed to harden, it became soluble in acids. The solubility of the silica was proportional to the time of immersion of the mixture under water. This peculiar property of hydraulic silica is not due to its fine state of division, for the silica formed in the preparation of hydrofluosilicic acid does not possess it.

Active Silica in Lime.—The active silica in lime is for the most part, like that in Portland cement, soluble in hydrochloric acid, being present no doubt mainly in the form of silicate of lime. The great importance of this form of silica of lime employed for building purposes was shown in the preceding chapter.

The Setting of Mortar in Air.—When a moist mixture of practically pure lime and quartz sand sets on account of its exposure to the atmosphere, the hardening is due to the evaporation of the water and the production of minute crystals of hydrate of lime holding fast to one another and to the grains of sand. As the mortar dries it also absorbs carbon dioxide from the atmosphere, and calcium carbonate is formed.

After the mortar has been exposed for twenty-four hours, the hardened mass consists of a mixture of hydrate of lime and carbonate of lime, but as time progresses, carbon dioxide from the atmosphere continues to displace the water in the mortar, and the latter, in consequence, continues to harden.

In old mortars the water in a state of combination seldom amounts to 4 per cent., whereas the proportion of carbon dioxide usually amounts to from 10 to 30 per cent. according to the purity of the lime and the proportion of sand used. Most of the combined water in old mortar is moreover present as hydrated silicate of lime or hydrated calcium aluminate, and not as calcium hydrate.

Sand is used as a constituent of lime mortar because sand is cheaper than lime, and to enable the air to come in contact with the whole of the lime. If lime without sand were made into a plastic mass with water and then allowed to dry by exposure to air, an impervious outer crust of carbonate of lime would be formed which would prevent air from gaining access to the interior of the mass, and it

would remain soft for an indefinite period. The sand also tends to prevent undue shrinkage of the mortar as it sets.

The Setting of Mortar under Water.—Mortar made with rich lime is not so strong as mortar made with lime containing active silica. This active silica enters into combination with the lime in the presence of water and forms hydrated silicate of lime, which is a stronger and more durable cement than calcium carbonate. No constituent of the atmosphere is required to assist in effecting combination of the silica with the lime if the mortar be mixed with sufficient liquid water. The calcium silicate is insoluble in water, and the chemical reaction which results in the setting of the mortar takes place as readily under water as in air. Hence the mortar is termed "hydraulic." Hydraulic mortars also contain alumina which combines with lime to form calcium aluminate which also assists in the hardening of the mortar.

Rich Lime Mortar will therefore entirely fail to set under water because the lime is cut off from contact with the carbon dioxide of the atmosphere, and because calcium hydrate is soluble to a very appreciable extent in water. By contact with a sufficient volume of water the whole of the lime in rich lime mortar might be dissolved and only the sand be left. Most natural waters contain dissolved carbon dioxide, which might react with the calcium hydrate solution to form solid calcium carbonate but for the fact that calcium carbonate is itself soluble in water containing free carbonic acid, although insoluble in pure water. When exposed to the air the calcium hydrate in rich lime mortar is gradually converted into calcium carbonate, which is much less soluble. The solid calcium carbonate and hydrate formed when rich lime mortar is used in air-exposed walls, holds more or less tenaciously to the sand and bricks or stone, but is always inferior in strength and durability to the calcium silicate and aluminate present in hydraulic mortars.

Stone Lime Mortar or Feebly Hydraulic Mortar fails to set satisfactorily under water because the quantity of active silica and alumina present is so small that, after all the silica and alumina has combined with lime, a large proportion of free hydrate of lime is left. This free lime cannot be converted into insoluble calcium carbonate in the absence of atmospheric carbon dioxide, and is slowly dissolved by the water in which the mortar is immersed, and even calcium carbonate is dissolved by water containing carbon dioxide. Stone lime mortar sets harder in air than rich lime mortar because of the larger proportion of calcium silicate and aluminate present.

Hydraulic Mortar sets satisfactorily either in air or under water, because the proportion of the calcium silicate and aluminate formed by the action of the water used when converting the dry mixture of lime and sand into a plastic mass is so large that the mortar hardens and becomes insoluble irrespective of the constituents of the atmosphere. In Portland cement, which may be regarded as almost perfect hydraulic mortar, the silica, alumina, and lime are so proportioned that when they have been induced to enter into chemical combination by the action of water very little free lime remains.

Proportion of Lime to Sand.—Lime being more costly than sand, it is a common practice to mix as much sand or sand substitute with the lime as may be employed without dangerously reducing the strength of the mortar. The proportions commonly recommended are, by volume, 1 of lime to 3 of sand for lime mortar, and 1 of cement to 4 of sand for cement mortar. For high-class work less sand is sometimes used, but in speculative building these proportions of sand, which should be regarded as the maximum permissible quantities, are often greatly exceeded.

In London, all mortar must comply with the following requirements of the By-laws of the London Building Act, 1894:—

"The mortar to be used must be composed of freshly-burned lime and clean sharp sand or grit, without earthy matter, in the proportion of one of lime to three of sand or grit.

The cement to be used must be Portland cement, or other cement of equal quality, to be approved by the District Surveyor, mixed with clean sharp sand or grit, in the proportion of one of cement to four of sand or grit. Burnt ballast or broken brick may be substituted for sand or grit, provided such material be properly mixed with lime in a mortar mill;

These proportions are, of course, by measure and not by weight. Mortar made with 1 part of hydraulic lime to 3 of sand by weight might contain not more than 10 per cent. by weight of calcium oxide (CaO) and yet be good mortar and made in compliance with the requirements of the by-laws.

The vagueness of the terms used in the by-laws has rendered it extremely difficult to obtain a conviction on the evidence of chemical analysis against a builder under this Act for employing bad mortar. What, for example, is the legal definition of the term "earthy matter"? Lime and sand might both be correctly described as earthy matter, since both are normal constituents of earth.

Clay, garden mould, and road sweepings are presumably intended to be included in the term "earthy matter," yet the use of broken brick, which is but heated clay and sand, is permitted. Garden mould, moreover, may contain so small a percentage of matter other than sand and compounds of lime that the results of a chemical analysis would not afford striking evidence of the evil character of a mortar containing it. The presence of, say, 2 per cent. of fermentable organic matter does not appear very alarming in an analysis, but men of experience know that it may materially weaken the mortar and cause the walls in which it is used to evolve emanations prejudicial to health.

Again, what is lime? Chemically speaking, it is an oxide of the metal calcium. But builders know well that pure oxide of calcium, or "fat" lime must not be used for mortar. On the contrary, the lime should be made from an impure limestone containing a comparatively large proportion of clayey or "earthy" matter.

Method of Estimating Earthy Matter.—In 1896 Messrs. Dibdin and Grimwood, of the Chemical Department of the London County Council, read an interesting paper before the Society of Public Analysts on "The Analysis of Mortar," in which the following method for estimating earthy matter in mortar was given:—The sample is well broken up and mixed, and "a portion weighing 10 grammes is placed in a beaker, stirred up with 10 per cent. hydrochloric acid, and allowed to stand for one minute, when the fluid is decanted, and with it all the fine earthy matter held in suspension. This process is repeated until all the supernatant water at the end of one minute is clear. The cleaned, washed sand and grit or broken brick is then dried and the weight ascertained. The earthy matter is filtered from the washings and weighed."

As a result of their investigation the authors of the paper found that the earthy matter in mortars made in accordance with the requirements of the by-laws and subjected to this test varied from 0.61 to 2.1 per cent.

The writer has tested a number of mortars by the Dibdin & Grimwood test, but has obtained considerably higher proportions of earthy matter even in very good mortars than those quoted by the authors, especially in mortars in which sand is partly replaced by broken brick. The earthy matter obtained by this method of examination is, moreover, not necessarily deleterious. A considerable proportion of that obtained from samples examined by the writer consisted of oxide of iron, not dissolved by the dilute acid, and it also included amorphous silica (not clay or silicate of alumina) which was readily soluble in 10 per cent. caustic soda solution, and which was, no doubt, a useful constituent of the mortar. The test is a useful one, but before condemning the earthy matter obtained as prejudicial it should be subjected to analysis.

Wet Bricks and Stiff Mortar versus Dry Bricks and Sloppy Mortar.—For many generations it has been accepted as an axiom that good brickwork can only be erected by using bricks saturated with water and well mixed mortar in a stiff, plastic condition. The object of the wetting of the bricks has been to prevent the bricks from absorbing water from the mortar and thus prevent the latter from becoming properly set.

In recent years speed in bricklaying has in certain cases been greatly accelerated by the use of unwetted bricks and of mortar mixed with sufficient water to make it assume a sloppy condition. Dry bricks are lighter and less uncomfortable to handle than wet bricks, and sloppy mortar can be more rapidly laid than stiff mortar. A trowel charge of sloppy mortar can moreover be made to cover twice as many bricks as a trowel charge of stiff

mortar, and less energy is expended in tapping the bricks into position.

Theoretically the use of sloppy mortar is wrong, for although the excess of water tends to remove the objection to dry bricks, yet there must be a tendency for the lime to separate from the sand owing to its different specific gravity, the rate of separation being much greater in a liquid than in a plastic mixture of the two substances. In the liquid mortar, moreover, a considerable amount of lime must enter into solution and permeate the bricks, thus leaving an excessive proportion of sand in the mortar which remains on the surfaces of the bricks.

Buildings, however, which have been erected on the liquid mortar system have not collapsed, and in the absence of comparative experiments by the Royal Institute of British Architects, or any other authority, as to the strength of brickwork built by the two systems respectively, it is not surprising that sloppy mortar is in certain quarters rapidly increasing in popularity.

BOOKS RECEIVED.

THE BUSINESS ENCYCLOPEDIA AND LEGAL ADVISER. By W. S. M. Knight, Barrister-at-Law. Vol. II. (The Caxton Publishing Co.)
WAGES TABLES FOR WAGES PAYABLE BY THE HOUR. Compiled by Edwin Dowding. (King, Hill, & Olding.)

OBITUARY.

MR. STANHAM.—We have to record the death at his residence, Glenholme, Grove Park, Chiswick, on July 22, in his seventy-fifth year, of Mr. George Gordon Stanham, an old and respected member of the architectural profession. Mr. Stanham, who from active practice as an architect and surveyor sixteen years ago, and was succeeded by his son, Mr. George Gordon Stanham, of Queen Victoria-street, E.C., architect to the Stationers' Company. Mr. Stanham entered upon his career as a student in the Government School of Design at Somerset House. At that time the master of the architectural class was C. J. Richardson, whom he afterwards assisted in making some of the drawings for Richardson's volumes. Large folio size, upon the "Architectural Remains of the Reigns of Elizabeth and James I.," begun in 1836 and completed in 1840. Mr. Stanham was employed during some while as the assistant of Messrs. Hunt & Stevenson, of Westminster, architects. Of his architectural works we may mention the Nonconformist Chapel and Schools in Allen-street, Kensington; many buildings in the City of London, including premises in Cheapside (at the corner of Bow Church-yard) and in Coleman-street, together with large wool warehouses in East London. He was architect also of some buildings, comprising Messrs. Perry & Tom's premises, erected at the rebuilding of the City of London (south side). As a surveyor, Mr. Stanham was concerned in the improvement and development of several large estates, and laid out the Holland-road property for the late Mary, Baroness Holland, of Holland House. He was closely associated with various building societies, and was well known in London as director and surveyor of the Kensington Building Society; he was director and surveyor of the Temperance Building Society, and others. We may add that Mr. Stanham, who owed all his success to his own labours and abilities, was a Freeman of the City and a member of the Needle-makers' Company.

GENERAL BUILDING NEWS.

WESLEYAN CHAPEL, DURHAM.—A new Wesleyan church and schools are being erected at Durham on a site adjoining the Shire Hall in the Elvet. The architects are Messrs. W. J. Forster & Son, of Bradford. The building will be an Elevated Gothic in style, with a tower and spire at the north-east corner rising to a height of 100 ft. Inside the church there will be a nave, aisles, choir and organ chamber, with a gallery, the Old Elvet end. The ground floor will provide accommodation for about 500 worshippers, and the upper floor will seat more. The interior wood work, as well as the open wagon roof, will be of pitch-pine. The school and other accessory buildings are behind the church. There will be direct access from the church to the adjoining premises, which include a school with an assembly hall, and which are grouped the infants' room and classrooms. The scheme also includes a ladies' room, kitchen, vestry for the minister, and a choir, and a guildroom placed on an upper floor. The contracts are let at a total of about 7,200 l.

CHURCH, RETFORD.—The foundation-stone has been laid of a new church in the parish of Retford. The architect (Mr. C. Hodgson Fowler) prepared plans for the complete church, a tender

for which was obtained at 7,540 l. The whole church when completed will seat 550, but the portion which is now under construction provides accommodation for 200 only.

CHURCH, WESTON-SUPER-MARE.—St. Saviour's Church, Weston-super-Mare, the erection of which was begun about ten years ago, when the chancel, organ chamber, and vestry were built, has now been enlarged by the addition of the nave. The church has been built with local limestone and Bath stone dressings. The interior is faced with buff Cattybrook bricks, and red rubber strings and voussours to arches. The style is the Early English period. The carvings have been executed by Mr. J. P. Steele, of Bristol. The church is lit by electricity. The whole of the contract, and also the choir and nave seating, has been carried out by Mr. H. W. Pollard, of Bridgwater, under the supervision of Messrs. S. J. Wilde and Fry, architects. The first portion of the edifice cost 3,000 l.; the contract for the portion now added was 3,300 l.

CHURCH FOR FIVEALE, SHEFFIELD.—On the 24th ult. the Archbishop of York dedicated St. Cuthbert's Church, Fifth Park-road, Sheffield, which is to be the centre of a parish formed out of parts of Ecclesfield, Grimesthorpe, and Pitamoor. The chancel, transepts, and organ chamber have been completed, and also a portion of the nave and aisles. When finished, the church will consist of chancel, nave, north and south aisles, transepts, organ-chamber, and clergy and choir vestries. There remains to be provided three bays for the nave, a recess at the west-end for the font, and porches on the north and south sides. There is at present accommodation for about 300 people, but when the full scheme has been carried out there will be 700 sittings. The choir stalls are of English oak, and in panels at the end of each stall are carvings representing events in the life of St. Cuthbert, and also figures of the four Evangelists. The lectern, communion rail, and gas fittings are of wrought-iron and brass. A combination of hot water and hot air has been introduced into the system of heating. The building has been erected by Messrs. J. Longden & Sons, under the supervision of the architects, Messrs. J. D. Webster and J. Douglas Webster.

CHURCH SCHOOLS, RASTRICK.—New Sunday schools, erected in connexion with St. John's Church, Rastrick, Yorkshire, were opened recently. The new schools have been built from designs prepared by Mr. B. Stocks, architect, of Huddersfield. The buildings will be 110 ft. 6 in. in length and 50 ft. 2 in. in width. The principal room will be used as a mission church until the new church is built.

BUILDING IN ABERDEEN.—The Plans Committee of the Town Council has sanctioned the plans of the following new buildings in Aberdeen:—Stable at South Esplanade West, for Mr. Henry Cable, per Mr. William Smith, architect; premises at the junction of Market-street and Palmerston-road, for the Great Grimsby Coal, Salt, and Tanning Company, Ltd., per Messrs. Brown & Watt, architects; alterations and additions in connection with dwelling-house on the south side of Albany-place, for Messrs. Peter Bisset & Son, contractors, per Messrs. Sutherland & Pirie, architects; offices on the south side of the diversion of the road at Wellington Bridge between Wellington-road and North Esplanade, for Messrs. James Abernethy & Co., engineers, per Messrs. Kelly & Nicol, architects; six dwelling-houses on the north side of Orchard-street, for Mr. James Green, per Mr. R. G. Wilson, architect; dwelling-house on the south-west side of Fonthill-terrace, Messrs. Brown & Watt, architects; two dwelling-houses on the south side of Caledonian-place, for Mr. Joseph Lamb, superintending engineer, per Mr. Duncan Hodge, architect; alterations on shops at corner of St. Nicholas-street and Schoolhill, for Dr. John Robertson, per Messrs. D. and J. R. McMillan, architects; alterations on premises Nos. 130 and 132, Union-street, for the Caledonian Insurance Company, per Messrs. Brown & Watt, architects; alterations on premises at corner of Union-street and St. Nicholas-street, for Mr. H. Samuel, per Mr. James A. Beattie, C.E.

FIRE-STATION, HIGHBURY.—On the 23rd ult. Mr. A. A. Allen, Chairman of the Fire Brigade Committee of the London County Council, laid the memorial stone of a new fire-station now in course of erection in Blackstock-road, Highbury. The value of the site was estimated at 2,000 l., and the architect's estimate for the cost of the building was 11,620 l. Mr. W. E. Riley, the Council's Superintending Architect, will supervise the erection, and the new building will be lighted by electricity.

CHURCH SCHOOLS, WOLVERHAMPTON.—On the 22nd ult. the dedication service in connexion with the new St. Peter's Schools, Wolverhampton, was conducted by the Bishop of Lichfield. The schools, which are situated near to St. Peter's Church Institute, will take the place of the schools in St. Peter's walk, which are about to be demolished to enlarge the wholesale market, and will accommodate 850 children, the cost being 6,000 l. The architect is Mr. F. T. Beck, and the builders are Messrs. H. Willcock & Co., Wolverhampton.

Y.M.C.A. BUILDINGS, ST. HELENS.—The foundation-stones of the new Young Men's Christian Association buildings at St. Helens were laid on the 24th ult. The new premises are being erected on a plot of land adjoining the Y.M.C.A. Gymnasium, at the corner of North-road and Duke-street. Under

the rooms to be utilised for the Association's purposes will be a row of shops. The new premises will be Renaissance in style, and will be faced with Ruabon brick and terra cotta dressings. Mr. Joseph Ellison, St. Helens, has secured the contract, and the plans for the work were prepared by Messrs. Briggs & Wolstenholme, of Blackburn.

CONVALESCENT HOME, LLANDUDNO.—On the 24th ult. the memorial stone of the Lady Forester Convalescent Home, Craigydol, Llandudno, was formally laid. The home occupies a site on the slope of Gloddath Hill, the north-western and north-eastern boundaries of which being Queen's-road and Fern Bach-road. The edifice is designed for the reception of fifty to sixty convalescents. In the centre will be the administration block, containing apartments for the matron and staff, offices, &c.; the north wing will be occupied by the women and children, and the south wing by the men. A single dining hall of 50 ft. in length and 30 ft. in width will be built for the accommodation of patients of both sexes. Electricity will be supplied from the municipal works for lighting purposes, and also to operate an electric lift. For the men there will be a smokers' room. The lodge and entrance gates will be in Queen's-road, and it is proposed to build a laundry and stables in the north-east angle of the grounds. Mr. E. B. T'Anson, of London, is the architect, and Messrs. Brown & Son, Salford, are the contractors. The grounds have been laid out and planted from the designs, and under the supervision, of Mr. W. Pierce Williams.

"CARRICK HOUSE," BELFAST.—A Municipal lodging-house, to accommodate 130 paying guests, is being erected at Belfast, and in the course of a few weeks it will be opened. It was designed by Mr. James Munce, Assistant City Surveyor, with the assistance of Mr. J. C. M. Browne, and carried out by the staff of the Surveyor's Department. Carrick House has a frontage of some 135 ft. to Lower Regent-street. It is built of red brick, with Dumfries stone dressing sparingly introduced. The upper floors are devoted to sleeping accommodation, the cubicles being arranged in two large blocks, between which the space is roofed over, forming a covered area or common hall. Each cubicle has its own window, to be opened or shut at the will of the occupant. The windows are arranged in pairs opposite each other, so that there is a thorough ventilation from side to side. The ground floor comprises a kitchen and dining-room below one dormitory, and a living room for the lodgers underneath the other. The right hand side of the building, next to the kitchen and grocery shop, is devoted to the staff, and the left hand to lavatory accommodation, which is cut off from the rest of the establishment. The cooking and heating will be done by gas and the lighting by electricity. A reception room is situated to the left of the entrance, and on the opposite side is the superintendent's office, containing a Milner's safe in which will be kept money and valuables lodgers may wish to place in safer custody than their own. Entering the common hall will be dispensed at low prices. Each lodger will have at his disposal, on paying 6d., a key "passing" three lockers of different sizes, which he can use for food, clothing, and other contents during his stay. The dining hall adjoins the common hall, and will accommodate about eighty persons at one time. Leading out of the dining-room is the "shop" store. Behind the sale counter is the kitchen. Behind the shop runs a corridor, where the guests may sit and smoke, garden seats being provided for their convenience. Clean blankets, linen, &c., are kept in a heated room. Lodgers can either do their own laundry work in a room fitted for the purpose, or get it done for them at a small cost. A yard will admit laundry vans from Unity-street, and close by are the drying-room, fumigating-room, coalhouse, and woodhouse. Accommodation is also provided for the blacking of boots, and small rooms will be let at nominal rates to barbers and others whose services are equally desirable. A bathroom is provided, and lodgers will be expected to use periodically the cold and warm douche, which is provided gratis, or to pay one penny for a slipper bath, including soap and towel. Throughout the building the walls are of white glazed brick to a height of some 5 ft., with blue wash upwards. At the foot of the main staircase is a Bostwick folding-gate, 8 ft. 6 in. high. The ticket office will be opened at 7 p.m., and the Rowton House system of distribution adopted. The building is of three stories, and upstairs are four dormitories, each at present containing twenty-five beds. The electric light installation is by Messrs. John Braden & Co. Messrs. Richard Patterson & Co. have been responsible for the plumbing work under the supervision of Mr. James Smylie, Corporation building inspector.

FIRE STATION, CLAPHAM.—The memorial stone of the new fire station which is being erected at the junction of Grafton-square and the Old Town, Clapham, was laid recently. In the new building, the front portion nearest Old Town, which will be two stories in height, will consist of the appliance-room, offices, lavatory, and recreation-room on the ground floor, and staircase to superintendent's and district officer's quarters over. Adjoining the recreation-room will be the single men's quarters, whilst beyond, facing Grafton-square and in the rear of the site, will be the cottages for the accom-

WINDOW, &C., RUGBY SCHOOL CHAPEL.—A few

ys ago the Archbishop of Canterbury, a former admaster of the school, unveiled the new "Parable" west window which has been presented by old Rugbeian as a memorial to his father. The ndow was executed by Messrs. William Morris & Co., of Merton Abbey, from a design made by Mr. Pearle. At the same time were unveiled two small medallions set up in the north transept, of which Hugh Clough and Matthew Arnold, captured by Miss Lilian Morris, the decorative rking being by Mr. T. G. Jackson, R.A. The chapel, iginally erected in 1820 after Henry Hakewill's designs, was practically rebuilt by Butterfield for a tercentenary celebration, 1870, and four years o was enlarged by Mr. Jackson, as a memorial to the late Reverend P. Bowden-Smith, assistant master. Samuel Wyatt, who had been first architect for the chapel, headmaster's use, and other school buildings, died (1807) orly after he had sent in his plans; in November, 90, Henry Hakewill was appointed their architect the trustees, and so continued until his death in 1850. He designed the various buildings in the domestic Gothic, or rather Tudor, style, of which oured illustrations, after Westall and others, will found in Ackerman's quarto volume, 1816, giving a history of Winchester, Westminster, Eton, arrow, Rugby, and other public schools. At the opening of the chapel on October 1, 1808, was the memorial to Archbishop Benson, signed and by Mr. Jackson, and comprising a tallion portrait executed by Mr. A. Bruce Joye. Dean Goubourn window in the south transept by Mr. C. E. Kempe, an old Rugbeian.

BUILDING TRADE IN FRANKFORT-ON-MAINE.—Francis Oppenheimer, the British Consul-general, reports officially that during the past year 1901 he designed the various buildings in the domestic Gothic, or rather Tudor, style, of which oured illustrations, after Westall and others, will found in Ackerman's quarto volume, 1816, giving a history of Winchester, Westminster, Eton, arrow, Rugby, and other public schools. At the opening of the chapel on October 1, 1808, was the memorial to Archbishop Benson, signed and by Mr. Jackson, and comprising a tallion portrait executed by Mr. A. Bruce Joye. Dean Goubourn window in the south transept by Mr. C. E. Kempe, an old Rugbeian.

UNIVERSITY COLLEGE, LONDON.—The following list of prizes for the past term in the architectural classes at University College, conducted by Professor Roger Smith:—*First Prize*:—Donaldson Silver Medal, C. W. Kilner, Bury St. Edmunds, Suffolk; *Second Prize*:—Silver Medal, H. W. Hutton, London; *Third Prize*:—Silver Medal, C. S. J. Durden, London; *Fourth Prize*:—Silver Medal, G. L. Lambie, London; *Fifth Prize*:—Silver Medal, B. Stapleton, London. *Building Construction and Drawing*:—Elementary Class, 1st Prize, C. W. Kilner, Bury St. Edmunds, Suffolk; 2nd Prize, F. T. Fox, London; 3rd Prize, W. H. Williams, London; 4th Prize, J. H. Vivian, London. *Advanced Class*:—1st Prize, F. H. Hudson, London; 2nd Prize, H. W. G. London; 3rd Prize, G. Wiggins, London; 4th Prize, L. A. Jarvis, London; 5th Prize, C. A. Sheppard, London.

Councillor Johnston moved as an amendment, seconded by Baillie Glass, that the Committee recommend that the whole of the Council's architectural work, as well as the various duties at present performed by the City Architect, should be transferred to the Burgh Surveyor. On a division there voted, for the motion, 4; for the amendment, 4. The votes being equal, the Convener gave his casting vote in favour of the motion, which was declared carried.

KING'S COLLEGE, LONDON.—The following are the results of the examinations in the Evening Department of Architecture and Building Construction, given in order of merit:—*Building Construction*:—Silver medal and 3rd in books, A. Norton; bronze medal and 2nd in books, R. C. Foster; 1st in books and certificate of distinction, E. L. Hampshire; certificates of distinction to E. H. Gates, C. A. Vardy, A. E. Brooker, H. H. Whittington, and P. M. Willcox; certificates of approval to C. L. Hodges, J. A. Meikle, P. B. Sands, A. F. Sigsworth, and E. E. Davis. *Alderman Sir George Faudel-Faillie's medal for Sanitary Construction* was awarded to E. H. Gates. *Constructional Drawing*:—3rd in books and certificate of distinction, H. H. Whittington; 2nd in books and certificate of distinction, E. L. Hampshire; 1st in books and certificate of distinction, A. E. Brooker; certificates of distinction to A. Norton, E. H. Gates, P. C. Foster. *Certificates of approval* to C. H. Welch, W. H. Judges, P. M. Willcox, and J. Perkins. *Architectural Price*: 3rd in books and certificate of distinction, C. H. Price; 2nd in books and certificate of distinction, C. A. S. Vardy; 1st in books and certificate of distinction, C. H. Welch; certificates of distinction to F. Hartnoll, C. L. Hodges, W. H. Judges; certificates of approval to P. B. Sands, E. L. Hampshire, A. Norton, P. M. Willcox, E. H. Gates, and J. E. Hodgson. *History of Architecture*:—Silver medal and 2nd in books, A. E. Brooker; bronze medal and 1st in books, E. L. Hampshire; certificates of merit to J. A. Gillett, N. Horsfield, and A. L. Snow. *Architectural Sketching Class*:—Bronze medal and 1st in books, H. B. Mackenzie; certificate and 1st in books, J. Horsfield. *Architectural Studio*:—Gold medal and 3rd in books, W. Nicholls; bronze medal and 1st in books, H. J. Byron. *Wood-carving*:—Silver medal, H. S. Jones; bronze medal, G. I. Bridges; certificate of distinction, H. C. Grubb.

WESTMINSTER CITY COUNCIL.—At their recent meeting the Council resolved to make application to the London County Council for sanction to their borrowing £7,950l. in respect of the widening of the Strand, on the south side, between Nos. 80 and 104, both included—eastwards from Beaufort-buildings to Fountain-court; of that amount the London Council will, as arranged, repay 70,000l. upon the accomplishment of the improvement. The Council agreed to pay 4,000l. to Messrs. Fantappie on account of their contract of 5,500l. for street decorations; and reported that the London Brighton, and South Coast Railway Company had paid 4,000l. as compensation for injury to the public library and baths and wash-houses in Buckingham Palace-road during the widening of Victoria terminus. The public library was opened on July 7, 1894, and the baths, built by Messrs. J. Mowlem & Co., at a cost of about 30,000l., on May 7, 1890, the architect being Mr. J. Smith.

THE LOCAL HISTORY OF LINCOLN.—The Committee of the City of Lincoln Public Library are desirous of forming a collection of literary works relating to the local and topographical histories of the city and the county of Lincoln. They have already acquired some 600 volumes, together with a large number of engravings, maps, and prints, and are about to publish a specially-prepared catalogue of the collection which, thus far, they have been enabled to make with the means at their disposal.

LEGAL.

YORKSHIRE BUILDING CASE.

THE case of Illingworth v. the Melbourne Parish Council came before the Court of Appeal composed of the Master of the Rolls and Lord Justice Cozens-Hardy, on the 28th ult., on a motion by the defendants to leave to enter an appeal by them from a judgment of Mr. Justice Ridley notwithstanding that the time for doing so had expired. Mr. Newson appeared in support of the motion; and Mr. Lushington for the plaintiff. It appeared from the statement of Mr. Newson that the action was brought by the plaintiff to recover from the defendants the sum of 531. 10s. 9d. under a contract in connexion with the erection of nine almshouses at Melbourne, Yorkshire, and Mr. Justice Ridley entered judgment for the plaintiff for the full amount claimed. The defence raised three points of law under the Local Government Act. The first was that the defendants were not empowered under the Act to construct almshouses at all. The second was that the defendants had no power to incur expense which would involve the levying of a rate exceeding 3d. in the pound; the third defence being that the contract was not in writing, signed and sealed, as required by Section 3, Sub-section 9, of the Act. After the judgment was entered an appeal was advised by counsel for the defendants and then the defendants passed a resolution to appeal. Notice of appeal was given to the plaintiff's solicitor, but through inad-

vertency defendants' solicitors omitted to enter the appeal within the prescribed time. The learned counsel asked the court in the circumstances to grant the defendants indulgence, and to allow them to enter the appeal now.

Mr. Lushington opposed the application. He contended that the plaintiff ought not to be deprived of the advantage he had gained. The defences raised were purely technical. Mr. Justice Ridley had stayed execution on the terms that the money was brought into court, and that the defendants had not done.

The Master of the Rolls, in giving judgment, said in his opinion the defendants, in the circumstances, were entitled to no indulgence, and that the application should be dismissed with costs.

Lord Justice Cozens-Hardy concurred.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

6,136.—IMPROVEMENTS IN CLINOMETERS AND LEVELS: A. Wittmer.—At the back of the instrument is mounted a graduated disc, and at its front is attached a transparent cover. The disc-shaped chamber thus formed between the cover and the disc is half filled with liquid to be poured in through an aperture.

6,754.—APPARATUS FOR SEWERS, RESERVOIRS, TANKS, &c.: R. Tippetts.—To ensure a uniform flow of water outwards under varying conditions of flood or volume, a flexible water-tight joint connects a tube within a chamber to a casting in the cross wall of the chamber, and a float carries the free and perforated end of the tube which gives a constant head to the water or sewage in which it hangs. A bellows-like joint is made between a web and the flange of the tube, which is pivoted to the bracket by means of leather or similar attachments upon pivoted plates.

6,764.—ATTACHMENTS FOR WEIGHING-MACHINES: H. Pooley.—For renewable knife-edge bearings, the knife-edge, which is adjusted and fastened with a nut, has a projecting shank for engagement with a slotted hole in the beam, to which a stud secures a lug that slides between guides. For removal of the knife-edge the platform girder is hollowed above the bearing, or its face-reat may be supported by lugs, and can be taken away for renewal of the knife-edge.

6,773.—HOLDERS FOR PAINT BRUSHES, &c.: F. H. Hughes.—The holder is intended for brushes or liners used with a straight-edge or other guide, and is cut out of a sheet of metal, with edges turned up for forming the part in which the brush is fastened with a screw; other edges serve for the handle, the ends of strips of the blank engage with slots, and the guide is made by bending back other parts.

6,800.—MANUFACTURE OF CEMENT: G. W. Bulchard, A. A. Bulchard, J. A. Bulchard, and H. Gibson.—To prevent the slurry from settling the inventors provide for its continuous agitation with vertical rakes, in an annular tank, which are mounted upon shafts at the ends of the arms of a frame having a central pivot, the power transmitted by the driving shaft turns the rakes or stirrers upon their own axes as well as the arms about their pivot. In another form of a rotatory kiln the slurry is conveyed into a tubular lining inserted into one end, which, being heated by the hot gases around it, will also quickly dry the slurry.

6,815.—A WATERPROOF GLUE: W. A. Hall.—The cement or glue that shall be waterproof an admixture is made of slaked or unslaked dry lime, casein, sodium sulphate, and sodium phosphate.

6,823.—RINGS, HOOKS, &c., FOR LIFTING-TACKLE AND SIMILAR PURPOSES: H. Rodenkirchen. Trace-hooks, lashing-rings, and sling-rings, used with slings, and for tackle fitted with rings through which ropes are passed, are fitted with a set of rings threaded upon another ring having a circular-shaped section, and the carrying hook is joined to a cross-piece in such a manner as will enable it to turn upon its axis.

6,835.—FASTENINGS FOR CASEMENT WINDOWS: A. C. Howell.—To one end of a piece on the casement is pivoted a stay which will pass through a hole in a bracket attached to the sill and shaped as a fixed base plate. A tubular pillar through which the stay is inserted, is adjustably joined to the plate, a stopped and screwed pin is fitted into the upper portion of the pillar for clamping the stay as may be desired, a pressure-block being interposed between the stay and the pin.

6,837.—PROCESS OF MOULDING BRICKS, TILES, SLABS, CORNICES, AND SIMILAR GOODS: E. R. Salford.—The pan or mixer from which the material is fed to the mould, has a door or pivoted flap to be opened with a hand lever and closed with a weighted arm. A porous pressing-plate or mould, consisting of a grooved plate beneath a perforated plate, and a filter-cloth, and a carrier, are carried by wheels upon rails, and are linked to one another, as well as to hydraulic rams. During the pressing operation a ram forces the bottom against the mould when the ram will be depressed for the ejection of the article and its removal upon the carrier. Rams work the upper pressing and ejecting plunger up and down. To obviate injury of the moulded goods, the receiving plate is linked parallel-wise to the

frame of the carrier, the weight of the article being counter-balanced by a weighted lever which is pivoted on to the frame and the plate. The moulds and plungers may be divided for the moulding of tiles and bricks, and two subsidiary lower plungers will serve to lift the mould clear above the pressed slab.

6,851.—A HOLDER FOR INCANDESCENT LAMPS: C. W. Kemp.—Spring-plungers and two screw-threaded rings are provided for the insulating body, the shade or globe rests upon the collar or tongues of the metallic casing. The parts are fitted together by means of the engagement of dove-tailed projections from the cap with recesses in the insulator, the casing is secured in the shade by the outer screw-ring, it then passed on to the insulating-body and is clamped to the cap-rim by a screwing of the upper ring into the outer ring. Guide-grooves in the insulating body take in the shade in the casing.

6,868.—GRAVEL-WASHING MACHINERY: S. F. Pegg & S. A. Pegg.—The flanges that project outwards of the sections of the trough are bolted to one another. The legs or pillars of the trough should be severally made of a screw-threaded leg, having a squared upper portion and a cylindrical end that turns into a support.

6,887-8.—BRICK-MOULDING MACHINERY: F. S. Pullen and W. H. Mann.—The depression of the handle of a bell-crank lever will set in motion the driving-shaft of the screw-press which, as the plunger arrives at the end of its stroke, will be then reversed by means of the impact of a projection from the plunger against an arm of the lever. A tumbler, to be thrown over with a lever, aids the reversal, whilst the motion of the bell-crank lever is transmitted to a sliding-rod so as to work endless belts or a clutch. With the rise of the plunger the driving gear is thrown out of play through the action of an inclined block upon the plunger on the roller of the sliding-rod. When the upward stroke is finished the machine is brought to rest by the contact of a bevelled fly-wheel at the upper end of the screw against an inclined brake-block mounted upon a flexible arm attached to the bearing of the shaft. (6,888.) Relates to clutch mechanism for starting and stopping the press independently of the movement of the heavy spur gearing. The crank-shaft of the press loosely carries a spur-wheel which is coupled to it with a bevelled spring-bolt on a boss of the shaft so as to enter one of a range of holes in a disc of the spur-wheel. One starts the press by shifting the pivoted portion of a jointed hand-lever aside so as to clear it from a bracket on the pressing-plunger, and to let it fall to impinge against a fixed stop; as the plunger descends the lever will be forced aside by the bevelled under-surface of the bracket, whilst a spring will return the lever into its place over the bracket. The rising of the plunger raises the jointed and intercepting levers, and the press is automatically stopped with the release of the bolt from the disc by the action of the bevelled edge of the latter lever.

6,895.—APPARATUS FOR USE IN JOINING WATER-MAIN AND OTHER PIPES WITH MOLTEN LEAD: D. F. O'Brien.—The apparatus comprises a burner and a hydro-carbon vapouriser. To an asbestos-lined casing is bolted a lead-melting pot; a hand-worked valve regulates the brass delivery-pipe, which should have a smooth bore; the bottom plate has a lining of asbestos, and air apertures. There are lugs on to which the hydro-carbon tank may slide, and above it are set the vapouriser and burner. Underneath the vapouriser is a tubular mixer, and a strainer is placed between the burner and the outlet. The vapouriser will be warmed by a pan below it is supplied with hydro-carbon.

7,000.—GRATES AND FIREPLACES: A. MacCallum.—The coal is laid in a wire cage set above the grate, along the middle bar is a gas pipe, of which the jets are turned inwards so as to ignite the coal. The contrivance is described as effecting a saving of fuel, prevention of down-draught, and consumption of smoke.

7,030.—MOULDING OF LAVATORY AND SIMILAR BASINS, BATHS, AND OTHER EARTHENWARE GOODS: W. B. Rowley, S. H. Rowley, M. J. Adams, and T. Tilt.—For moulding any article in one piece and the plastic material into shape, after it has been laid upon a core or pattern which is secured to a sliding table. On the table are racks, geared with a pinion and wheel. The pinion is carried loosely on a shaft, and has clutches for engagement with other clutches (that are turned in opposite directions with belts), by means of a handle with a shaft and a slotted fork. In another shape, applicable to the moulding of lavatory basins, the moulding-blocks are attached to shafts which are turned with racks and toothed wheels. Confer also 11,805 of 1899.

(at Hereford.)
7,037.—VENEERS AND INLAIS: E. Hagenfeldt.—The novelty consists, or some such material, as paper or papier-mâché, on to which the veneer is first glued, in order that it may more easily take the shape required. The invention is described as being available for the inlaying of marquetry veneers.

7,081.—MANUFACTURE OF ARTIFICIAL MARBLE: S. Schougaard and F. Ewert.—An admixture is made of animal glue, alum, and gum-arabic dissolved in water, gypsum, and pigments. The slabs are made by spreading the compound upon smooth surfaces, coarse canvas being placed in the slabs for strengthening purposes. The surface of the goods

will take a polish of wax, polishing-spirits, and so on.
7,082.—A HOLDER FOR WINDOW-SASHES: H. H. Dobney and F. W. Calah.—Apertures are fashioned in the sash stiles; balls inserted into the openings are pressed by springs outwards into holes made in the frame, so that the sash may be held up in any position desired, without the employment of weights, pulleys, or similar appliances.

7,084.—MEANS OF ANNEALING COPPER AND OTHER METALS: D. Bates and G. W. Peard.—For annealing wire, rod, strip, sheet, and other metal the inventors devise a furnace whereof the retorts or chambers have tubes inclined downwards into water in tanks, there are pipes for conveying superheated steam, or some non-oxidising gas into the retorts, and endless conveyers, travelling upon rollers laid in a channel which joins the tanks, convey the articles through the retorts, rollers and guiding-plates are fitted for the conveyer, and one of the rollers may be intermittently driven with pawl and ratchet or other gearing.

7,087.—MEANS OF FASTENING SLIDING DOORS: W. K. Kaye.—A two-armed lever upon a spindle is mounted in a casing, which constitutes a sliding plate and is affixed to the door. Upon one or each end of the spindle is a handle which serves for sliding the door. In a casing affixed to the door pillar or frame is pivoted a hook-shaped latch, regulated with a spring, to engage with a guide-rod that slides in an abutting-piece. As the door is shut by a pushing of the handle, the edge of an opening in the casing will engage with the bevelled head of the latch, which will then be raised and drop into position for fastening the door. A turning of the handle causes the arm of the lever to lift and so free the latch, whereupon one can open the door. In another form both the lever and the latch are set in one casing, and are regulated with only one spring; a plate attached to the frame holds the latch.

MEETINGS.

WEDNESDAY, AUGUST 6.

Builder's Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

July 5.—By STEPHENSON & ALEXANDER (at Cardiff).	
Llanishen, Glamorgan.—Part Estate, 23 a. 2 r. 3 p. f.	69,000
Freehold park and wood land, 20 a. 2 r. 5 p.	2,100
Freehold building site, 2 a. 1 r. 5 p.	580
Thornhill, the Cottage and 1 a. 1 r. 7 p. f.	1,000
Thornhill, three building sites, 7 a. 2 r. 10 p. f.	1,330
July 8.—By C. R. MORRIS, SONS, & PEAR (at Langport).	
Curry Rivell, Somerset.—Hawkers Farm, 48 a.	1,650
Two freehold cottages and 1 r. 20 a. 2 r. 5 p.	370
Various closes of pasture, 19 a. 2 r. 6 p. f.	750
Isle Brewers, Som.—Whitmoors Enclosures, 26 a.	1,100
July 12.—By J. H. BETHELL (at Forest Gate).	
Manor Park.—Dover-rd., 30 plots of freehold building land (in lots)	9,750
July 11.—By WOODS & SWELLING	
Hounslow.—1 to 7, Dover-terrace, f. y. r. 159 l.	2,350
1 and 4, Hibernia-villas, f. y. r. 48 l.	700
1 to 4, Baroda-villas, f. y. r. 75 l.	1,200
1 and 2, Tenby-villas, f. y. r. 44 l.	670
Twickenham.—61, Halliburton-rd., f. y. r. 22 l.	475
40 and 42, Halliburton-rd., f. y. r. 37 l.	410
Halliburton-rd., plot of building land, f. y. r.	945
54 and 56, Halliburton-rd., f. y. r. 42 l. 18 s.	540
118 to 124 (even), Halliburton-rd., f. y. r.	840
44 l. 10 s.	900
Brompton.—3, Sterling-st., ut. 33 yrs. g. r. 74 l.	375
Kentish Town.—59, Carlton-rd., ut. 48 yrs. g. r.	340
61, 64, y. r. 30 l.	
July 15.—By C. R. MORRIS, SONS, & PEAR (at Langport).	
Drayton, &c., Som.—The Drayton Manor Estate, 154 a. 3 r. 14 p. f. (in numerous lots)	7,950
By Messrs. COBB (at Rochester).	
Cliffe, Kent.—Knowles Market Garden Land, 14 a. 2 r. 34 p. f.	160
Cals Croft, 2 a. 3 r. 10 p. f.	210
Berry Court Farm, 270 a. 1 r. 31 p. f.	6,750
Fresh Marsh Field, 4 a. 1 r. 10 p. f.	330
Berry Court Wood, 39 a. 1 r. 2 p. f.	230
Little Marsh and Reddish Meadow Farm, 10 a. 1 r. 17 p. f.	235
Cooling, Kent.—Mount Pleasant Enclosure, 5 a. 3 r. 34 p. f.	150
Frindsbury, Kent.—Child's Four Acres, 4 a. 2 r. 24 p. f.	140
July 16.—By ALFRED AND DEARMAN EDWARDS (at Hereford.)	
Wellington, Hereford.—The Rose and Crown Inn, and 13 acre, f. y. r. 20 l.	510
By Messrs. COBB (at Rochester).	
Faversham, Kent.—2, Belvedere-rd., also ship chandler's premises adjoining, f. y. r. 25 l.	675
4 and 5, West-st. (S.), f. y. r. 70 l.	1,225
Oare, Kent.—Two freehold cottages, w. l. 20 yrs. g. r.	400
By BELCHER, ADKIN, & BELCHER (at Wantage).	
East Challow, Berks.—White Mead Enclosures, 12 a. 1 r. 9 p. f.	620
July 17.—By F. W. MERRIAM (at Forest Gate).	
East Ham.—43 to 49 (odd), St. Bernard's-rd., f. y. r. 93 l. 12 s.	955
Forest Gate, 69, Shrewsbury-rd., f. y. r. 26 l.	355

By BENTLEY & SONS (at North Cave).	
North Cave, Yorks.—Bedlam Farm, 58 a. 1 f.	900
Brick Farm, 12 a. 1 f.	2,550
July 18.—By HENRY DUKE & SON (at Yeovil).	
Ashington, &c., Som.—The Ashington Manor Estate, 15 a. 15 p. f.	12,000
Mudford, Sock, Som.—Enclosure of pasture, 1 a. 3 r. 33 p. f.	110
July 19.—By SURRIDGE & SON (at Coggeshall).	
Copford, &c., Essex.—Beckingham Hall Farm, 197 a. 2 r. 7 p. f.	3,300
By WILLIAM SPALMAN (at Norwich).	
147.	130
Great Coggeshall, Essex.—Second Ingredeowns Field, 3 a. 3 r. 11 p. f.	210
Saulingham Thorpe, 20 a. 1 f.	1,110
Acle, Norfolk.—The Great and Little Dew Marshes, 95 a. 1 r. 39 p. f.	1,235
Foulsham, Norfolk.—Freehold grazing grounds, 69 a. 1 r. 7 p. f.	1,080
Gissing, Norfolk.—Farmhouse and 78 a. 2 r. 15 p. f.	450
The Lavender-plot and three closes in rear, f. y. r. 77 l.	650
Blofield, Norfolk.—Three enclosures of land, 16 a. 2 r. 1 p. f.	1,157
By BRAD & CAPPS.	
Notting Hill.—91, Oxford-gdns., ut. 63 yrs. g. r.	1,000
97, St. Mark's-rd., ut. 73 yrs. g. r. 10 l. y. r. 65 l.	595
53, Blechynden-st. (S), ut. 614 yrs. g. r. 8 l. y. r. 30 l.	270
21, and 22, St. Nicholas-st., ut. 614 yrs. g. r. 18 l. y. r. 57 l. 10 s.	645
8, Bramley-mews, ut. 614 yrs. g. r. 58 l. y. r. 34 l.	495
10, 20, and 22, Lionel-mews, l. w. r. 53 l. 18 s.	445
Shepherd's Bush.—23, Camden-gdns., ut. 61 yrs. g. r. 9 l. y. r. 48 l.	600
By J. H. BETHELL.	
Chigwell-row, Essex.—High-rd., the Willows and 2 a. 1 f.	4,700
North, Berks.—10 to 14 (even), Plevins-st., ut. 65 yrs. g. r. 20 l. y. r. 61 l.	375
Plainston.—Whitwell-rd., corner plot of building land, 1 a. 1 r. 10 p. f.	1,075
Upper-rd., &c., freehold building land, 45 a.	2,550
Morley-rd., f. y. r. 84 l. reversion in 97 yrs.	1,075
By E. H. HENRY.	
Britton.—41, Lion-st., ut. 61 yrs. g. r. 6 l. 6 s. y. r. 32 l.	
By Messrs. KEMBLEY.	
Upminster, Essex.—High House and the Hermitage, 202 a. 5 p.	2,650
Fulham.—Jervis-rd., f. y. r. 15 l. 10 s. reversion in 684 yrs.	39
Romford, Essex.—The Junction, three plots of land, 1 a. 1 r. 10 p. f.	75
By A. SAVILL & SONS.	
Ilford, Essex.—Cranbrook-rd., Great Gearies and Cranbrook-rd., a block of building land, 12 a. 1 r. 24 p. f.	5,300
Cranbrook-rd., Highfield, f. y. r. 12 a. 3 p. f.	3,800
1, y. r. 5 l.	28
Cranbrook-rd., freehold building land, 1 a.	28
By J. W. TUDMAN.	
Bloomsbury.—1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.	

Caledonian-rd., 30, 41, and 43, Pembroke-st., u.t.	£840
474 yrs, g.r. 124, 128, w.r. 1024, 28	
Hornsey-6 and 8, Grove House-rd., u.t. 73 yrs.	650
g.r. 134, p.; also fig.r's 134, reversion in	
78 yrs. By PERKINS & CYSAR.	
Lewisham-141, Lewisham-rd., u.t. 14 yrs, g.r.	1000
44, et. 444	
By W. ARNOTT & SONS, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000	

PRICES CURRENT (Continued):—	
QUOTING, BULLDOSE,	BRICKS, &c.
And Flats	£ s. d.
Double Stretches 14 0 0	per 1,000 at railway depot.
Double Headers 14 0 0	"
One Side and one End 15 0 0	"
Two Sides and one End 15 0 0	"
Spays, Chamfered, Squins	14 0 0
Seconds Quality WhiteandDipped	14 0 0
Salt Glazed	0 0 0
Thames and Pitt Sand	7 3 per yard, delivered.
Thames Ballast	6 0 0
Best Portland Cement	31 0 per ton, delivered.
Best Ground Blue Lias Lime	25 0 0
NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.	
Grey Stone Lime	10s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 66s. 6d. per ton at rly. dep.	
STONE.	
s. d.	
Ancaster in blocks	1 1 per ft. cube, del. rly. depot
Bath	1 1
Farleigh Down Bath	1 1
Best in blocks	1 1
Grinshill	1 10
Brown Portland in blocks 2	2 4
Darley Dale in blocks	2 4
Red Corshill	2 4
Clooseburn Red Freestone 2	2 4
Red Mansfield	2 4
Hard York in blocks 2	2 10
" 6 in. sawn both sides landings, to sizes s. d.	
(under 4 ft. sup.)	2 8 per ft. super. at rly. depot.
" 6 in. Rubbed Ditto	3 0
" 3 in. sawn both sides slabs (random sizes)	3 0
" 2 in. self-faced Ditto	0 9
Hopton Wood (Hard Bed) in blocks 2	3 per ft. cube, del. rly. depot.
" 6 in. sawn both sides landings 2	7 per ft. super. del. rly. depot.
" 3 in. do.	1 2
SLATES.	
s. d.	
20x10 best blue Bangor	12 0 per 1000 of 1200sq.ry. dep.
" best seconds	11 10 0
16x8 best	6 17 6
20x10 best blue Portma	11 7 6
16x8 best blue Portmadoc 6	11 7 6
SLATES.	
s. d.	
20x10 best Eureka un-fading green	13 10 0 per 1000 of 1200sq.ry. dep.
16x8	7 10 0
20x10 permanent green	10 10 0
16x8	6 0 0
TILES.	
s. d.	
Best plain red roofing tiles	41 6 per 1,000, at rly. depot.
Hip and valley tiles	7 per doz. "
Best Broseley tiles	48 6 per 1,000 "
Hip and valley tiles	4 0 per doz. "
Best Raabon Red, brown or brindled Do. (Edwards) 7	5 per 1,000 "
Do, ornamental Do.	60 0 "
Hip tiles	4 0 per doz. "
Valley tiles	3 0 "
Best Red or Mottled Staffordshire Do. (Peakes) 50	0 per 1,000 "
Hip tiles	4 1 per doz. "
Valley tiles	3 8 "
WOOD.	
BUILDING WOOD.—YELLOW.	
At per standard.	
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	14 0 0 16 0 0
Deals: best 3 by 9	13 10 0 15 0 0
Battens: best 2 1/2 in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	10 10 0 11 10 0
Battens: best 2 1/2 by 6 and 3 by 6	0 10 0 less than 7 in. and 8 in.
Deals: seconds	10 0 0 less than 8 in. 0 9 0 0
Battens: seconds	10 0 0 less than 8 in. 0 9 0 0
Foreign Sawm Boards—1 in. by 12 in. by 12 in.	0 10 0 more than battens.
1 in.	1 0 0
Fire timber: Best middling Danzig or Memel (average specification)	At per load of 50 ft. 100
Seconds	4 10 0 5 0 0
Small timber (8 in. to 10 in.)	3 12 6 3 15 0
Swedish balks	2 15 0 3 0 0
itch-pine timber (30 ft.)	3 0 0 3 10 0
JOINERS' WOOD.	
At per standard.	
White Sen: First yellow deals, 3 in. by 11 in.	22 0 0 23 0 0
" 3 in. by 9 in.	20 0 0 21 0 0
Battens, 2 1/2 in. and 3 in. by 11 in.	18 0 0 20 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0 18 0 0
" 3 in. by 9 in.	14 0 0 15 0 0
Battens, 2 1/2 in. and 3 in. by 9 in.	11 0 0 12 0 0
Petersburg: first yellow deals, 3 in. by 11 in.	20 0 0 21 0 0
Do, 3 in. by 9 in.	17 0 0 18 0 0
Battens	13 0 0 14 0 0
Second yellow deals, 3 in. by 11 in.	15 0 0 16 0 0
Do, 3 in. by 9 in.	13 0 0 14 0 0
Battens	11 0 0 12 0 0
Third yellow deals, 3 in. by 11 in.	12 0 0 13 0 0
Do, 3 in. by 9 in.	10 0 0 11 0 0
Battens	10 0 0 11 0 0

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Answers to be delivered
*Designs for Free Library	Maidenhead Town Council	50l., 20l., and 10l.	Oct. 1
*Proposed Municipal Buildings	Barry U.D.C.	150l., 100l., and 50l.	No date
*Library	Bristol City Council	Not stated.	do.
*Cottage Home	Grantham Town Council	5l., 5s.	do.

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Teachers to be delivered
Wrought Iron Fencing	Aldershot U.D.C.	N. F. Dennis, Civil Engineer, Council Offices, Aldershot	Aug. 6
Boundary Wall	do.	do.	do.
Parish Offices, Kingston-on-Thames	Merton Parish Council	H. G. Quartermain, Architect, Norton Park	Aug. 6
Surveyors' Materials, &c., near Liverpool	Little Woolton U.D.C.	The Surveyor, Grange-lane	do.
Sewerage Works, Bottomont	Stanley U.D.C.	F. Massey, Civil Engineer, Tetley House, Wakefield	do.
Kerbing, &c., Perth-road	Hove Town Council	H. H. Scott, Town Hall, Hove	Aug. 7
Fourteen Cottages	Kinsale (Irish) & D.C.	E. Evans, Engineer, 53 South Mall, Cork	do.
Store Premises, Great Horton-road	Bradford Co-operative Soc., Ltd.	W. Rycroft, Architect, Manchester-road, Bradford	do.
Three Houses, Summerhill-road	do.	do.	do.
Lighting Works, &c.	Ware U.D.C.	G. H. Gishy, Town Hall, Ware	do.
Schools, Amman	Aberdare School Board	T. Roderick, Architect, Clifton-street, Aberdare	do.
*Alterations, &c., to Porters' Lodge, Union Workhouse	Hertford Union	Russell Austin, 13, Villiers-street, Hertford	Aug. 9
*Main Drainage Works, &c., Homerton Workhouse	City of London Union	Clerk to Guardians, 61, Bartholomew Close, E.C.	Aug. 11
Paving, &c., Perth-road	Hford U.D.C.	J. W. Benton, Town Hall, Hford	do.
Granite (1 1/2 tons)	Hford U.D.C.	The Surveyor, Council Offices, Hford	do.
Road Works, Balharra-road	Bishop's Stortford Gas Co., Ltd.	W. J. Geo. Water-lane, Bishop's Stortford	do.
Boundary Wall	Loughborough Town Council	A. H. Walker, Civil Engineer, Town Hall, Loughborough	do.
Concrete Paving	Conventry Corporation	J. E. Swindlehurst, City Engineer, St. Mary's Hall, Conventry	Aug. 12
Street Works, Hill-street	War Department	Colonel G. Barker, Royal Engineers Office, Colchester	Aug. 13
Works, Repairs, and Materials, Huntingdon and Ely	London County Council	Architects' Department, 3, Warwick-street, Charing Cross, S.W.	Aug. 14
Fire Brigade Station, Streatham	Much Wenlock Sanitary Comm.	W. Wyatt, Engineer, 99, Radford-road, Leamington	do.
Pipe Sewers, &c.	Rev. Dr. Gaffney	J. J. O'Callaghan, Architect, 16, Nassau-street, Dublin	Aug. 15
College, Mullingar, Co. Westmeath	Scalby & Newby Agricultural Soc.	Flintoff & Tickle, Society's Offices, Scalby	Aug. 15
Grand Stand, &c.	Abergavenny L.D.C.	J. Gull, Surveyor, 4, Brecon-road, Abergavenny	do.
Stone Bridge, Llanarth	do.	do.	do.
Retaining Wall, Hendre Glyn, Llanover	Bristol Corporation	City Electrical Engineer, Temple Back, Bristol	Aug. 21
*Foundations for Electricity Works	Colchester Town Council	C. E. Bland, Town Hall, Colchester	Aug. 27
Water Supply Works, Balkeine Hill	Ipswich Borough Council	Town Clerk, Town Hall, Ipswich	do.
*Buildings for Electricity Works	Newport Corporation	Borough Engineer, Newport (Mon.)	do.
Erection of Lunatic Asylum, Caerleon	Swansea Harbour Trustees	A. O. Schenk, Civil Engineer, Harbour Offices, Swansea	Sep. 4
Hydraulic Accumulators and Tower for housing same	do.	do.	do.
Drawbridge, &c., North Dock Lock	Metropolitan Borough of Hackney	R. Hammond, Engineer, 64, Victoria-street, S.W.	Sep. 11
*Coal Stores (including Steel Work and Builders' Work)	Woodford (Essex) School Board	E. Tidman, Architect, 34, Victoria-street, S.W.	No date
*New School Buildings, Snakewell-lane	do.	John Wills, Architect, Victoria Chambers, Derby	do.
*Wesleyan Church, Waltham Abbey	do.	Gordon & Guntton, Architects, Finsbury House, Blomfield-st., E.C.	do.
Church, Rushall, Tunbridge Wells	do.	S. Adams, St. Mary-street, Cardigan	do.
Wire Fencing, &c., Tebbard, Cardigan	Cambridge Corporation	Borough Surveyor, Guildhall, Cambridge	do.
Church, Vestries, &c., Peat Tree-road, Derby	Mr. W. J. Bevan	J. P. Williams, Architect, Pontypool	do.
House and Shop, Aberystwyth	do.	J. L. Russell, Lower Cork-street, Mifflinstown	do.
Villa, Mitchelstown	do.	T. D. Lewis, 35, Penton-road, Maccy	do.
Heating Apparatus, Belham's Chapel, Maesdy, Wales	do.	Newton & Asquith, Ackroyd-street, Morley	do.
Eight Scaffolding Houses, Station-road, Ardsley	do.	G. Radford, New Inn, Mansfield, Woodhouse	do.
Slatting Six Houses, Mansfield Woodhouse	do.	J. Oldroyd, Architect, 16, Infirmary-street, Leeds	do.
Nine Houses, &c., Havereswell	do.	Garlick & Flint, Architects, Buxton	do.
Four Cottages, Chapel-on-le-Frith	Mr. W. Walton	A. H. Goodall, Architect, Market-street, Nottingham	do.
Church, Vestries, &c., Peat Tree-road, Derby	do.	Conservators' Office, Victoria Embankment	do.
*Dredging Works	Thames Conservancy	Judson & Hudson, Architects, Oakworth, near Kettleigh	do.
Three Houses, Lane Ends, Oakworth	Mr. F. D. Cousens	Garlick & Pennington, Architects, Pontefract	do.
Three Houses, Wakefield-road, Purton	do.	E. Raves, Architect, Orpington-road, Winchester Hill, N.	do.
House, Beaumont-avenue, St. Albans	do.	H. E. Russell, Architect, St. Albans	do.
Carriage Building Works, Kingsbury Estate, St. Albans	do.	W. D. Pratt, Architect, Long Row, Sherwood	do.
House, Sherwood	do.	J. Crawshaw, Architect, 1, Norman-drive, Eccleshill	do.
Two Villas, Moorhead, Shipley	do.	E. Garlick, Architect, 121, Stamford-street, Scallybridge	do.
Four Shops, Market-street, Stalybridge	do.	H. Rigby, 129, Atherton-road, Hindley	do.
School Works, St. Paul's School, Huddley	do.	J. Stalker, Architect, Kendal	do.
Painting, &c., Catholic Schools, Convent, &c., Kendal	do.	do.	do.
Additions to National Schools, Kendal	do.	Manager, Company's Offices, Morley	do.
Works at Mills, Cottages, &c.	Morley Cloth Finishing Co., Ltd.	W. Hill, Secretary, Rooms-lane, Morley	do.
Painting Club Premises	Horley Conservative Co., Ltd.	H. G. Roberts, School Board Offices, Mold	do.
Works at Schools, Mold	Buckley School Board	do.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Clerk of Works	Leicester Guardians	4l. 4s. per week	Aug. 11
*Clerk of Works	Cardiff Corporation	250l.	Aug. 12
*Clerk of Works	Conservators' Office, Victoria Embankment	See Advertisement	Aug. 14
*Inspector for Carpenter and Brick Work	Watford Public Library	See Advertisement	Aug. 16
*Third Draughtsman (Surveyor's Department)	Metropolitan Asylum Board	25s. 6d. per week	Aug. 20
*Temporary Draughtsman	Paddington Council	Not Stated	No date

Those marked with an asterisk (*) are advertised in this Number

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Contracts, pp. iv. vi. vii. x. & xxi.

Public Appointments, p. xiv.

PRICES CURRENT (Continued).

WOOD.		At per standard.	
JOINERS' WOOD.		£ s. d.	£ s. d.
White Sea and Petersburg:—			
First white deals, 3 in. by 11 in.	14	0	15
" " " 3 in. by 9 in.	13	0	14
" " " 3 in. by 7 in.	12	0	13
Second white deals 3 in. by 11 in.	13	0	14
" " " 3 in. by 9 in.	12	0	13
" " " 3 in. by 7 in.	11	0	12
Fitch-pine—deals	16	0	18
Under 2 in. thick extra	0	10	0
Yellow Pine—First, regular sizes	32	0	33
Brands (12 in. and up)	2	0	more
Odiments	22	0	24
Seconds, regular sizes	24	0	26
Yellow Pine Odiments	20	0	22
Kauri Pine—Planks, per ft. cube	0	3	6
Danish and Sterlin Oak Logs—			
Large per ft. cube	0	6	0
Small " "	0	2	3

PRICES CURRENT (Continued).

WOOD.		At per standard.	
JOINERS' WOOD.		£ s. d.	£ s. d.
Wainscot Oak Logs, per ft. cube	0	5	0
Dry Wainscot Oak, per ft. sup. as	0	7	0
" " " do.	0	7	0
Dry Mahogany—			
Honduras, Tabasco, per ft. sup.	0	9	0
as inch	0	9	0
Selected, Figury, per ft. sup. as	0	1	6
inch	0	1	6
Dry Walnut, American, per ft. sup.	0	10	0
as inch	0	10	0
Teak, per load	16	0	30
American Whitewood Planks—			
Per ft. cube	0	3	0
Prepared Flooring—			
1 in. by 7 in. yellow, planed and	0	13	0
shot	0	13	0
1 1/2 in. by 7 in. yellow, planed and	0	13	6
matched	0	13	6

PRICES CURRENT (Continued)

WOOD.		Per square	
Prepared Flooring—		£ s. d.	£ s. d.
1 1/2 in. by 7 in. yellow, planed and	0	15	0
matched	0	15	0
1 in. by 7 in. white, planed and	0	11	0
shot	0	11	0
1 in. by 7 in. white, planed and	0	11	6
matched	0	11	6
6 in. at 6d. per square less than 7 in.	0	13	6
JOISTS, GIRDELS, &c.			
In London, or delivered			
Railway Vans, per ton	£ s. d.	£ s. d.	£ s. d.
rolled Steel Joists, ordinary sections	6	5	0
Compound Girders	8	5	0
Angles, Tees and Channels, ordi-	7	17	6
nary sections	8	5	0
Flitch plates	8	5	0
Cast Iron Columns and Stanchions,	7	2	6
including ordinary patterns	7	2	6

FAUNCE-STREET:-

Sayer & Son £138
J. F. Ford 129

GROVE-STREET:-

Harris & Co. £169
H. Groves 138
W. J. Howie 155
Sayer & Son 147

HAGUE-STREET:-

J. F. Holloway £260
Willmott & Son 210
Corfield & Co. 280

HIGHBURY TRUANT:-

Silk & Son £750
Marchant & Hirst 395
W. Horneatt 570
G. Kirby 508

HIGH-STREET, PLUMSTEAD:-

Hayter & Son £230
Sayer & Son 205
D. Jolly 154

ILDBERTON-ROAD:-

H. Line £230
Black & Son 186
Sayer & Son 173
J. Appleby 178

KENMONT-GARDENS:-

G. H. Sealey £265
S. Polden 114
W. R. & A. Hide 108
W. Horneatt 102

LATIMER ROAD:-

O. H. Sealey £343
J. & M. Patrick 276
General Builders 249
F. Chidley 161

LILLIE-ROAD:-

J. & M. Patrick £260
E. Flood 184
C. Gurling 168
F. Chidley 147

MONTEM-STREET:-

C. Dearing & Son £260
McCormick & Son 213
C. & W. Hunnings 150

MUNSTER-ROAD:-

J. & M. Patrick £248
Lathey Bros. 169
C. Gurling 163
W. Horneatt 159

NEW-ROAD:-

Hudson Bros. £187
Rice & Son 143
Lathey Bros. 137
E. Flood 127

OBAN-STREET:-

A. J. Sheffield £437
Unsigned 324
A. W. Derby 305
Corfield & Co. 287

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Mathy Bros. 159
Rice & Son 153

SALTER'S HILL:-

H. Line £260
Rice & Son 240
Garrett & Son 237
Lorden & Son 222

SHILLINGTON-STREET:-

J. & M. Patrick £385
W. Hammond 370
Rice & Son 355
C. Gurling 337

TRUNDLEY'S-ROAD:-

Harries & Co. £165
Black & Son 137
W. Banks 129
H. Groves 120
E. Proctor 120

WILTON-ROAD:-

J. F. Holliday £360
Chessum & Sons 230
McCormick & Sons 258
Silk & Son 245

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BRISTOL:

ASHTON GATE WORKS, CORONATION-

VOL. LXXXIII.—No. 3105.

AUGUST 9, 1902.

Window-Niche from the Certosa, Pavia	From a drawing by Mr. G. A. Paterson.
The Grand Staircase, Hardwicke Grange, near Shrewsbury	Mr. E. Ridsdale Tate, Architect.
House at Windermere	Mr. M. H. Baillie Scott, Architect.
House at Cobham : the Hall	Mr. M. H. Baillie Scott, Architect.
Crowns : Some Medieval Examples in Glass, Stone, & Wood	Drawn by Mr. R. W. Paul.

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Coronet on Helmet of Athelstan, from a Penny, showing Coronet with		Pattee with Pearl's Crest	
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THE present week is one in which even journals which are dedicated to a special province of human work and endeavour may afford a moment to forget their usual limitations of subject, in order to join in the noble expression of loyalty and good-will to the Sovereign of this ancient land, who will be crowned this week at a ceremonial venerable from its antiquity, and in a church which, originally founded at the instance of an English Sovereign of pious though rather distant memory, has in the course of centuries become, more than any other building, the centre of our national memories and our national honour. The occasion is certainly one which appeals to the imagination. As a mere spectacle it may no doubt be magnificent; but this is the case in which (to adapt Milton a little), "the eye is meant than meets the eye"; it is not only the outer aspect of the show which appeals to us, but its symbolical significance; the outward sign or form of a Government and a Constitution which has enjoyed a historical continuity unparalleled in the modern world, and the stability of which for long a period is the best practical proof of adaptation to the requirements and wishes of the nation. The relation of the Sovereign to the people is indeed widely different from what it was in times past; the freedom of the people, as Tennyson put it, has been "laden slowly down from precedent to precedent"; but while the English people have perhaps a greater amount of individual liberty than is to be found in any other country, we have contrived with that to preserve the ancient forms which link the present with the past, and to preserve also, it is by no means unimportant, the element of splendour in governmental ceremonies—the decorative side of government: an element not to be despised.

since it adds something to the splendour of life and something also (whatever Republican purists and economists may say) to the dignity of national representation. Anyone who has read in that clever American novel "Through one Administration," the description of the dull commonplace of the White House receptions, may conclude that it is something to live under a form of government which gives occasion from time to time for a splendid spectacle, as a little relief from the "set grey life" of every day. And it should be an additional reason for national rejoicing on this occasion, that the festival of the Coronation has been preceded by the termination of a war which, from all we can gather, appears to have had the happy effect of transforming a set of brave enemies into a set of loyal friends of the Empire, and of extending the powers and the responsibilities of the government of which the Sovereign to be crowned this week is the highest and the hereditary representative.

The foregoing remarks were written for publication in our issue under date June 28, the formerly intended Coronation week, and were interrupted at the last moment by the melancholy announcement of the postponement of the ceremony in consequence of the King's serious illness. We prefer, however, to leave them as they were written, as the expression of our feeling at the time, and when everything seemed to promise a ceremonial of almost unprecedented dignity and splendour. No doubt the ceremony will still be an imposing one, though it must be shorn of some part of its significance by the absence of many of the foreign representatives who were unable to remain. On the other hand, the nation will feel even an enhanced interest in the coronation of a Sovereign who has a second time been restored to them after a dangerous illness, and who has shown under this recent trial a fortitude on his own account, and an unselfish regard for others, which cannot have passed unrecognised or unappreciated by his subjects, who will all unite in the hope that he who is to be crowned this week may be spared for many years to reign over us.

By CYRIL DAVENPORT, F.S.A. *With*
Illustrations by R. W. PAUL.

 SPECIAL ornament or diadem to be worn on the head is a very early visible mark of kingship. Among savage nations advanced enough to adopt some form of government, the strongest men became the rulers, and remained so as long as they retained their muscular superiority. A very usual sign of this chieftainship was a feather, or group of feathers, worn on the head.

Among us to the present day the use of feathers worn on the head to denote rank remains in full force. Although for the very highest rank we have no such head-dress, yet the feather badge of the Princes of Wales is evidence that at no very distant period three ostrich plumes worn on the head were a visible mark of royalty.

There are, moreover, plenty of official instances of less exalted ranks which are indicated, among other ways, by the wearing of distinctive feathers. Such are the richly plumed State hats of all our great orders of knighthood, the carefully feathered cocked hats of the staff of our army and other military dignitaries, and the black and white feathered edgings worn on the cocked hats of Civil servants on official occasions.

These marks of honour, however, are only survivals of one form of savage ornament, and the particular head-dress in which we are for the moment more interested has developed in the direction of metal rather than in that of feathers.

Among the ruins of Mycenæ and of Troy—both among the earliest remains of any civilised towns in Europe—Dr. Henry Schliemann found several beautiful diadems of gold. These had doubtless developed gradually from simple circlets of metal. Those found at Mycenæ were of thin hammered gold, of an elongated oval form, long enough to fasten round the head, the thickest part coming over the forehead and the finely tapering ends fastening with a tie or wire at the back. Ornamental designs were repoussé in low relief all over the entire plate, and in some instances the upper rim was further ornamented with

leaves of thin gold, each separately attached, thereby foreshadowing the circlet with its upper edge ornamented with fleur-de-lys.

This form of diadem is common enough at an early period, and several examples of it have been found at other places, and although these doubtless indicated rank, it is not known at present to what extent they did so.

The diadems found at Troy were of an entirely different type, they consisted of close, short chains of gold, fastened on to a thin ribbon-like flat chain which encircled the head, while from that part of the circlet which came over the ears depended a few long chains of similar workmanship, hanging down to the shoulders. These long drooping side chains were probably the prototypes of the curious "cataseistas" or jewelled chains which show attached to several of the crowns and coronets of our early kings, as figured on coins and some of the great seals, that of Edward the Confessor and Henry I. among them. The cataseistas, one over each ear and one at the back, can also be actually seen on the beautiful mediæval "Corona Sancta," or crown of St. Stephen, the crown of Hungary, as well as upon the doubtless correct restoration, by Herr Franz Bock, of the mediæval crown of Constantine Monomachos.

It is likely enough that one of the first forms of actual diadem was a string of beads. The earliest ornament of any kind into which man put any constructive ability was most likely a necklace of naturally pierced shells. Indeed, the earliest known human skeleton—one found in a cave near Mentone—actually had a necklace of pierced shells and teeth sticking to it. Whether first on some occasion such a necklace was made too small for its recipient and stuck fast on his head with artistic effect, or whether, on the other hand, a diadem was made too big and slipped down accidentally on to the owner's shoulders, will never be known; but however it arrived, it seems on the evidence of coins that our early kings actually wore coronets of strings of beads (fig. 1).



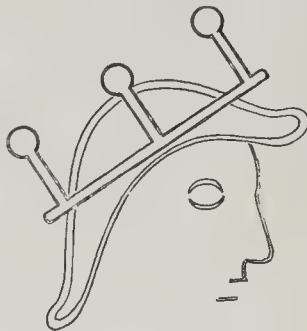
Head of Coenwulf, King of Mercia showing a coronet of beads.

Fig. 1.

No remains of such diadems now exist, so conjectures as to their actual construction cannot well be checked, but there is plenty of documentary evidence as to head fillets of some soft material having had a long reign as marks of authority. Alexander the Great wore one with which he bound up a wounded friend.

At a period in our English history somewhere about the tenth century, the beaded fillet certainly gave way to a solid metal circlet. This change was possibly due to

the wish of kings to wear some distinct mark of their rank in battle. The beaded or soft fillet would neither look well nor last well on a helmet, so we find that on a penny of Æthelstan (fig. 2) his helmet is adorned



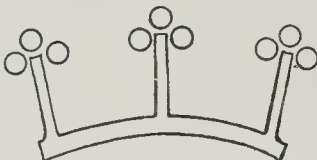
Coronet on helmet of Æthelstan, from a penny, showing coronet with single pearls on stems.

Fig. 2.

with a solid circlet bearing three pearls on raised stems; the entire coronet may be supposed to have had four of these pearls.

From this standpoint the growth of the ornamentation on our English crown can be followed with some certainty. I do not mean to say that each successive coronet fully carries out any regular sequence, because several of them revert to older forms; but now and then a development appears which tends more and more to repetition, and so slowly the present design has been evolved.

The next coronet after that of Æthelstan to show any true development is figured on the great Seal of William I. (fig. 3), where



Coronet from the Great Seal of William I, showing points with triple pearls.

Fig. 3.

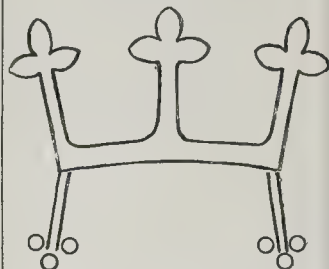
the single pearls on their stalks have become triplicated. This triple arrangement of separate pearls or dots is one which easily takes the more distinctly decorative form of a single trefoil, and into this shape it soon falls, as may be seen on the Great Seal of Henry I. (fig. 4), the coronet also showing the mediæval cataseistas depending from each side.

On pennies of Edward I. the trefoils of Henry, now more carefully drawn and quite properly to be described as heraldic fleur-de-lys, are shown with a supplementary pearl between each (fig. 5).

The mention of the word "fleur-de-lys" serves to remind us that from the time of Edward III. until 1801 the coat of arms of France was quartered with that of England on our Royal coat of arms. Not only that, but for the greater part of that time it was accorded the place of honour—the first

quarter—on the ground that England was only a duchy as compared with France, by reason of William, Duke of Normandy. This may also account in some degree for the fact that nearly all our early kings are shown wearing coronets instead of closed crowns.

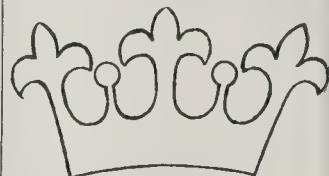
This long connexion of our own Royal coat with the fleur-de-lys of France gives



Coronet from Great Seal of Henry I, showing trefoils and cataseistas.

Fig. 4.

colour to the common belief that the fleur-de-lys on the crown of St. Edward are really the French ones, and were put on the crown so as to be in accordance with those on the shield; but, as I have endeavoured to show, those on the crown are responsible for their own shape, and have really nothing to do with those which were on the shield. If they had really been adopted for the reason above stated, they should have been discon-



Coronet from penny of Edward I, showing fleur-de-lys with pearls between.

Fig. 5.

tinued in 1801, when George III. finally excluded the French coat from our Royal shield.

Now comes the question of the cross-patées. When our Henry VI. was made King of France he found it necessary to have Great Seals made for his department of Foreign Affairs. On the first of these seals the King is seated in State and has a coat of arms surmounted by a coronet on each side of him. One of these coats shows the



Coronet from first seal for foreign affairs of Henry VI, showing crosses patées with pearls between.

Fig. 6.

arms of France, and the coronet above it bears fleur-de-lys along its upper edge; the other shows the coat of arms of England, and the coronet above it bears the cross-patées alternately with low-pearls (fig. 6).

On the second seal for foreign affairs of the same king he is shown actually wearing a coronet which shows crosses-patées and low pearls arranged in the same way, and crosses-patées from this time show a marked tendency to recur on the English coronets or crowns until a time comes when they always appear.

The normal English coronet of this period closely resembled the French one, they both had fleur-de-lys set on a circlet, and when Henry found it advisable, in face of his double sovereignty to show on a great seal the arms of each country, he evidently considered it necessary to differentiate the ornamentation of the respective superimposed coronets. Retaining, therefore, quite properly the coronet with rounded fleur-de-lys for his French coat, he squared out and truncated each of the three petals for use upon that over his English coat.

This flattening out and squaring of the ends of the fleur-de-lys formed at once the heraldic ornament known as a cross-patée. The low, single pearls which at first are found alternately with the new crosses-patées now begin gradually to develop in their turn in the same way as before, they soon become trefoils and then fleur-de-lys. So we get the crosses and the fleur-de-lys alternately, as they show on the great seal of Henry VIII. (fig. 7).



Crown from Great Seal of Henry VIII showing ornamentation as now.

Fig. 7.

The crown now permanently shows another characteristic, that of being arched or enclosed, and surmounted at the top by a mound or orb and cross. The enclosing of a coronet by arches is considered to turn it into a crown, and to indicate independent sovereignty, but this view has not been very strictly adhered to in the case of our crowns, as they show indiscriminately in both ways on official coins and seals from the time of Edward the Confessor until that of Queen Victoria, who in her last coins is represented as wearing a coronet only, which is, moreover, wrongly designed, as it would seem to have upon it many more than the proper number of four crosses-patées and four fleur-de-lys. It is curious that such an inaccurate figure should have been allowed to pass muster.

But mistakes are not all of modern provenance. It is doubtful whether the apparently enclosed crowns, such as those worn by Edward the Confessor, Harold, William I., Stephen, and Edward IV., were not really only some kind of regal cap.

From the time of Henry VIII. onwards, however, we meet with no difficulty, the type of crown has been definitely settled, and if in future the Sovereign is to be shown on coins or seals with anything at all upon his

head, it is to be hoped that it will be a proper crown with proper attributes. The type is a circlet, along the upper edge of which are set alternately four crosses-patées and four fleur-de-lys, from the circlet rise two complete arches, crossing from cross-patée to cross-patée, the junction at the top surmounted by an orb and cross, significative of the Christian dominion over the world. This is a noble type and can be studied in perfection in the excellent Coronation medal recently designed for Messrs. Elkington by Herr Emil Fuchs.

The Royal Crowns may be jewelled as richly as each Sovereign may desire, but the true form should remain unaltered, or, at all events, should only be added to as time goes on, in accordance with some large growth of Empire. The power, however, of including historic jewels in the Crown may, however, render it always unnecessary to disturb the crosses and fleur-de-lys; as, for instance, it would be fitting enough to indicate the Sovereignty of India by the inclusion of the Koh-i-Noor.

On the restoration of Charles II., Sir Robert Vyner, the royal goldsmith, was commissioned to make new regalia of the same patterns as those which had been destroyed by order of the Roundhead Government in 1649.

St. Edward's crown, the crown of England, now kept at the Tower, is substantially the same that Sir Robert Vyner made for Charles II. Besides this official crown, another more ornamental one has been made for all our kings and queens since Charles II. The silver settings of some of these State crowns, denuded of their jewels, still exist, and others have been figured in various places. All of them seem to have had the great ruby of Edward the Black Prince set in the centre of the front cross-patée.

Crowns belonging to kings and queens regnant, as well as the circlets and crowns which have been made for queens-consort, are always jewelled. No other crowns or coronets are allowed to carry upon them more than simulacra of jewels embossed upon the circlet.

The jewelled work on St. Edward's crown is not of much interest. The main arrangement of the jewelled ornamentation is that of clusters, each consisting of a large coloured stone, ruby, emerald, or sapphire, set in a rim of enamelled arabesques, sometimes further ornamented with diamonds. No stone of special beauty or historic interest finds a place in this crown.

The State crown of Queen Victoria, which will be used, with minor alterations, for the Coronation of his Majesty King Edward VII. on the 26th inst., is a fine example of one of the ornamental State, or Imperial, crowns. It was made by Messrs. Rundell & Bridge for the Queen in 1838, of thin silver, and is thickly set with jewels, some of which were in the former State crowns, and some of which were newly added. In the front of the circlet is a large flat sapphire cut *en cabochon*, and partially pierced, which was taken from the crown of Charles II., and bequeathed to the Prince of Wales, afterwards George IV. by Henry Benedict, Cardinal York, with other Stuart treasure. In the centre of the cross-patée, just above the sapphire, is the great spinel ruby which was given to Edward the Black Prince by Don Pedro, King of Castile. It is also said to have been worn by Henry V. at

Agincourt in front of the kingly coronet on his helmet. It is a splendid and remarkable stone measuring about 2 in. in length. It is not cut, but only polished on its own naturally irregular surface. It is pierced, along its greater axis, after the manner of most Oriental stones, which have been at some time or other strung as beads, the upper opening of the piercing being now closed by a small ruby stud set in gold.

One more historic stone adorns this crown, it is a large sapphire, now more or less spoilt by having been recut in the modern way, which was taken from the ring of Edward the Confessor when his shrine at Westminster was opened.

Among the 277 pearls which are on this crown, many are whole and set as acorns on the arches, which represent oak sprays. Other fine drop-shaped pearls are set at the angles where the arches cross at the top. The oak leaves of the arches are all thickly set with diamonds, as, indeed, the whole surface of the crown and its ornaments may be said to be. There are on it altogether 2,783 diamonds cut as brilliants.

No development of design such as we have followed can be traced in the case of any of the great crowns of the world. Every mediæval crown existing is a law for itself, and is unique. The crown of Russia, indeed, may be considered to have followed the development of a bishop's mitre, whatever that may be, because it actually is a richly-jewelled mitre with two lobes. All kingly crowns are considered by some authorities to be analogous to bishops' mitres in the same way that sceptres may be held to represent a form of crozier, but here we get upon debatable ground.

We already use the oldest Coronation ceremony in the world, carried out now substantially in the same way as it was centuries ago, and has been ever since, and we can also claim with some show of reason that the Crown of England, alone among crowns, is the outcome of a long series of slow developments, and is designed on lines which have been regularly evolved from primitive simplicity into a dignified and noble type.

VENETIAN CHURCHES.

THE disaster which has recently befallen one of the most famous of Italian cities has naturally aroused keen public criticism of the authorities and of the system under which public monuments in Italy are cared for. Italy has received a greater number of valuable heirlooms in the form of monumental art than any other country, and, in consequence of circumstances resulting from political and social reforms during the past century, these objects of art, as is often the case with heirlooms, have become a somewhat burdensome trust confided to the care of the Italian Government. The following notes on the present condition of the Venetian churches will show the amount of responsibility which the Government has assumed during the course of events in the great revolutionary period, 1840-1870.

In 1870, at the time of the unification of Italy, the law of mortmain, by which property could be held by corporations or individuals, civil or ecclesiastical, was practically abolished, and all such property not confirmed by, or subject to, the new laws relating to trusteeship, appears to have been

handed over to the Administration of Crown Property, called the "Demanio." In this way the greater part of the monastic and conventual property, including all the churches with their monumental contents, passed into the hands of Government. In the case of Venice, where few available funds were forthcoming to purchase back the confiscated property for ecclesiastical use, the monumental churches have been in the care of different Government bureaux for the past thirty years.

A very wide distinction must be drawn between the meaning and use of what is called a church on the north and on the south of the Alps. Italian Christian churches have throughout all ages represented the temples of an earlier religious system to a very great extent. They also represent in a still more decisive manner the tomb-houses of distinguished or wealthy families. In more ancient times such tomb-houses had been attached to private villas, and were also private chapels for religious purposes. Under a Christian dispensation these tomb-houses of different families were collected together, and at first mere adjuncts, became in more recent times the most important part in the structure of churches. In other words, Italian churches are essentially receptacles for the dead, instead of being primarily places of religious instruction amongst the living as in northern countries. Such a system is represented only to a certain extent in the country church of the north, where the local potentate may usually have his family tomb within the chancel or in a chantry; but in the Italian church the whole structure depends upon its utility as a species of "Columbarium" wherein to accommodate the mortal remains of past generations. Every Italian church is surrounded by a series of little chapels containing altars at which the sacrifice of the mass was intended to be performed in perpetuity for the repose of the souls of the founders of such buildings, whose tombs are ranged upon the surrounding walls, or form the pavement. These chapels or reserved spaces are always the private property of individuals or of their representatives, and they can still be sold as freeholds.* In case of a transfer of such property the purchaser of course puts up his "stemma" or family badge on every coign of vantage, but nowadays taste in such matters has changed a great deal, and it is rare for such a transfer to take place, for obvious reasons. Intramural sepulture is now almost prohibited in Italy, and consequently the chief object of possessing one of these chapels no longer exists.

This system of burying the dead of the superior classes within the churches gave rise to a difficulty of accommodation, which in the Middle Ages was met by the simple expedient of providing a series of large stone chests or sarcophagi, ingeniously fitted into the walls or between the buttresses on the outside of the churches, or in contiguous cloisters. In these the accumulating bones of earlier interments were intended to be collected, and by this expedient the transfer of proprietary rights in the chapels was

much facilitated. The outside ossuary or bone-chest was decorated with appropriate inscriptions and the "stemma" of the family.

In Venice one or two of the great churches are still surrounded by these miniature ossuaries built in between their external buttresses, and corresponding with the family altars or chapels inside. SS. Giovanni e Paolo has a great many preserved around its front, in spite of the drastic alterations of the "restoration" in 1870. The more ancient bone-chests were sometimes destroyed when pseudo-Classic fronts and later additions were made to mediæval churches.

One of the most remarkable instances of this mediæval fashion of burying the dead in sarcophagi between the buttresses of the outside of a church is the great collection of tombs surrounding the Cathedral of Rimini, made by Sigismund Malatesta in 1450 (illustrated in the *Builder* of February 1 of this year). In this case the Lord of Rimini was adopting a current fashion for the purpose of gratifying his "classic" enthusiasm; the sarcophagi were supposed to contain the bones of philosophers and poets gathered from various parts of Italy, which, in those "Renaissance" times, were perhaps of more consideration for the purpose than the commoner mortal remains of a distinguished ancestry and old descent. Sigismund Malatesta, doubtless, thought he was doing a very fine thing, and certainly a very novel one. In another very remarkable example of this fashion—S. Maria Novella, Florence—the bone-chests, several dozens in number, are said to contain the remains of persons formerly buried in the more ancient Cathedral of Santa Reparata in Florence. They were moved to the present position in the thirteenth century. The greater part of these tombs were barbarously "restored" along with the unfortunate church in about 1860. The custom referred to may perhaps be traced to extreme antiquity. The ancient church of S. Andrea in the Roman Forum possesses a large number of sepulchres cut into its walls in the form of the contemporary loculi of the catacombs, but occupying a position which reminds one of the bone-chests of the mediæval churches.

At the present day the ancient churches of Venice are only used by the very poorest class of the people; their ownership is merely governmental, as the proprietary rights belonging to their chapels can only be exercised for the specific purpose for which they were erected, a purpose long since obsolete. Burial within churches is no longer customary, and, as in other countries, a subject of special permission not easily obtained. With the abandonment of the chapels for their intended purpose, the altars within them have also fallen out of use, the stipends attached for saying mass have disappeared, and the parish incumbents make use of them without reference to their original significance. The neighbouring palaces still carry the names of the illustrious dead who lie buried in these old churches, but there are few, if any, instances of the chapel being considered as attached to the palace as in the olden days, and as is still the custom in other Italian cities. Perhaps we may be allowed to consider that a certain advantage has resulted from this state of things as far as concerns monumental art. The neglected monuments of

Venice have certainly escaped a great deal of the well-meant, but altogether disastrous "restoration" which has ruined so many of the grand old churches of Rome and Florence during the past nineteenth century.

The hitherto very much abandoned church of the "Frari," with its countless tombs and dirty disused chapels—a veritable monument of desolation and decay—is now being treated with admirable care. Since the sixteenth century this church seems hardly to have been touched structurally; at that period a very unsightly clerestory of half-circle windows was inserted to show off the ponderous monuments which block up its western aisles. This clerestory was afterwards found to admit such a glare of light that the present dingy red curtains became a necessity. As is the case wherever the huge monuments of the later Doges have been placed in these old churches of the pointed style, the inevitably accompanying whitewash, covering up blocked windows and earlier decorations, has been applied without stint. This whitewash, when of the last century, is usually relieved with drab or grey imitation of non-existent masonry, which in course of time becomes peculiarly dismal in appearance. In such cases it seems permissible to remove the whitewash when there is any decoration of an old and valuable kind concealed underneath. So in the present case of the "Frari," the decoration of the fourteenth century is being carefully brought to light, but without, of course, interfering with the later monuments, or impairing their completeness. When finished, the eastern part of this church will have a particularly magnificent effect in conjunction with the remarkably preserved mediæval fittings of the choir and the unique rood-screen. In the reinstatement of these decorations, as also in the Church of S. Stefano, on the Grand Canal, no attempt to "restore" them is made. The whitewash is carefully removed and the stencilling beneath is merely fortified and touched up here and there in places where it may have been practically destroyed.

The style of decoration in the fourteenth and fifteenth century churches of Venice is of a local character, some peculiarities of which may be noticed in the pictures of Carpaccio. The vaulting ribs and other constructive features were often painted brick red on a plaster covering to the real brickwork. The walls were treated in an imitation of brickwork or marble, which has a pleasing effect, as it is a mere conventionalism, and not intended as a deception. The Church of S. Stefano possesses, thanks to the uncovering process now going on, a very fine and elaborate example of this style. The nave is partly restored to its original condition, with the hitherto covered-up decoration. The arches of the nave arcades possess elaborately floriated and crocketed ornament, culminating in a rich finial over the apex of each arch, from which issues the half figure of a saint, whose name is inscribed in each case in long black letter behind his head. The whole conception of this design relieved on a chessboard pattern of delicate red and yellow—perhaps representing brickwork—is very original and pleasing. This chequered decoration in S. Stefano reminds one a great deal of the somewhat similar design on the outside of the upper story of the Ducal Palace.

* In Florence one or two of the chapels, originally the property of great historic families, have passed into other hands during the nineteenth century. In Santa Croce, the "Westminster Abbey" of Italy, an ancient chapel was sold to the since extinct English family of Sloane in 1860.

NOTES.

In a letter to the *Times* of Wednesday last, Sir Edwin Durning-Lawrence makes the statement that it would have been perfectly easy, and even cheap, to have made the Venice Campanile as strong as when first erected by the injection of Portland cement grout at the proper time. We are not aware that any one having the slightest authority to speak as an expert on constructional subjects has suggested that the collapse of the Campanile was unavoidable. On the contrary, the opinion has been expressed in more than one direction that the catastrophe could have been prevented by the exercise of greater vigilance on the part of those responsible for the safety of the structure. Thus it appears that the letter in question is intended to combat a view that has not been seriously raised. Nevertheless, it is interesting to architects and others as a reminder of the value of Portland cement for binding together masses of material, and for strengthening porous substances. If we accept the view not unreasonably entertained by the writer, that the collapse was due to loss of coherence, so that the material of the tower "was little better than a mass of dry dust," there can be no doubt that the injection of cement grout, filling the pores of the old bricks and all interstices of the walls, would have been of immense value. Such treatment involves the drilling of numerous holes through which the healing liquid may be pumped, and as the process must be started from the bottom and continued gradually and carefully to the top, considerable time is necessary for completion in the case of a lofty structure. The work of restoring the Venice Campanile would have occupied some two or three years, so it is evident that the grouting treatment could only have been undertaken as a precautionary measure, and not when a state of urgency had been allowed to arise. The usefulness of cement grouting is by no means unknown to architects, and is fully recognised by engineers. Some of our readers will remember that we recently called attention to the practice followed in the New York subway, where defective patches of concrete were made good by the injection of cement grout, instead of being cut out and replaced in the ordinary manner. Railway and bridge engineers frequently find grouting under pressure of the greatest service, and there is no reason why it should not often be adopted in architectural practice where the conditions are favourable, both in new and in old buildings.

FROM a report of the meeting of the Wilts County Council on Tuesday, it appears that there is some reason to hope that Stonehenge may be secured as national property, which would be by far the best safeguard for its future preservation. In the statement which Lord Edmond Fitzmaurice made on the occasion, he said that the position taken by Sir E. Antrobus, the present owner of Stonehenge, had been much misrepresented. That Sir Edmund Antrobus ever asked 125,000*l.* for Stonehenge and the land immediately adjacent was, he said, quite untrue. That matter related to a far larger negotiation, and not only was it not the figure named for Stonehenge, but it related to negotiations for land from which Stone-

henge was expressly excluded. He further urged that for the County Council to enter into a discussion of rights of way on this subject would, under the circumstances, be only obscuring the main issue. This view was accepted, and the motion which Mr. Percy Wyndham had intended to bring forward on this subject was withdrawn. So far, therefore, the question of Stonehenge seems to be in a more satisfactory position than was supposed. We hope the matter will end with its purchase by the nation, as such a remarkable historic monument, even if safe for the present, ought to be secured against the possible caprices of future private owners.

WE are glad to see that the County Councils and the Education Bill. Herts County Council has appointed a Committee to investigate the conditions of, and various points in regard to, education in their county. This is done in view of the passing of the Education Bill, and it is to be hoped that the example of this Council will be followed in other parts of England. It is more especially to be desired that they should investigate the expenditure of money by small local authorities for the purposes of so-called technical education. A great deal of this has been wasted in what is little better than winter amusements, which have never really given any consecutive instruction so as to fit the learners for taking up some special occupation after the course has been completed. It is desirable, if possible, that when the Education Bill comes into operation local technical education should be centralised. This would limit the number of students, but, on the other hand, it would mean that the course of study was seriously pursued, and there would be some certainty that the money spent by the Councils would be really productive of results.

A QUESTION of some interest has been decided in the case of the Mayor, Aldermen, &c., of the Borough of Northampton *v.* Ellen. The Corporation purchased the waterworks in 1884, and Section 36 of their Act provided that for the supply of water for domestic use they should be entitled to charge a sum not exceeding 7½ per cent. on the net rateable value of each dwelling-house. Section 25 gave them power to make up any deficiency that might arise out of the general district rate. In 1890 the boundaries of the borough were extended, and by the Extension Order it was provided that for a period of ten years the general district rate levied on this extended portion of the borough should not, when added to the poor rate, the borough rate, "and any other rate made by the Corporation in the same year," exceed 5*s.* 6*d.* in the pound. Recently the Corporation had reduced the water rate from 7½ per cent. within the old borough, but retained it at 7½ per cent. in the new district, leaving the deficiency thus created to be made good by the general district rate. The Corporation were now suing the defendant in respect of the water rate levied on a house in the new district, and the defendant resisted payment on the ground that no water rate was leviable as long as the rates exceeded 5*s.* 6*d.* in the pound. Two important points were decided by the Court. First, that under Section 36

of the Act (a section drawn in very general terms in connexion with waterworks), the Corporation had no power to differentiate the rate in the two districts; secondly, that a water rate was not to be taken into consideration under the Order in arriving at the rates which were not to exceed 6*s.* 6*d.*, the water rate not being a rate in such sense, but a price paid for the water, just as gas might be purchased.

WE learn that the British Fire Prevention Committee are organising an International Exhibition of fire preventive and life-saving appliances, to be held at Earl's Court from May to October, 1903. The exhibition will be classified under the heads of "Fire Prevention," including building construction, and electrical and heating safeguards; "Fire Fighting," including all fire-extinguishing and life-saving appliances and fire-station equipment; "Fire Calls"; "Salvage Work"; "Ambulance Service"; "Water Supply," &c. As it is intended to illustrate also the history of the subject, there will be a "History, Literature, and Art" section, including books and periodicals, illustrations of fires, &c. The scheme seems very well drawn up, and while such an exhibition cannot fail to be very interesting, it is to be hoped that it may also have practical results.

WE have received the prospectus for 1902-3 of the Liverpool School of Architecture in connexion with University College, Liverpool, which has additional interest just now that the Victoria University at Liverpool has decided to grant a degree in architecture. The prospectus shows an excellent and most comprehensive programme of studies, under the general management of Professor Simpson. The following quotation from the prospectus will be of interest:—

"For the first time in England (in America a degree scheme is almost universal), a student can obtain a degree in which a knowledge of architecture is combined with a knowledge of general subjects. The advantages of this course are obvious. A student can now continue his liberal studies at the same time that he is studying the special subject which he is afterwards going to make his profession. Candidates for the B.A. degree are required to pass—(a) the Preliminary examination of the University in five subjects—(1) English Language and English History; (2) Mathematics; (3) Latin; (4) Elementary Mechanics; (5) One of the following: Greek, German, French; (b) the Intermediate examination for the ordinary B.A. degree in the following subjects:—(1) One of the following: Greek, Latin, French, German, Italian; (2) One of the following: Ancient History, Modern History, English Literature; (3) One of the following: Physics, Pure Mathematics, Applied Mathematics. Candidates are required to present certificates of having attended (a) the approved classes for the subjects presented in the Intermediate examination; (b) courses of instruction in Architecture and allied subjects averaging not less than five hours a week the first year and fifteen hours a week in the second and third years. Such courses shall include all the subjects presented for examination. An attendance of not less than fifty hours in the Department of Engineering is required from all candidates. The subjects of examination are:—(a) History of Ancient and Mediaeval Architecture; (b) History of Modern Architecture; (c) Construction and Planning of Buildings, including Sanitation, Graphic Statics; (d) Architectural Drawing. And any two of the following:—(e) Freehand Drawing; (f) Modelling; (g) Decorative Design; (h) Applied Mechanics; (i) Art and Theory of Painting; (j) Art and Theory of Sculpture."

With such a scheme as this, and with excel-

lent instructors (as we know to be the case) Liverpool may look to become a new centre of architectural education.

Handmade Lathing. OUR advertisement columns, this week and last, contain an appeal from the London Operative Lathers' Trade Union, addressed to builders, urging them, on practical as well as on patriotic grounds, to use English-made hand-cleft ceiling laths in place of foreign machine-made laths. With regard to the patriotic claim, we fear the time is past for that kind of argument; in the present ready commercial intercourse with all parts of the world it can hardly be expected that buyers will do otherwise than go to the cheapest market, if they can get what they want abroad at a lower rate than in England. The argument should be confined to urging that the hand-made laths are the best, and here we are fully in sympathy with the advertisers. Their reasons for this opinion are fully stated in their advertisement, and are we believe quite sound, and we recommend them to the attention of those builders who wish to do the best, and not merely the cheapest work.

University College. At the distribution of prizes last week, the headmaster of the school, Mr. J. L. Paton, advertised to the proposed removal of the school to fresh quarters in the northern suburbs, and stated that an estimated sum of from 70,000l. to 80,000l. would be required for the erection of efficient buildings upon a new site. As a portion of the old buildings will thus be set free for other uses, it is to be hoped that the authorities of University College will take the opportunity to remove the unsightly building which they have erected towards Gower-street for the use of the engineering school, and will restore Wilkins's open quadrangle as he intended it to be.

The Lyceum Theatre. We understand that the shareholders have finally resolved to dispose of the property rather than carry out the structural alterations required by the London County Council at an outlay estimated to exceed 15,000l. The company was formed in March, 1899, to acquire for 275,000l. the freehold estate—covering 22,700 ft. superficial and valued at 260,000l.—of the theatre, with rentals of adjoining premises, and the interest of Sir Henry Irving as lessee. The Lyceum Theatre is one of the oldest established playhouses in the town. It was originally built in 1765 after designs by James Paine, as an academy and exhibition-room under that name for the Incorporated Society of Artists; Garrick purchased the lease from them that the building might not become converted into a theatre. It stood next to Wimbledon House, afterwards D'Oyley's famous linen and small-ware shop, near what is now the south-east corner of Wellington-street. In 1790 one Lingham, of the Strand, a breeches-maker, bought the house and opened it for musical performances. Five years afterwards he leased an adjoining plot to Dr. Arnold, the composer, who there built a theatre, but by reason of the strong opposition of the Covent Garden and Drury Lane managers his enterprise failed, and the house was used for exhibitions of paintings and

various entertainments and shows, amongst them being Winsor's experiments (1803-4) in gas-lighting. S. J. Arnold, succeeding his father, enlarged the building in 1809 for his English Opera and Ballet House, which gave way to the new theatre erected for, it is said, 80,000l. in 1816 after Samuel Beazley's designs, and destroyed by fire on February 16, 1830. The site having been taken for the laying out of Wellington-street, 1829-30, as an approach to Waterloo Bridge, a new theatre was built on the present site in that street, at a cost of 35,000l. from plans and designs by Beazley, and opened for English Opera on July 14, 1834. Beazley built a new green-room in 1838, and a room at the Lyceum for the recently revived "Sublime Society of Beefsteaks," founded by Rich and Lambert at Covent Garden Theatre in 1735. That Society, whose effects were dispersed at Christie's Rooms in April, 1869, had migrated to the (old) Lyceum in S. J. Arnold's time, and, after a sojourn in 1830-8 at the Bedford Head, again to a suite of rooms (entered from Exeter-street) at the Lyceum. In 1847 the interior was richly decorated for Charles Mathews and Mme. Vestris; the latter there bade farewell to the stage, in Planché's extravaganza, "Once Upon a Time." Alterations of the interior, with new entrances and exit-doors, and an enlargement of the house by the taking in of the two restaurants on either side of the portico, were effected eleven years ago under C. J. Phipps's superintendence. During thirty years past the fortunes of the theatre have been closely identified with Sir Henry Irving's dramatic career. Particulars of Sir William Emerson's award in the arbitration before him, as between the London County Council and the proprietors, are given in our number of July 12 last.

Great Opportunity for Architects. THE Trustees of the Martyrs' Memorial Church, Canterbury, advertise a competition which may be said to be exceptional even in these days of remarkable temptations offered to competing architects. They wish for plans for a church to seat 400 persons, together with a schoolroom to accommodate 250 children, with various adjuncts which are mentioned. For this they offer 15l. as a first premium, with the munificent addition of 5l. as a second premium. The fortunate architect who is selected for the first premium will be required to furnish a draft specification and "necessary additional satisfactory elevations and details for working," on the receipt of which the 15l. will be paid to him, "and the plans and drawings will become the property of the Trustees without further charge." Lest, however, the premiated architect should be anxious as to the proper carrying out of his design, it is added that "a clerk of works will see to the carrying out of the design." We can imagine the rush that there will be among the leading church architects of the day to avail themselves of this remarkable offer.

SCHOOLS, EDINBURGH.—It is proposed to make an extensive addition to the Broughton School, Edinburgh, and plans by Mr. Carfrae, the architect, were submitted to the Edinburgh School Board recently. The classroom accommodation in the new building will be 785, and deducting classroom places in the old building on account of formation of central hall, 228, the increased accommodation will be 557.

MEETING OF THE ROYAL ARCHEOLOGICAL INSTITUTE AT SOUTHAMPTON.*

MONDAY, July 28, was devoted to another visit to Winchester, to inspect the cathedral and monastic buildings, under the guidance of Mr. W. H. St. John Hope. The party first assembled in the north transept of the cathedral, when, by the aid of a large plan with movable flaps, Mr. Hope explained the architectural history of the building and the successive changes it had undergone, basing his remarks on the paper written by Professor Willis in 1845. Recent investigation has, however, demonstrated the need for revising the accepted theories, and Mr. Hope showed that in addition to the tower over the crossing, the church most probably had a single western tower with side wings, like Ely, instead of the two western towers hitherto assumed. He also claimed that the thirteenth-century work at the east end was at least thirty years later than the episcopate of Bishop Godfrey de Lucy (*ob.* 1204), to whom it has long been assigned, and that although the plan was probably Bishop Godfrey's, the only remains of his work were to be seen above the vaults, where there was evidence of three transverse gables on the south side for which no provision existed now below. His corbel table also remained on the north side, but there the aisle had a continuous roof and no gables. Mr. Hope further urged that the ascription of the poor west front and the adjoining bays of the aisles to Bishop William of Edington be abandoned, the style being far more in accordance with work known to have been in progress under Bishop William of Wykeham in 1371. The Dean of Winchester said that, as regards the west front, he had come to the same conclusion as Mr. Hope, and he was glad to have his opinion confirmed by so high an authority. Mr. Hope afterwards conducted the party over the church. By the kindness of the Dean several of the reliquary chests had been temporarily removed from the side screens of the presbytery and deposited in the space behind the altar, where they were inspected with much interest. After luncheon the party reassembled outside the north transept, where Mr. Peers, by the aid of a plan, pointed out the relative positions of the Old Minster, the New Minster, and the "Nunna-minster," and gave his reasons for believing that the predecessor of the present cathedral stood on the north side of the existing nave. Certain foundations that had lately been opened up by excavation Mr. Peers considered were part of the buildings of the New Minster, erected shortly before its removal to Hyde in 1110. The party next resumed the perambulation of the church and the remains of the monastic buildings under the guidance of Mr. Hope, and, after inspecting the remains of the chapter-house, the kitchen, and the cellarer's building, in the cellar of which is preserved an original thirteenth-century table with carved stone legs, proceeded to Dome Alley, a double row of early seventeenth-century houses, with ornamental lead gutters and spouting. Mr. Hope gave reasons for assuming that this occupied the site of the monks' infirmary. Finally, the Deanery, anciently the Prior's house, was reached, and here the Dean of Winchester and Mrs. Stephens hospitably received the members at tea. The Dean also described the leading features of the house; and after inspecting the remains of the great hall, now divided up into the drawing-room, dining-room, and a series of bedrooms above, the party returned to the station *en route* for Southampton.

In the evening the annual business meeting of the Institute was held, when new members were proposed, and the Report of the Council was read, which showed that the Institute was in a flourishing condition, especially with regard to its finances. Reference was also made to the satisfactory arrangements that had been made by the incorporation of the greater part of the library with that of the Society of Antiquaries. The selection of the place of next year's meeting was left to the Council. The concluding evening meeting was afterwards held, when votes of thanks were passed to all those who had contributed to so successful a gathering.

On Tuesday, the 29th, a special train was in readiness to convey the party to Bishop's Waltham, where Mr. Hope described and explained the ruins of the ancient palace of the Bishops of Winchester. One of the

* Continued from p. 102 ante.

towers and the foundations of a large hall and an apsidal chapel are the chief remains of the house built here by Bishop Henry de Blois, but the Norman buildings have partly given way to a large hall and kitchen, &c., the work of Bishop William of Wykeham, who died here in 1404. Another range, perhaps the brewhouse and bakehouse, also of the fourteenth century, remains in the outer court, and the whole site is surrounded by an excellent brick wall, the work of Bishop Thomas Langton (ob. 1500-1). The journey was next resumed in carriages to Warrford, where, after luncheon, Mr. Hope described the remains of the early thirteenth-century house of the De Ports, consisting of a lofty hall with arcades of three bays, and the battery and kitchen with great chamber above. One of the four original pillars is still standing to its full height of 25 ft., but of the rest one has disappeared and the others have been reduced to a few feet in height, probably on account of the destructive ivy, which has the surviving example in its deadly grip. It was resolved that the attention of the owner be called to the desirability of saving from further destruction the remains of so interesting and unusual a building. The parish church was next visited under the guidance of Mr. Micklethwaite, who called attention to the fine late Norman tower and the interesting seventeenth-century screen and choir fittings, as well as the thirteenth-century inscriptions over the south door and on the north wall. That on the north side is as follows:—

† ADAM DE PORTV BENEDICAT SOLIS AB ORTV
SIC CURVE SIGNATA PER QVEM SVM SIC
RENOVATA. BENOVATA.

That over the south door is surmounted by a Saxon sundial, and reads:—

FRATRES ORATE PRECE VESTRA SANCTIFICATE
TEMPLI FACTORES SENIORES ET IVNIORES.
WILFRID FVNDAVIT BONVS ADAM SIC RENOVAVIT.

Corhampton Church, a small and Late Saxon building, consisting of a nave and chancel, was next inspected, and explained by Mr. C. R. Peers, who called attention to the pilaster strips, the long and short work at the angles, and the fine north doorway, now blocked. In the chancel is an interesting early stone chair. On the return of the party to Bishop's Waltham the members were hospitably received at tea by the Vicar, the Rev. J. P. Nash, who also explained the chief features of the parish church, an interesting structure, chiefly of the sixteenth and seventeenth centuries; it also possesses a fine Jacobean pulpit.

Wednesday and Thursday, July 30 and 31 were devoted to a special excursion in the Isle of Wight. The party, which numbered about forty, including the President, Sir Henry Horwath, proceeded first to the headquarters at Newport, where the maces and other civic antiquities, and the parish church and communion plate, were inspected before luncheon. A move was afterwards made to Carisbrooke, where the remains of the early Roman villa were described by Mr. Hope, and the parish church was inspected under the guidance of Mr. Percy G. Stone, who had charge of the party. The castle was next visited and described by Mr. Stone, who has lately carried out some judicious repairs in the gatehouse and other portions. The clumsy bolting with cement visible on the keep entrance and elsewhere is due to the Office of Works. By the kindness of Lady Adela and Mr. Cochrane, the deputy coroner of the island, the interior of the castle buildings was inspected, and after ascending to the keep and viewing the great wheel of the well, the party returned to Newport.

On Thursday carriages were in readiness, and after a lovely drive along Arreton Down, a visit was paid to Arreton manor-house and the parish church, which were described by Mr. Stone. The manor-house is an early seventeenth-century building with some good panelled rooms, all in admirable order. The church is an interesting structure, chiefly of the thirteenth century, but the west wall is Late Saxon work, with doorway and window over. The drive was next continued to Brading, where a brief inspection was made first of the well-known Roman villa. After luncheon a visit was paid to the church, which was described by the vicar, the Rev. E. Summers, who called attention to the many interesting tombs of the Oglender family. Before resuming the journey to Yaverland, Mr. J. H. Oglender gave some account of the ancient Corporation of Brading, Yaverland Church, a small and much-restored edifice,

was described by Mr. Stone as practically the chapel to the manor-house hard by, a good example of the seventeenth century with some nice woodwork about the staircase. The church contains nothing of interest. The last place visited was Godshill, where the church, an interesting and little-injured building, was described by the vicar, the Rev. P. M. Bartlett. It consists, practically, of two naves and chancels, side by side, with north and south transepts and a western tower, all for the most part of the fourteenth and fifteenth centuries. There are a number of late tombs, including the alabaster effigies of a knight and lady of Derbyshire work, and some good woodwork dating from the Laudian revival. The return of the party to Newport brought the meeting to a successful termination.

It will be seen that in addition to the cathedral and monastery of Winchester, monastic remains were inspected at Romsey, Porchester, Netley, Beaulieu, and Titchfield. The castles included Winchester, Porchester, and Carisbrooke, while domestic architecture was represented by the foundations of the Roman houses at Carisbrooke and Brading, the twelfth-century buildings in Southampton and in the episcopal palaces at Wolsley and Bishop's Waltham, the thirteenth-century hall at Warrford, the fourteenth-century buildings at Bishop's Waltham and in Porchester Castle, the fifteenth-century work at St. Cross, the stately sixteenth-century gatehouse at Titchfield, and the Tudor house at Southampton, and the seventeenth-century houses at Arreton and Yaverland and Bishop Morley's fine building at Wolsley. The parish churches included work of all dates, from Late Saxon times down to the present day.

It only remains to add that the weather was propitious throughout, and the meeting in every way a most enjoyable and well-managed one.

MAGAZINES AND REVIEWS.

THE *Quarterly Review* for July contains a very interesting article on "The Depths of the Sea," dealing in part with the history of the investigation into the character and configuration of the surfaces which form the bottom of the ocean, and the gradual improvement and development of the instruments of investigation. The remainder of the article deals with the Fauna and Flora of the deep sea. The article on "A Council of Trade," suggested mainly by the American shipping combination, though it hardly touches our immediate subjects of interest, deals with a subject most important to the general well-being of the country, viz., the means to be adopted of keeping together and developing our world-trade against active competitors. The main argument of the article may be represented by the following quotation:—

"One fact is incontestable, and that is, that this country is exposed to more serious emergencies, and to keener and more formidable competition, than ever in its previous history. Now the danger to England lies in the fact that she has so long been the cradle of industry, of inventiveness, and of enterprise, that faith in her star appears to be an ineradicable principle of her people. There is a truly British conviction that we shall sooner or later come out at the top, and to that conviction, unaided by sufficient efforts to secure its justification, it is to be feared we may cling too long.

Once the emporium of the world's commerce, England has taught other nations to manufacture, to trade, and what is almost more serious for her, to carry for themselves. This decentralisation, so far as Great Britain is concerned, has been in progress for the past half-century, and was accentuated by the opening of the Suez Canal, when the Mediterranean and other countries instituted Eastern trading-fleets of their own, carrying their own goods, importing and exporting free of toll to Great Britain. The same process has been going on in many parts of the world; and it long since became inevitable that, as the great distributing centre of trade, this country must, to a considerable extent, lose her commanding position.

The process has, of course, been gradual, and many compensating advantages have served to mitigate the loss. Owing, however, to rapid, extraordinary and sensational developments, it becomes imperative to consider this country's position; and it is scarcely necessary to point out that the more immediate risk in such consideration is that hasty expedients, legislative or otherwise, may be advocated and adopted without that systematic inquiry and study which sound business principles demand. With full respect we submit that at the present moment no machinery of State exists for such a study of our national commercial policy as a whole."

As a whole, the *Quarterly* is an exceedingly

strong number, but the other most important articles are on subjects which it is not within our province to comment on.

The *Magazine of Art* has an article on the work of a young artist, Mr. Walter West, whose illustrative designs have both charm and originality, and there is an admirable book plate design in which the portrait (we presume) of the fair owner forms the central incident. We quite agree with the opinion expressed in the article on the Salons of 1902, that four or five hundred of the pictures in the New Salon ought not to have been hung. Among those selected for illustration we are glad to see M. Cottet's "Messe Basse en Hiver," a work of real power, already mentioned in our pages. There is an article by Prince Karageorgevitch on "The Later Works of Eugène Carrière," a painter who in our opinion has obtained a following beyond what his real powers would entitle him to, by the adoption of a mystical (or misty) and eccentric manner. An article on "The Scenery of Charles Kean's Plays" (that is, of the plays produced under his management) recalls and illustrates the talents of some of the eminent English scene painters of that generation. In the architectural portions of his Shakespeare revivals Kean was assisted, as noted in the article, by the late Mr. George Godwin. The editor contributes an article in memory of Benjamin-Constant. An article on "Mrs. Philip Newman's Jewellery" gives us some illustrations of jewellery which has the merit of being refined and artistic without eccentricity—a merit rather too uncommon at present.

The *Art Journal* contains an article on "The Best of Richard Doyle," dealing with the work of that gifted humourist in his more serious moods—a side of him which is not popularly known; and a continuation of the notes by Mr. Walter Crane on the Turin exhibition. Cerne Abbas, the buildings and the district, is the subject of an article written and illustrated by Mr. Arthur Tomson. Mr. Bromhead contributes an article on "Doves and Pigeons," illustrated by Miss Allport's pretty sketches, which are probably the real *raison d'être* of the article.

The *Architectural Record* commences with an article consisting of a well-deserved tribute to M. Nétot, the architect of the New Sorbonne, written by M. Augé de Lassus, and we presume translated from the French. No living architect better deserves praise and recognition for the fine qualities displayed in his great building, and the energy and ability with which he has carried out such an important piece of work. To be sure it may be added that French architects are fortunate to live in a country where such great opportunities are found for them, and where—better still—their abilities find fitting recognition. In England it is seldom indeed that an architect has such a chance as M. Nétot has had in the Sorbonne, and if he had it, he would probably meet with neither gratitude nor recognition except from his professional friends. "The New Cathedral at Westminster" is the subject of an article by Mr. F. Herbert Mansford. The article, though expressing warm admiration for Bentley and for his great building, is not written in any spirit of extravagant eulogy, but is tempered by some judicious criticism; an article in this spirit is in reality a much better compliment than mere adulation. Mr. Mansford is not surprised that many people find the tower too thin in proportion; he does not observe, however, what might very well be observed, that it is hardly possible to form a just idea of the tower until the lantern stage is completed, as we cannot till then realise exactly the character that is aimed at. People in London (we do not know whether Mr. Mansford is English or American) go about saying that the Campanile looks like a chimney; when they see the lantern finished they may realise that this stern plainness in the stalk of the tower is deliberately maintained in order to give effect to the lantern; like so many of the mediæval towers of North Italy, it represents, or will probably be found to represent, a decorative lantern pushed high into the air on a tower in which nothing in the lower part is allowed to detract from the concentration of effect on the lantern. An article on "L'Art Nouveau" is contributed by a French art-tradesman, as we suppose he may be called, M. Bing, who has established a manufactory for the production of the kind of decorative art in furniture and accessories which he says one of his critics has described as "French twist"; a happy expression for which we thank the

said critic, whoever he may be. M. Bing is persuaded that he is an apostle of a new life in French art; but spasms and contortions are hardly to be accepted as a sign of healthy life.

The *Berliner Architektur-Welt* is almost entirely occupied with the illustration of one building, the Villa Stolwer, built from the designs of Herr Bruno Schmitz. Externally it is a large mansion of irregular outline, in which the materials of a somewhat *rococo* classic style are treated with a freedom producing almost the general effect of a Medieval grouping. The principal interest lies in the numerous illustrations of interiors and decorative treatment; and if there is much with the taste of which we cannot sympathise, no one can deny its extreme cleverness and originality. Those who want to realise what the new German taste is in its best form will find the August number of the *Architektur-Welt* of considerable interest.

In the *Architektonische Rundschau* we find an example of the hard unsympathetic modern Gothic of Germany in the illustrations of the Paulus-Kirche at Stuttgart. The geometrical elevation of a new hotel in Vienna, by Herr Otto Wytrlik of that city, is at all events free from the commonplace of decorative treatment which such buildings usually present in England; it is a mass of wall pierced with rows of square-headed mullioned windows, the plainness of the whole being relieved by flat decoration on part of the walls, apparently tiling. The treatment of the roof balustrade is novel and picturesque. On one of the balconies of the circular pavilion at the end sit draped female figures holding aloft horizontal metal circlets from which electric lamps depend. The plan is not given. This is a design certainly out of the commonplace, and both pleasing and suitable for the class of building. The remaining illustrations of the number are not of special interest.

The *Artworkers' Quarterly* contains a paper on "Studies of Birds for Decorative Purposes; from Nature and Ancient Examples," in which the illustrations are quite admirable, both those taken from ancient examples, and those which are direct studies from nature, but with a decorative treatment—studies of the main lines rather than of detail. They are by different artists, whose names are given. Mr. Percy Dearmer, a very competent authority, contributes his second article on "Church Vestments." The criticism on the Church Crafts League Exhibition contains some remarks which we think are not uncalled for, in regard to the rather exaggerated pessimism of the League criticism as to "Art having been divorced from the Church" &c.; the writer suggests that the real fact is that church art has suffered, no doubt, from imitation and from the trade spirit pervading it, but not more so than secular decorative art. There is something in this, though we do think that what is called "Church art" has been rather peculiarly the prey of the mere medieval imitation spirit.

The *Antiquary*, in its "Notes of the Month," draws attention to the threatened destruction of the earthwork near Ditchfield known as Maiden Bower, and hopes that steps may be taken to avert it. We entirely concur; the owners of such relics ought to be taught what a responsibility rests with them for preserving relics of the past which, once destroyed, can never in any sense be replaced. In some cases, we are inclined to think, such antiquities are allowed to be destroyed not so much from perversity as from a lack of ignorance of their historic value. "Rushlights and Early Candleholders in the Isle of Man," with photographs of numerous examples of these Manx implements, is a curious study in utensils which, though obsolete, are not so ancient as might have been supposed; the Isle of Man is a stronghold of ancient custom, and it appears that the use of rushlights survived there till within the last half-century. "Candles were also made by dipping a linen rag or twisted cotton wick into melted fat, and holding it up to cool; the process being repeated until it was of sufficient thickness." This kind of rag candle, in the making of which necessity is the mother of invention, was in still more recent times the extemporised candle of the farmer or squatter in a new district in Australia, (we forget the local name given to it, but it had one), and may be still in use in some half-reclaimed districts of Australia. Mr. J. A. Rutter contributes an article on "Moated

Mounds," a title which seems rather confused in its etymology, since "mound," "mote" or "mola" appear to have been really the same thing—the conical mound with a ditch round it which was formed by the extract of the materials for the mound. The word "moat" in the title seems therefore to be used in its derived and popular sense of a surrounding ditch, but it really meant the whole thing, and a "moated mound" is really equivalent to a "moated moat" (using the modern spelling). The ultimate object of Mr. Rutter's article, which is rather desultory in its arrangement, seems to be to suggest that there is another form of early earthwork to be taken account of, "in which the place of a mound is taken by a banked enclosure." He gives a list of the examples he includes in this category. The subject is not concluded in the present article.

The *Nineteenth Century* contains an article by Sir Robert Hunter on the "Reconstruction of Hainault Forest"—the legal reconstruction that is to say, by which it is proposed to acquire and preserve for ever as a recreation ground the really beautiful portion of Hainault Forest, towards Chigwell, which is still left. As the writer observes, many people who are familiar with Epping Forest both by name and by sight, hardly know of the existence of the beautiful tract of woodland, finer than anything in Epping Forest, which still exists towards the eastern end of the tract of country called Hainault Forest, great part of which is now "forest" only in name. It is to be earnestly hoped that the proposed purchase will be effected, for it would be lamentable that such a piece of natural forest as this should be reduced to building land. Sir Robert Hunter gives the history of Hainault Forest, once part of one continuous forest of which Epping is another part, and gives a map of the district, which, by the way, is without a scale. To the same number Mr. C. L. Eastlake contributes an article on "Old Masters and Modern Critics," an enquiry into the value of certain critical writings on art. He bestows a good deal of attention on Ruskin and Morelli, about the former of whom he says some things which have already been said in these columns and elsewhere. "It is difficult," he says, "to reconcile Ruskin's advocacy of the school once known as pre-Raphaelite with the extravagant homage which he paid to Gainsborough; or to understand why he deprecated, in the field of ordinary landscape-painting, topographical inaccuracies, while Turner, whom he extolled to the skies, so frequently committed them with an easy conscience." He might have put it more strongly than that, for Ruskin actually described and praised Turner's alterations in the facts of a landscape, and invented reasons for them, which were probably never present to the mind of Turner. There is a great deal of truth in Mr. Eastlake's article—wholesome truth; but we do not know whether his position is quite maintainable, that "a man who has to pass an opinion on any representation of nature—whether it be a human figure, a beast or a tree—should at least be able to draw correctly himself." Does it follow that his opinion is worth nothing otherwise? Hardly, we think. A man may surely be able to see that the representation is not an accurate reproduction of the model, though he may not have the technical power to show how to do it himself. We admit that the real value of outside criticism is more in regard to the spirit and tendency of art in regard to technique; but bad technique may nevertheless be evident to those who cannot draw themselves, as bad verse may be evident to those who never wrote a line of poetry.

Macmillan contains a thoughtful article by Mr. William Potts under the title "What was the Renaissance?" We have not space here to follow out the writer's argument, with which in general we are quite in sympathy; but his conclusion is that the Renaissance was neither a new birth in Art or in letters—that the new movement in Art and in Literature was not the essence but the accompaniment and consequence of a change in the mental attitude of men, which might be described as consisting in "the untrammelling of the human mind from its bondage to the authority imposed upon it by the religious, political, and social systems of the Middle Ages;" which he proceeds to illustrate by the analogy of the change from the Medieval mullioned and stained window to the unobstructed openings of the Renaissance window. The Medieval window, picturesque in itself, shut out the light of day

and the aspect of Nature; the Renaissance window let them in. The parallel is an apt and suggestive one.

The *Century* has an article on "The New New-York" by Mr. Randall Blackshaw, with illustrations, some in colour, by Mr. Jules Guérin. The article describes, of course, what is being done or projected to render New York a finer city in the aesthetic sense. "To-day," says the writer, "a New York is coming to birth which bids fair to vie, if not in historic interest, at least in magnificence and beauty, with even so splendid a capital as that of France." This will hardly be done, however, by the erection of such monstrosities as the high building at the acute angle of Broadway and Twenty-third-street, sarcastically called "the flat-iron," which forms one of the illustrations, and of which we do not notice any condemnation in the text. There seems no doubt, however, that a great amount of sumptuous building is contemplated in New York, and with the talent of American architects much of this will certainly be of a high class. Will it be possible to get rid of the elevated railway? Mr. Blackshaw observes, and we should think with truth, that what was given to New York with one hand in the making of Central Park, some forty years ago, has been taken away with the other hand by the making of the elevated railway. There seems now to be a leaning towards subterranean methods of rapid transit, which will not spoil the appearance of the city. In the illustrations of existing buildings there seems to be rather too much of an attempt to throw a kind of picturesque glamour over them by representing them almost *en silhouette*, as if seen on a misty day. There is a certain element of trick in this; but the article is a very interesting one nevertheless.

In *Scribner* "The Field of Art" section deals with "Artistic Photography Once More," the "once more" rather implying that one has had enough of the subject. The article consists of only a brief comment on two photographs, or rather reproductions of photographs by Mr. J. B. Carrington, consisting of subjects showing tree-stems in winter, with snow on the ground. Mr. Russell Sturgis, whose initials sign the article, instances these practically almost colour and white subjects as examples of a success that may be within reach of the photographer. They are, moreover, in their nature entirely still and quiescent, and in that respect also suited for photography. This is not going very far in support of "artistic photography," but the results in this case are not unsatisfactory. An article by Miss Edith Wharton on "A Midsummer Week's Dream" in Italy is illustrated by some charming sketches by Mr. Peixotto—better than any photographs.

In *Harper* Professor Duncan, of Washington College, gives a popular but very logically written exposition, under the title of "Radioactivity," of Becquerel's discovery of the property of certain substances, of which the most important is the almost theoretically known substance radium, to emit rays of light which will penetrate apparently opaque substances. The successive experiments by which Becquerel arrived at his results are very clearly described and illustrated. Mr. Abbey's illustrations to "The Deserted Village" are concluded in this number. The drawing of the stern of the ship by which the emigrants are departing is a very good piece of work, perhaps the best of the series. The figure subjects in general have hardly seemed to us to rise to the feeling of the poem.

The *Cornhill* contains an article by Mr. E. Kay Robinson on "The True Ordering of Gardens"; not (ostensibly) an essay on the vexed question of the formal or informal garden, but mainly on the way of making the most of the flowers and shrubs to be grown there. We do not quite understand, however, what the writer is driving at in his advice, in emphatic italics, to "make no flower-beds." As far as we can make out, the flowers are to be grown in a quasi-natural manner out of the grass, and "borders" as well as flower-beds are tabooed. The only good reason that we find given for this is that in winter the flower-bed is only an unsightly expanse of brown earth; which is true. But a garden is after all a conventional and not a natural creation, and no kind of design can well be got out of it without marshalling the flowers in some order.

The *Pall Mall Magazine* contains an article by Mr. McGrath on "Marconi's Ambition; the linking together of Greater Britain," the text

of which lies in the following quotation from a conversation with the inventor:—

"I shall not be satisfied," said Mr. Marconi to me at St. John's, "until I can signal direct to New Zealand across the Isthmus of Panama, and send messages to India across the intervening land, using my station at Poldhu for the transmitting of the aerograms to both countries."

Therefore we Britishers, of the homeland or the colonies, recalling that his work has been virtually all done under the British flag, may fairly claim that wireless telegraphy is "a shuttle in the Empire's loom that weaves us main to main"; and may look forward with pleasurable anticipation to the day when it will link together every section of Greater Britain."

The writer, who is evidently well up in his subject, proceeds with a detailed description of the history of Marconi's method of signalling, with the conviction (which we fully share) that a great and influential future is before it. An article under the title "In Terra del Fugian Waters," by Mr. W. S. Barclay, gives some new light on the scenery and local characteristics of an out-of-the-way quarter of the globe.

In the *Revue Générale* M. Primbault concludes his very complete and impartial survey of the present condition of the subject of aerial navigation. As a summary of the position hitherto attained it is an exceedingly comprehensive and useful essay, in which those who have not time to go into the subject in detail may find the main facts and experiences given in a concise form. The writer's conclusions are not optimistic. Some progress he admits has been made, and some partial successes gained, but he declines to believe that aerial navigation will ever arrive at such a development as to materially change the conditions of life. It will always, he considers, be hampered by the difficulty of getting sufficient driving power without adding a weight practically impossible to lift, except by balloon surfaces which will offer too large a surface to the wind to have any chance of contending against it; that, in fact, it comes to this—we cannot increase driving power without a disproportionate increase in weight, and we cannot increase lifting power without a disproportionate increase of wind pressure.

The *Essex Review*, which seems to go on in a spirited manner in spite of having finished up the churches of Essex, has an interesting article on "Vanishing Essex Villages," describing and illustrating some villages in a little-known corner of the county. Fobbing is one of these, and it is said to be now slowly but surely getting engulfed by the surrounding brickfields. This and other villages are in fact too near London to escape transformation; and the writer suggests that as there are societies for preserving ancient monuments, so there should be societies for preserving ancient villages. But how is it to be done, except by buying the land around them? And that, we fear, is not within the range of practical politics. A suggestion in another article, as to the real origin of the names of the "Green Man" at Leytonstone and the "Woodhouse Inn" at Wanstead, is interesting; we will only mention here that both the terms are shown to have been formerly used as synonymous with that of "Salvage Man" or "Savage Man" which we meet with in Elizabethan drama; men dressed in hairy skins to represent wild men of the woods in masques and pageants.

To the *Gentleman's Magazine* Mr. J. Ellard Gore furnishes another of the useful articles in which he gives in a popular form the outlines of some of the main questions connected with astronomy. The present one is concerned with Laplace and "The Nebular Hypothesis," which indeed, after a century of conflicting argument, may almost be said to be passing out of the region of hypothesis into that of accepted cosmical history. Mr. Beach Chester's article, "On the Highway to High Savoy," is a pleasantly written account of a country trip in France, and of the monuments and memories connected with the places visited or passed.

ST. BOTOLPH CHURCHYARD, BILLINGSGATE.—On July 23 was opened the burial-ground belonging to the church and parish of St. Botolph, which the rector of the recently united parishes of St. Mary-at-Hill, St. George, Botolph-lane, and St. Botolph has decided to utilise for open-air services and addresses. The church of St. Botolph was not rebuilt after the great fire, the benefice being added to that of St. George. The church of the latter parish will shortly be demolished, in pursuance of a scheme framed under the Union of Benefices Acts.

MODERN ARCHITECTURAL IDEALS: AN AMERICAN VIEW.

WE have just received the Report of the 1901 Convention of the American Institute of Architects. These Reports, like those of the French Architectural Congresses, are issued a very long time after date; but the Presidential address of Mr. Peabody, who was President of the last Convention, has lost none of its interest, as it deals with general considerations of the aims and ideals of the modern architect, and not with passing or local subjects; and many of our readers may be interested to hear the views on this subject of an eminent American architect. The following is the address, omitting only the opening paragraph, which referred to the loss of the President:—

Our profession has many causes for congratulation at this Thirty-fifth Annual Convention. There has been a large addition to our numbers since we last met. None of us can be indifferent to the fact that eager demands are coming from all parts of our land for a high standard of artistic work, and that the pecuniary responsibilities which are committed to our care are constantly growing. As large fortunes and important business combinations increase in number, an ever larger proportion of riches will continue to be spent on the patronage of Art. All men welcome these expenditures by the rich. To our profession they offer opportunities never before presented in this country. For all these reasons we have no cause to complain of our material prosperity.

Therefore, at such a friendly conference as this, it is all the more desirable that we should see clearly whether these favouring gales and currents are speeding us, and make sure that our gear is strong and our compass true. A review of the aspect and tendencies of our professional life is opportune. To what is it leading us? What opportunities does it offer? How shall we train our young men? How can we make this American Institute a more serviceable instrument? In short, I want to discuss with you the ideals towards which to-day we may reasonably aspire as architects in active practice.

First of all, we note a vital change that has made much progress in the last few years. Once an architect could make with his own hand every drawing for his building, and give it throughout his own touch and feeling. I fancy there is no one of us with a true artist's soul who does not dream of this as the ideal life for an architect. Nor is it an impossible life, and if a man is contented to do small things well, and can find clients who will pay him rightly for such artistic work, I commend this life as a happy and useful one. But though such a serene and artistic career is open to a few rare men, it is not offered to most of us; and generally where a man is faithful to this ideal life he finds himself suddenly the steward of a larger trust. Buildings of importance will not await one man's time. Modern building, and especially American building, implies a rapid campaign. Where it used to take ten years to spend a million dollars, it now takes as many months, or the financier stands aghast as interest runs to waste. The modern building methods and the passion for costly structures are the exigencies from which have arisen the need of large office forces. As in business, trade has massed itself into great consolidation and combinations, so commercialism has brought new problems to our art. It is a surprising fact that in democratic America, of all places, a country where individual exertion and independent action is the mainspring of public life, the spirit of co-operation and combination has so largely supplanted in our art the productions of the individual. It is, perhaps, a thing to deplore that an architect's office should resemble a department store, or should be open to the derisive charge of being a plan factory. In contrast, the life of the single-handed artist architect may well be thought attractive. But it is a fair question, which is the most valuable to the community. The same men are going to do the work in any event. In the one case they are nerved to comparatively ineffective exertion by personal contribute what they can best produce, and where they are weak they are supported by better men. It is an old story. A farmer in the oil fields may refine his own kerosene and preserve his independence, but the Standard Oil Company can furnish better oil at a cheaper price, not only to him but to the peasant in Central China.

My intention, however, is not to argue the question nor to discuss whether by these new methods imagination and poetry are stifled. Perhaps we have had enough display of un-governed imagination. Perhaps imagination that is valuable will make itself felt under any circumstances. I am not arguing. I only state a fact. We all recognise in these days that a man cannot be effectively both architect and builder as in mediæval days. It is only going one step farther to say that it now takes several men to make a good architect. Thus the large co-operative office is the most conspicuous feature of our recent professional life, and in many ways it is not an unwelcome one. Instead of individuals striving for public favour, clubs of artists are now engaged in this pursuit, and material success goes to those whose mutual confidence, *esprit de corps*, and professional skill are most highly developed. It is not a bad situation. It is not unlike the conditions which prevailed through great periods in the history of our art in other ages and other climes. We go to Florence and reverently tread her narrow streets, and people them with the gay, light-hearted artist folk of that golden period, when genius and talent so abounded that he was a dull architect who was not also poet and sculptor and painter as well. That community of interests among the artists and students, among the goldsmiths, painters, and sculptors of Florence, when Verrochio or Luini worked under Leonardo, and Raffaele with Perugino—the one the master the other the helper—was it not somewhat like the life in our own ateliers? Truly it seems as if in some of our great cities, where the workers in the allied arts have joined most thoroughly in mutual endeavour, this ideal artistic life is well simulated. Still more complete was the union of master and student during the Middle Ages, when the art of building was so far left to the guilds that the names of the leading spirits have vanished into oblivion, though their work still speaks to us in lofty nave and peaceful cloister and towering spire. This unselfish oblivion is not to the taste of the modern world. It is one of the great objections of the artist to these large offices. But his fears have no very substantial foundation. The organisation of a great railroad does not stifle individual talent. It rather gives real genius its opportunity, and possibly it is well that mediocre ability should not obtain leadership. In humbler place it can join to its full power in the production of great works, and feel and say "Magna pars fui."

Let us then treat the large office as a fact, and when the head of it says "I," let us hope for his sake that he intends it as Admiral Dewey might, and let us not forget the man behind the guns without whom the guns are powerless. And when the young aspirant for fame in a large office talks as if he were the nameless ghost whose spirit pervades all the successful work of the office, let us remember how long the Army of the Potomac vainly struggled and fought before Grant's master mind turned that same armed machine to victory. Indeed, Grant, at the great surrender at Appomattox—a leader because of early discipline in the small things of the Mexican War; successful because of his innate firmness and his judgment of men and things; in victory a generous, knightly soldier—may well be an example to the heads of our large offices.

The next change that I note in our professional life is the great advance in architectural education. Most of us agree that the American boys that crowd our offices, alert, intelligent, active minded, ambitious, are admirable material from which to make artists. They are fast proving themselves to be such, and are making names for themselves in foreign schools and at home. How they shall best be trained is a vital question. How shall these young men who serve the guns now and are to command the ships later get the most thorough education? I suppose that question is put to most of you only too frequently.

Clearly, one answer is that they can pick it up in these large offices. If the apprentice system, which lasted so long in England, had any merit, it has vastly more when applied to life in one of our large offices. Surrounded by able workers, the young man leads, in a measure, the life that is offered by the French atelier, where the most potent influence is that of the "ancients." But, in our American office, there is no time to teach the history of art, the theory of design, and to cultivate the powers of imagination and representation. Probably

we all agree that the most interesting work which the profession has to offer—its highest refinement—is centred in the act of composition, of gathering and combining under the influence of imagination, or, if you please, of inspiration. It is a hopeful sign for the country that now and to-day business comes to those who are masters of this art. An education in an office plainly does not cultivate such powers. Nor do I believe with those who bow to that vague deity—pure design, that they are to be gained by the contemplation of Nature and the study of natural products. The art of architecture is necessarily conventional, and is bound up with the history and the life of mankind, and the egotist who tries to play his hand alone makes a mistake. His work will be good so far as it accords with the principles that civilisation has pronounced sound, and will fail when his self-appreciation prevails.

These powers of idealisation and of creative composition can be brought to life and nourished and strengthened by no other means but practice, in the same way that an athlete increases his strength; and for my part I believe that this practice is most conveniently obtained in a school of architecture, just as lawyers have found a law school a fitter place for training than a lawyer's office. The thirst for architecture that pervades this country, and that is shown in crowded architectural exhibitions and attempts at architectural building, is shown quite as markedly in the multiplication of these architectural schools. There are more of them than there are architects fit to teach them. The more modest schools find a field for their endeavours in serving young men who aim at being draughtsmen, and who cannot reach the better organised institutions. All these schools serve a good purpose in tending to spread a knowledge of architecture among the community at large, and it is to be remembered that a man may well study architecture without expecting to gain a living by it. He can be an important influence in his community in developing the love of the beautiful to which our country is now awakening.

But, as architects, we can take a really live interest only in the best organised schools. Fortunately, these are already doing work in which we may take pride. Indeed, I confidently look forward to their attracting students at an early day from other lands, as young foreigners now come to us to study engineering. The chief duty that the American Institute can have in architectural education must always be to foster this work of the highest grade and to make the best thereof.

Your Committee on Education, in their valuable Report last year, made many suggestions looking to this end, and lately the *American Architect* has suggested that candidates for admission to a school of architecture should be required to pass a tolerably severe examination in drawing from the round, such as is required for admission to the great Academies of Fine Art. This would in some ways place the beginners where graduates are now. This is an admirable suggestion. It would tend to increase, in primary schools, the teaching of drawing, which, so far as it is a means of delineation, I believe to be nearly as fit a subject of general instruction as writing. But though much is to be gained by raising the standard of admission, it is the standard of graduation that finally tests the school, and the need now is for high-class post-graduate work. Some of the schools foster this high-class work. In rare instances they produce work to vie with that done in France, and as they develop the enthusiasm and spirit that is the chief merit of the French school, it becomes less and less necessary to study in a foreign school. We now need scholarships for post-graduate study in the schools themselves. There are scholarships enough to support students in foreign travel. The clever boy can get abroad if he proves himself worth the investment; and, besides, desirable as foreign travel is, it becomes less and less necessary as books and photographs are more widely available. Scholarships that would support boys at such study not only benefit the recipient and enable him to study without visiting foreign lands, but the presence of such a class of workers in a school give it a power and influence that no amount of endowment or museums or teaching can equal. The best instructors that youth can have are companions further advanced on a good road. Hence, I ardently hope that such scholarships may be founded; and it is certain

that those schools of architecture among us will quickly be distinguished as the real architectural universities which depend, not on the funds or buildings or number of students, but on their advanced graduate instruction and on a body of strong students banded together with *esprit de corps*.

Possibly the foundation of a prize, open to competition between these graduate schools, would do something to foster this very desirable advanced education. The American Institute is now about to enter into relations with these different schools by accepting their diplomas as a standard of admission. It might very properly take the charge of such a grand prize.

There is yet another means of education which prevails with us and which deserves our hearty encouragement. I mean the draughtsmen's clubs which join, with good fellowship, all aids to study. The Architectural Club in Boston maintains many classes, and is the instrument of great good in our city. I think the fact that these young men govern themselves and direct their own work is one of the reasons that the club continues and prospers. Such organisations generally do prosper while those in command are interested. To insure perpetuity it is necessary for the active members to know when their turn is over, and to yield willingly to the next generation as they themselves proceed to the work of older men. Through all my professional life I have watched with interest the relations of the Architectural Association in London with the Royal Institute of British Architects, and have hoped for something of the sort in America. When a member of the Architectural Association comes into the active practice of his profession, he surrenders control in the Association's affairs to his juniors, and takes his part in the quite different work organised by his seniors of the British Institute. I have hoped that the Architectural League of America is to take that relation to our older body. At times it has assumed a spirit of opposition to us, but I fancy that attitude, together with an endorsement of any passing cult, is but temporary, for fads and special cults pass away, and only basic principles remain, and surely we represent nothing worthy of opposition. If the energetic in our profession will take hold and administer affairs better than we have been able to, we shall ask nothing better.

I suggest referring to a committee the question whether an alliance cannot be made, either with the Architectural League of America, or an association like it, which might become the instrument of the draughtsmen and younger architects. I would make it the centre for classes and club life, from which the older members, as they recognise that their turn is passed, would naturally graduate to the Institute. To their hands, when the proper time comes, we should gladly bequeath the American Institute. If to-day our youths are apt to think that in this or that case the duties of the Institute have not been properly performed, it will be their turn then, and I trust that they will do far better than their predecessors, who had no architectural leagues in which to prepare themselves for their work.

If our young men get their highest training in the schools, and if club life and voluntary classes are left to our youngsters to govern in their own way, with the active help and sympathy of their elders, what partly-performed duties or what opportunities lie before us which may justify the existence of this Institute and the labours of its members?

We can only measure the amount of good the Institute has done by its output. Many a man who cares little for it, benefits because others have cared. Many a man, outside of our numbers, is more respected in his community and has a more certain livelihood because the Institute has proved itself a reasonable public body. Certainly, through its influence, the perils and hardships of competitions have been greatly mitigated. But all these are small and selfish ends. The real value of the Institute lies in its opportunities, in its openings for useful work, and mutual high endeavour. Thanks to the wisdom of its founders, I think it has been a potent means of good. Thanks to them, it has none of the features of a selfish trade union. In a trade union a man's powers and skill are handicapped for the general good, but with us a member has entered into no engagements of any kind except that he will honourably practice his profession. Our compact is rather that of the ancient guilds into which no one could enter who was not a master workman. We

seek to make membership a sign of established character. We are trying to make it impossible for anybody to be an Associate who has not thus established a name for honourable professional conduct, and for no one to be a Fellow who has not done really distinguished work. With the coming year, entrance to the Institute will be possible only through examination arranged by the Institute, or on presentation of a degree from an accredited school of architecture. I believe that the new tests will cause large additions to our numbers, because Associate membership, henceforth, is to mean that a definite and valuable standard of skill has been reached, and that from among this membership their comrades are to choose by honourable election the Fellows of the American Institute of Architects. To many young men these will, I doubt not, seem valuable inducements.

In its various chapters, the Institute has been and may be a power for good in scattered localities. Laying out cities, broadening avenues, arranging vistas, improving tenement districts, encouraging public art leagues and commissions—all are subjects which more and more engage the attention of our local Chapters, and in which they may readily prove themselves useful to their several communities, and now that American ambition turns towards the embellishment and beautifying of cities on grand lines, the Chapters can guide public taste and awaken public interest to schemes of artistic local improvement.

But, better than all this, a man through the Institute may have the good fortune to do something towards the raising of the standard of work and character in the country at large. During this year we have had unusual opportunities of this sort. We lent efficient aid to prevent unstudied and undesirable alterations in the White House which would have completely changed the character of that public monument. That was an unselfish and useful undertaking. Our members have been repeatedly called upon by Secretary Gage to serve as jurors for competition under the Tarsney Act, and have rendered willing service. Your officers have had consultations with several of the Government Departments relative to architectural work, and I think the immense improvement of Government architecture under the Tarsney Act may fairly be attributed, in part, to earlier action by the Institute. Our chapters protested against permission being given to the Pennsylvania railroad to cross the Mall in Washington. It seemed as if this protest were vain, as those who were most influential had given this up as a lost cause, but the Commission to consider the subject of the laying out of the City of Washington have not held this cause to be lost, and our action may yet prove to have been useful. We vigorously urged the appointment of this Commission on the plan of the City of Washington, and our anticipations as to the results of its labours are great. When our committee was urging the formation of the Commission before the Senate Committee, we were told that they had to grant it, as no man urging it was asking anything for himself. In such disinterested public service we are able to render good service to the State, and thus perform the highest duty that can come to us.

Perhaps you will agree with me in thinking that this year we might set before ourselves the task of urging the Government to appoint a permanent Art Commission. I commend this to you as an action well worthy the attention of a special committee.

Before I close, let me give one moment more to consider what effect this life of study and of active contact with a busy world has on the individual, for that is what finally interests us. An architect receives his training at college or in an office. He lives a busy life in the American business world. What does such a life bring to him, or what influence should it have on him? His occupations deal with art in its most conventional form; with hue and group, and texture and colour; with the history of art, and with drawing; and all the while he is rigidly bound to scientific construction, to business methods, and to commercial honour. There can be no great place among us for even an honest builder unless he is moved by artistic impulses, and can turn his building into architecture. There should be, on the other hand, no chance for any position, among architects, for the man who shields improper professional conduct under the excuse of artistic temperament. He



San Marco, Brescia.

SAN MARCO, BRESCIA.

This drawing shows the apse of the tiny Church of San Marco at Brescia, in the style so characteristic of northern Italy, the building being of stone, and the ornamental cornices and mouldings in red brick with pantile roof as a capping.

W. CURTIS GREEN.

COMPETITIONS.

NEW PREMISES FOR CHELSEA, BROMPTON, AND BELGRAVE DISPENSARY.—At their last meeting the committee of the Chelsea, Brompton, and Belgrave Dispensary adopted the plans submitted in a limited competition by Messrs. Sheppard & Burkinshaw, of 21, John-street, Adelphi, for new premises, and instructed the architects to proceed forthwith.

HARROGATE AND KNARESBOROUGH JOINT ISOLATION HOSPITAL.—The assessor has awarded the first premium to Mr. Geo. Hurst Stanger, C.E., F.R.I.B.A., of Messrs. Stanger & Stanger, Wolverhampton; the second premium being awarded to Mr. T. Stewart Inglis, of 52, Savernake-road, Hampstead. Forty-one designs were sent in.

THE HOUSING QUESTION, ECCLES.—The Health Committee of the Corporation of Eccles have resolved to invite competitive plans for the laying out of the insanitary area of Eccles, which comprises over 20,000 square yards in the town, and which is bounded by the main thoroughfare leading from Manchester to Liverpool and from Eccles to Barton. Provision is to be made on the site for the accommodation of at least 170 persons who may be displaced by the carrying out of the Housing of the Working Classes Act. The rentals of the houses which are to be erected are not to be less than 6s. per week, nor more than 8s. Sufficient land is to be retained in front of the area for the erection of business premises. Premiums are offered to architects of 50l., 30l., and 15l. for the plans respectively placed first, second, and third in order of merit.

DISTRICT SURVEYORS AND WOODEN STRUCTURES.

On May 15 last the case stated between the Mayor, Aldermen, and Councillors of the City of Westminster and certain of the District Surveyors, upon the questions relating to the position of District Surveyors and builders with regard to the erection of wooden stands and other structures under Section 84 of the London Building Act (the licensing of which was transferred from the London County Council to the newly constituted boroughs under the London Government Act, 1899), was heard and decided in the King's Bench Division of the High Court. The following is the final order of the Court on the subject:—

"Upon reading the questions submitted for the decision of this Court, under Section 29 of the London Government Act, 1899, in the form of a special case agreed on between the parties, and upon hearing Mr. Manisty, of counsel for the Mayor, Aldermen and Councillors of the City of Westminster and Mr. Macmorran, of counsel for Thomas Henry Watson, William Alfred Large, Robert Kerr, Edward Dru. Drury, Charles Foster Hayward, Alfred Williams and William Hewson Lees, District Surveyors, acting under the London Building Acts, within the said City, this Court doth decide the said questions as follows videlicet:

1. The powers, duties and liabilities of the District Surveyors with respect to the supervision or inspection of wooden structures, falling under Section 84 of the London Building Act, have not been transferred to the City Council and its officers, but the District Surveyors have no powers, duties or liabilities under the licences granted by the City Council.

2. Wooden structures falling within the said Section 84 are works of which the District Surveyor should have notice under Section 145 of the said Act in a proper case.

3. The right to receive the fees for such supervision and inspection, specified in paragraph 15 of the said special case, has not lapsed, nor has it been transferred to the City Council or its officers."

IMPROVEMENTS, PRINCE'S THEATRE, BRISTOL.—

This building has just been reconstructed from plans prepared by Mr. Frank Matcham. Four statues of more than life size surmount the frontage, the design of Mr. G. S. Arrowsmith, of London. They represent Tragedy, Comedy, Music, and Dancing. A glass shelter is provided outside the chief entrances. The contractor is Mr. A. J. Beaven, of Bristol. The heating is carried out by Messrs. Skinner, Board, & Co., heating engineers, Bristol.

is not only a thief, but a weak and feeble one, without even the courage to call things by their right names. The world sometimes excuses that attitude in shiftless men of genius, who are responsible for their conduct to nobody but themselves; but an architect is trusted with the property of others, and owes a strict account like other business men. In return, it is his happy fortune to direct the use of the money of others towards the higher products of man's imagination and skill. The world of poetry and romance lies behind all human occupations, but with us artists it is especially near the surface of our daily work. It is our chief function to cherish and increase the love of the beautiful in the daily life surrounding us. While doing this, business and routine often seem to repress the artistic impulses we most cherish. But it is doubtless our great blessing, that as we grope upwards towards the higher life of poetry and imagination, our feet must remain of necessity firm set on the bed rock of common sense and business integrity. Flowers blossom more freely when the plants are nipped back. Sir Walter Scott and Robert Stevenson might never have produced as they did but for pressure. Fortunate indeed are we that our daily work constantly awakens and draws from our imagination, but, at the same time, recalls us from dreamy dilettantism to hard work and active life and plain, honest, straightforward dealing. Our art makes the life of our community comfortable, beautiful, and stately. It keeps us in touch with higher things while holding us

to earth. It forms good citizens. It trains useful men. We may envy no man's opportunities in life. Let us all be glad that we are architects! Let us all exult in the position that our art holds in our country to-day.

Sometimes at the seaside come days of ugly weather. The ocean is leaden and oily. The distant shores show hard and gray, or the fog sets in and all is enveloped in gloom. From far and near the coasters, heavy laden and storm beaten, crowd into the gloomy port. Then comes a morning when the fresh north-west wind sweeps clean the sea and sky. The dark clouds vanish and leave a world in its true colours, bright and clean and sparkling in the sunshine, and down the shore in a long procession go the white-winged vessels speeding on their several errands to the ends of the sea.

Sometimes troublesome clients and difficult contractors envelope our professional life in gloomy weather, and the worries and anxieties of business befall our mental vision. Then, happily, comes a time like this of meeting together, when it is given to us to see things in their true proportions and in a favouring light. The fogs lift and with the clearing weather the fractious clients and the office cares vanish into thin air.

With cheerful courage our barques make for the open main; great ships with flaunting colours, solid coasters built for heavy work, the large and the small, with divers cargoes and bound to many a port, but sailing this morning in happy company, their canvas swelling to the breezes of hope and enthusiasm and confidence.

Illustrations.

WINDOW NICHE FROM THE
CERTOSA, PAVIA.

THE illustration of the detail of a portion of the Certosa at Pavia should more correctly be called a window-niche than a window; it represents one of the two square niches, backed by panelling, which repeat and carry on the design of the windows of the entrance facade.

The illustration is reduced from a drawing by Mr. G. A. Paterson, of Glasgow, one of a set which gained him the Owen Jones Scholarship two years ago.

STAIRCASE, HARDWICKE GRANGE.

This staircase is a portion of the internal alterations and decorative work now being carried out from the designs and under the direction of Mr. E. Ridsdale Tate, of London. It is constructed of walnut, with a richly-carved balustrade, and the panels of the wall-framing are of pollard oak cut from an old tree "felled" on the estate.

The arcade on the landing and the great arch spanning the corridor at the foot of the staircase are also of walnut; the pilasters, dado framing, and frieze and cornice in the corridor are of oak, pollard oak being used for the panels.

A bronze group surmounts the newel. Richly ornamented modelled ceilings of Jacobean style in fibrous plaster have been placed over the staircase and corridor, and the electric lighting is arranged in a gallery forming the cornice around the walls of the staircase and along the top of the cornice in the corridor. At the opposite end of the corridor is the entrance to the dining-room, designed in harmony with the staircase and hall, which is reached through an angular porch near the foot of the staircase.

The contractors for the various works are:—Messrs. H. Willcock & Co., Wolverhampton (builders' work, joinery, and wood-carving); Messrs. Walter Smith and R. G. Wheaton, Fulham, S.W. (modelled plaster work); the Carlisle Fireproofing Co., Carlisle (fireproof floors); and Messrs. Drake & Gorham, Westminster, S.W. (electric lighting). Mr. T. Geldart acted as superintendent of the works.

HOUSES AT WINDERMERE AND
COBHAM.

The two illustrations which show the exterior of a house at Windermere, and the interior of the Hall in a house at Cobham, are from drawings by the architect, Mr. M. H. Baillie Scott, which were exhibited in the Royal Academy of 1900.

SOME MEDIEVAL CROWNS.

In addition to the article on the development of the crown, given on another page, some examples are here given of types of crowns, chiefly from painted glass. The three examples from the Priory Church of Great Malvern are from the large window at the north end of the transept, and represent Henry VII., his queen, Elizabeth, and their son, Prince Arthur. In the chancel of Iron Acton Church, Gloucestershire, is some good glass, including a circular medallion with a King's head, and an example of a triple crown from what is considered as a representation of St. Gregory. In the little church of Melcombe Bingham, Dorset, are some fine fragments of glass said to have been brought from the Abbey Church of Milton Abbas, not far distant. In the Abbey Church itself are two curious frescoes at the back of the stalls, representing the founder, King Athelstan, and his Queen, but of thirteenth century date. In the south window of the chancel at Trull, Somerset, are three figures, St. Margaret, St. Michael, and St. George; the first-named wears a crown of fleur-de-lis. At Deerhurst, Gloucestershire, is a crowned figure of St. Catherine, in painted glass. The three other examples given are: 1. From the Coningsby Hospital in Hereford (a late quarry with a coronet and plume of feathers). 2. Two shields in stone from the bay window on the west front of Brympton House, near Yeovil. 3. A late example of a rose and crown from a wooden pulpit in Pitney Church, Somerset. In almost all

churches where stained glass remains in any quantity, examples of crowns will be found. Those here given will serve to illustrate their great variety of form and design.

Books.

Companion to English History (Middle Ages). Edited by FRANCIS PIERREPONT BARNARD, M.A., F.S.A. Oxford: at the Clarendon Press. 1902.

ANY book issued in furtherance of the movement known as "University Extension" is opened with some of that suspicion which, rightly or wrongly, clings to the movement itself. But in the case of the book before us any such suspicion would be unjust, for, with one or two exceptions, the subjects are treated as adequately as is possible within the limits of a single chapter; and if the manner suffers inevitably from condensation there is little fault to be found with the matter on the score of superficiality. The purpose of the book is to throw light upon certain chosen aspects of mediæval life and activity which are continually cropping up in the ordinary course of historical reading, but which are barely touched upon in the common text-books. On the whole, the selection of subjects seems to be a judicious one. There are three chapters dealing with architecture, under the headings, "Ecclesiastical," "Domestic" and "Military," and one with art generally. The kindred subjects of heraldry and costume have a section apiece, the remainder of the book being taken up with monasticism, town and country life, commerce, shipping, and education. We do not understand on what principle the Editor has excluded music and poetry, or the development of civic and religious ceremonial, a typical and peculiar growth of the period to be illustrated.

It is unfortunate that the opening Section, viz., that on Ecclesiastical Architecture, by the Rev. A. Galton, should be also the worst, both in matter and form. It is amateurish, jejune, and verbose. The mere reading up of a subject does not confer philosophic grasp; but surely an acquaintance with Mr. Prior's "Gothic Art" or Mr. G. G. Scott's "Essay" (neither of which is given in the list of books recommended) might have corrected the shallow view which conceives of Gothic art as a matter of cusps and ball-flowers, and leaves its owner fumbling feebly, overwhelmed with trivial details.

The quality of the information offered to "extensionists" may be tested by the following samples:—

"Roman architecture, also made wanton by the Orientals, produced that Byzantine style of which St. Mark's Church at Venice is the most notorious example in Western Europe" (p. 2).

"Norman roofs are semicircular, either of stem vaulting or of wood, or of flat wood" (p. 8).

"In the Western Counties the carving of the bench-ends was on the solid, while in East Anglia and the Midlands the construction was of a higher class, in which the rails, panels, &c., were inserted, the buttresses alone being on the solid" (p. 17).

"This graceful [fan] vaulting helps to relieve the flatness of Perpendicular roofs and arches" (p. 14).

Mis-statements of fact occur, as:—

"Sometimes the rood hung from a beam which was placed across the chancel arch" (p. 7).

"The walls [of English churches] were frescoed" (p. 20).

"The Easter sepulchres . . . were all destroyed" (p. 22).

Mr. Gotch's capacity for dealing with "Domestic Architecture" in an interesting manner is well known; but he has given only one side of his subject, leaving the impression that the castle and manor-house represent the whole of the domestic architecture of the period; for not a word does he say of the town house* surely not the least important part of mediæval building, though hitherto somewhat neglected by English archaeologists. It might not be easy to find a consecutive series of street-houses dating from the Early Mediæval period, but there is abundant documentary evidence of the highest interest and

value, beginning with the London Assizes of 1189 and 1212—the precursors of the London Building Acts—to which no allusion is made either by Mr. Gotch or by Miss Toulmin Smith in the chapter on "Town Life."

The only defect of Mr. Hartshorne's section on "Costume" is that it contains so much information given in so condensed a manner, and requiring such constant reference to the plates, as to make it useful for reference rather than reading.

It may be noted that the few examples of questionable taste in mediæval art occur in the fashions of female dress, then, as now, *l'avis moult estroitement*, and extravagantly *outré* in its headgear. Certainly the horned and steeped head-dresses of the fifteenth century were less trivial than are the "confections" of to-day or yesterday, but they illustrate the same tendency which makes a woman willing to appear grotesque rather than inconspicuous. At the same time, the simpler forms of head covering were quaint and pretty, e.g., the charming butterfly cap with its white wings, resembling that now worn by the sisters of St. Vincent de Paul.

The section on "Heraldry," by the Editor, is a masterly summary of a fascinating subject, and one which, for clearness and grasp, we have not seen equalled. Of exceptional interest is his account of the origin of the "ordinaries," those simple geometrical charges formed, for the most part, by divisions of the shield, the prevalence of which in early armory cannot (except in the case of the cross) be accounted for by symbolic meaning, or specially decorative quality. It is clearly shown that they were not mere arbitrary arrangements of abstract lines, but had their origin in the structural requirements of the large pre-armorial shield. This was formed of oaken boards, sometimes leather covered, and strengthened by iron clamps, studs, rims, and bosses. It is the old story of "decorated construction." The painting of the adjacent boards in contrasting colours produced the divisions known as *fess*, *bend*, and *pale*, according as the shield was built up of horizontal, diagonal, or vertical boards; simple charges as *chevrons*, *fretty*, &c., being formed by the metal stiffening strips. Such a charge as a *bordure beauly* easily explains itself as a metal rim attached with large gilt-headed nails. The narrowness of the charges in early armory is confirmatory of the hypothesis of their origin.

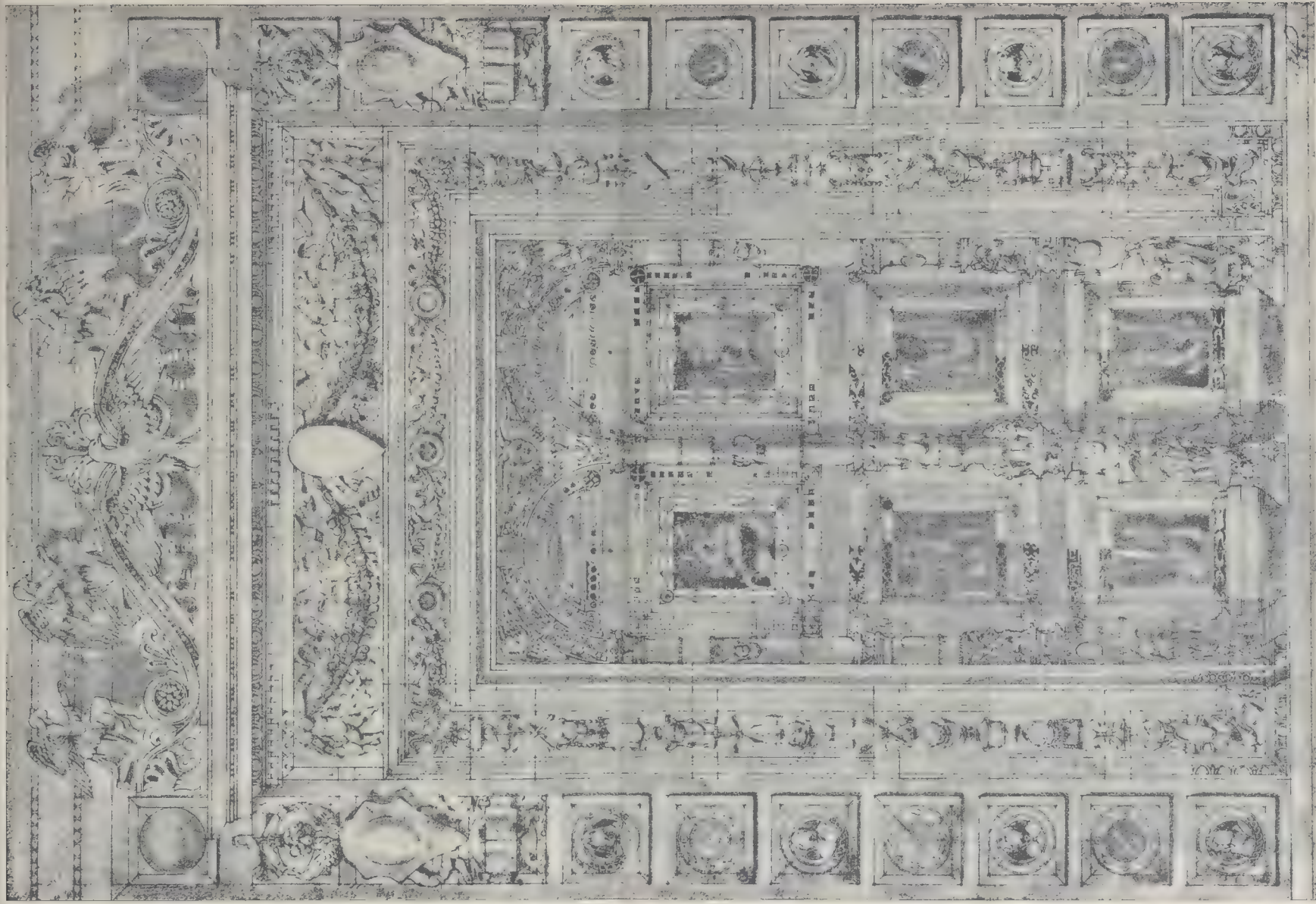
As the adoption of the closed helm gave birth to heraldry by necessitating the employment of conspicuous badges whereby leaders might be recognised in the dust and confusion of battle, so the disuse of the shield in warfare, circa 1500, brought about its decay. Before that date changes in the shape of the service shield had been dictated by utilitarian considerations alone, and the charge had to adapt itself to the current form. But as the shield fell out of practical use artists began to play tricks with its contour, which soon became purely arbitrary and capricious, or was even drawn to fit the charges. The wholesome restraint of outline being removed, the draughtsman lost the fine conventionalising power which this had conferred upon him, and sank into feebleness. Consequently, as the scutcheon becomes more and more unreal and conventional, so the animals and other charges grow more and more naturalistic and meaningless: debasement of the bearings advances *à priori* with debasement of the shield. As in the case of other minor forms of art, utility was the salt which preserved heraldry from corruption: so long as it was in touch with actuality it remained on a high artistic level; once it became purely decorative its degradation was assured.

Abydos. Part I. 1902. By W. M. FLINDERS PETRIE. (Twenty-second Memoir of the Egyptian Exploration Fund). London: Kegan Paul & Co.; 1902.

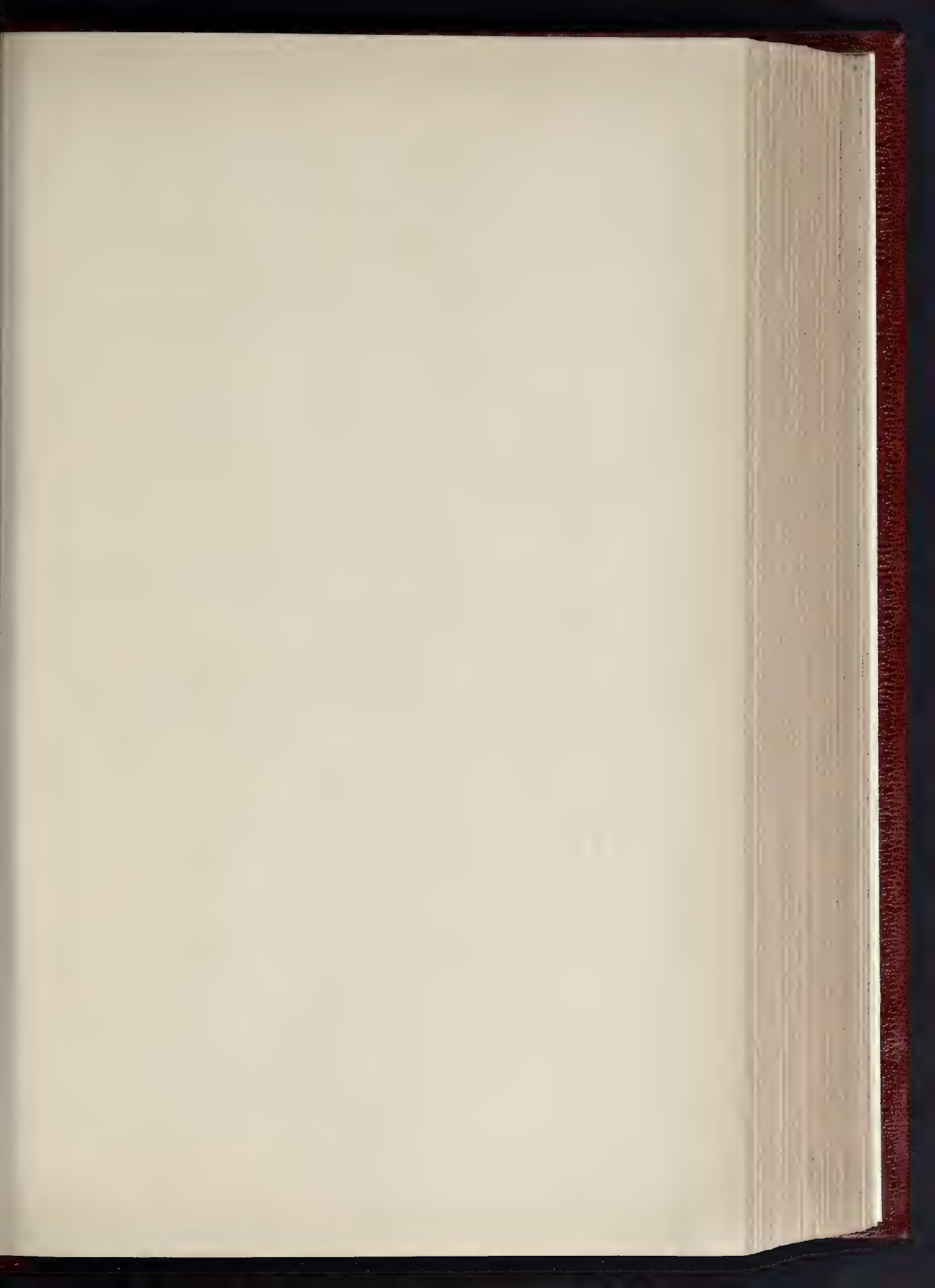
This is the first portion of the publications of the Egypt Exploration Fund which deals with the discoveries at Abydos. According to the Introduction, it covers all that has yet been found in the Temenos at Osiris and the cemetery, but a large part of the work is kept back for publication next year. This latter portion of the work, not included, will deal with the results of the excavations at some large tomb about a mile south of Abydos.

Of the illustrations, a large portion represent flint implements of various kinds, inscriptions, &c., and a large portion also represent stone

* Rather thinly treated in his "Early Renaissance," c. X.

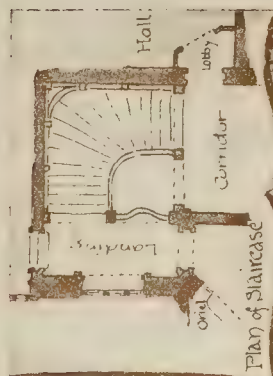


WINDOW FROM THE CERTOSA, PAVIA.—FROM A DRAWING BY MR. G. A. HATFIELD.



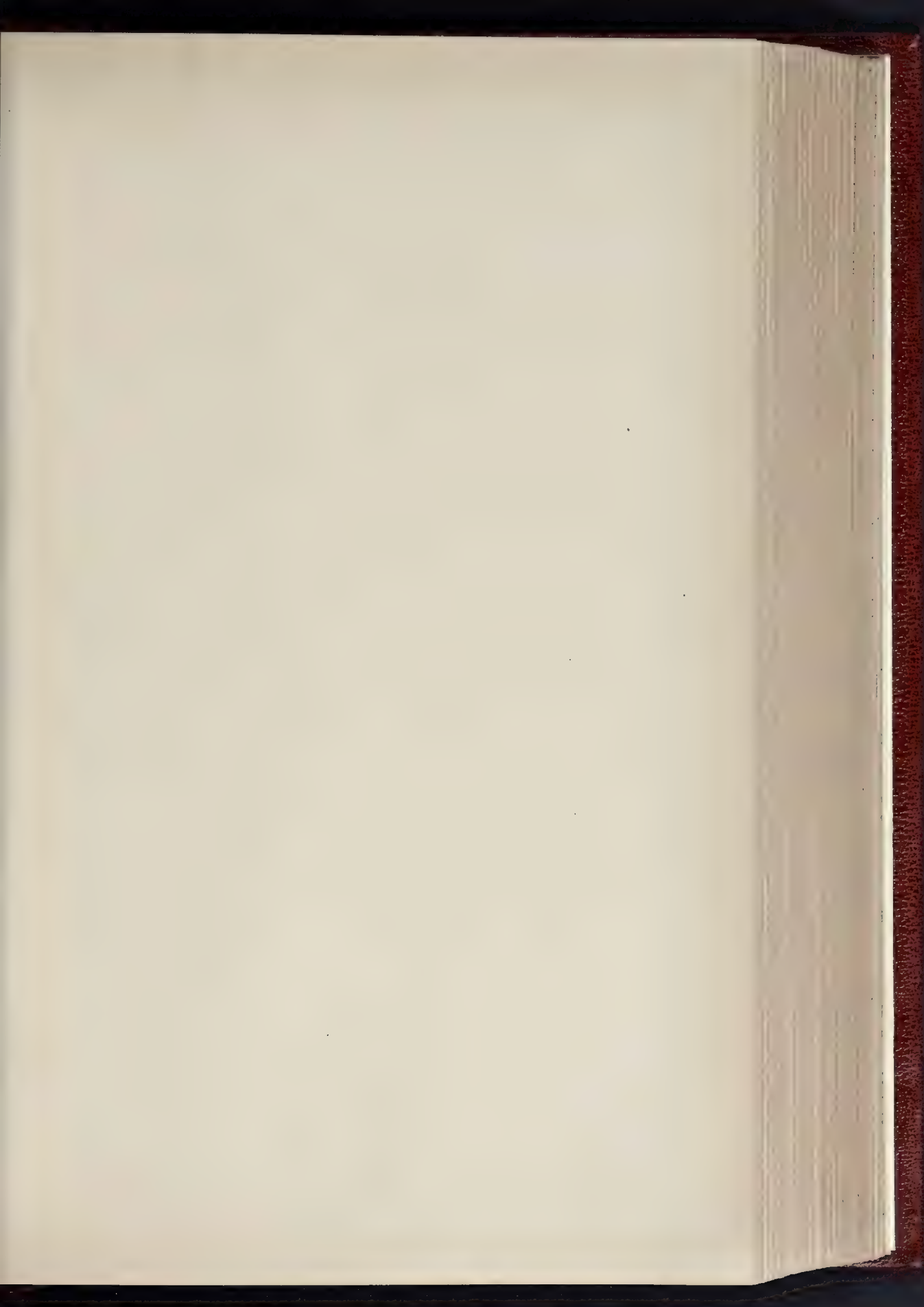
THE BUILDER AUGUST 9, 1902

THE GRAND STAIRCASE, HARDWICK, GRANGE, NEAR
E. KIRKDALE TATE, ARCHT.
FOR F. BIBBY ESQ. RE.
WANDSWORTH, LONDON S.W.

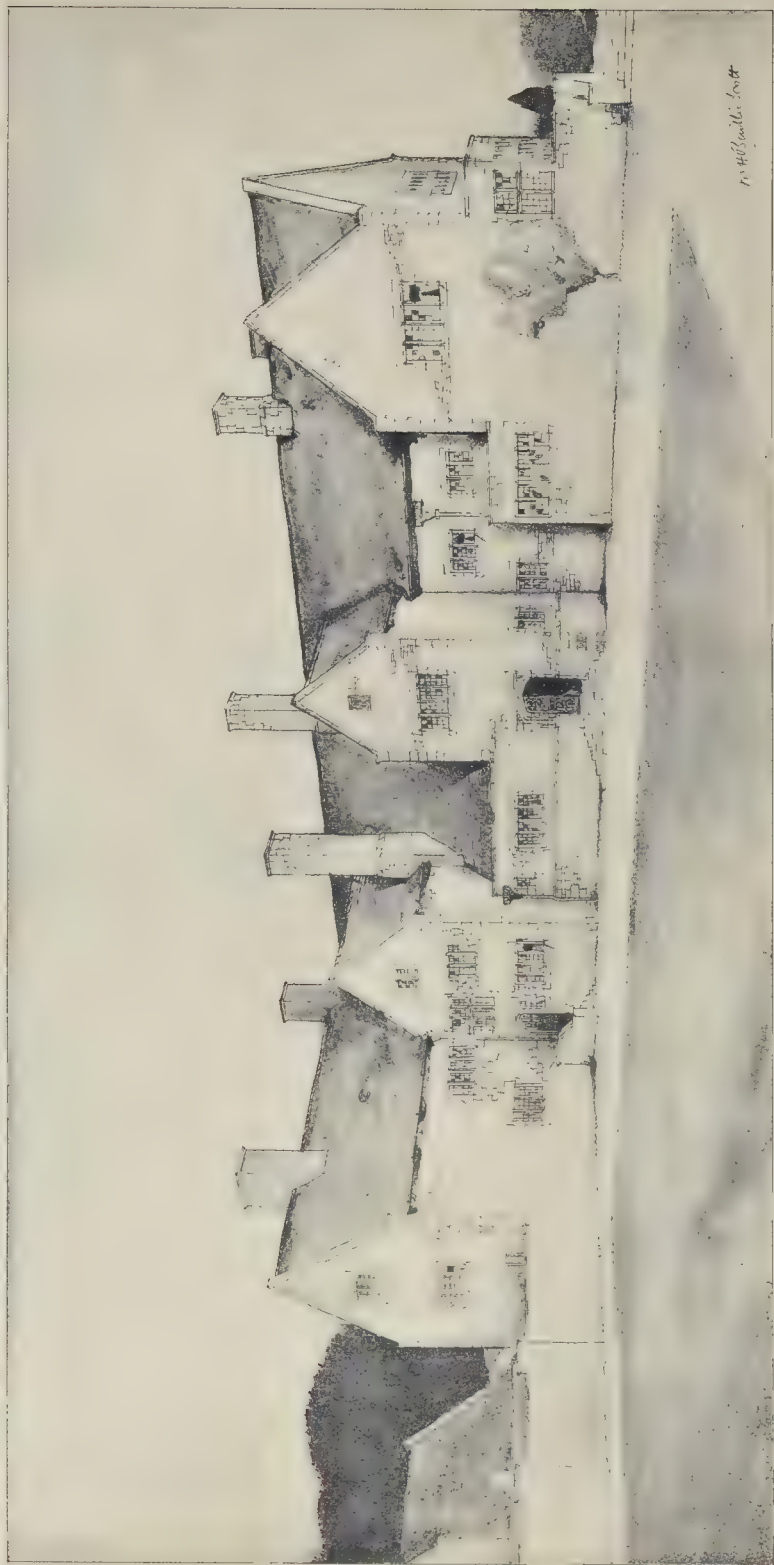




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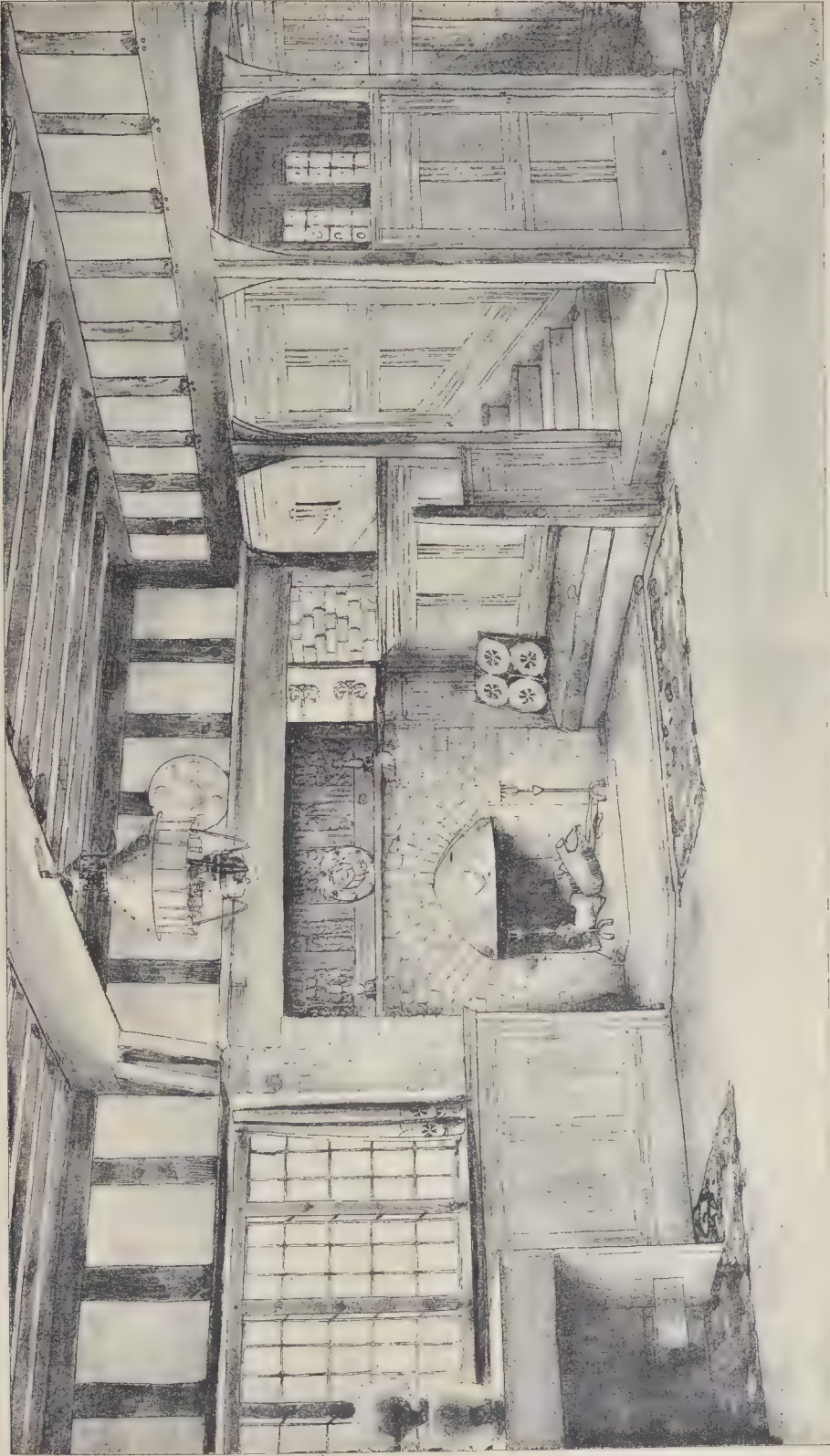


THE BUILDER, AUGUST 9 1902



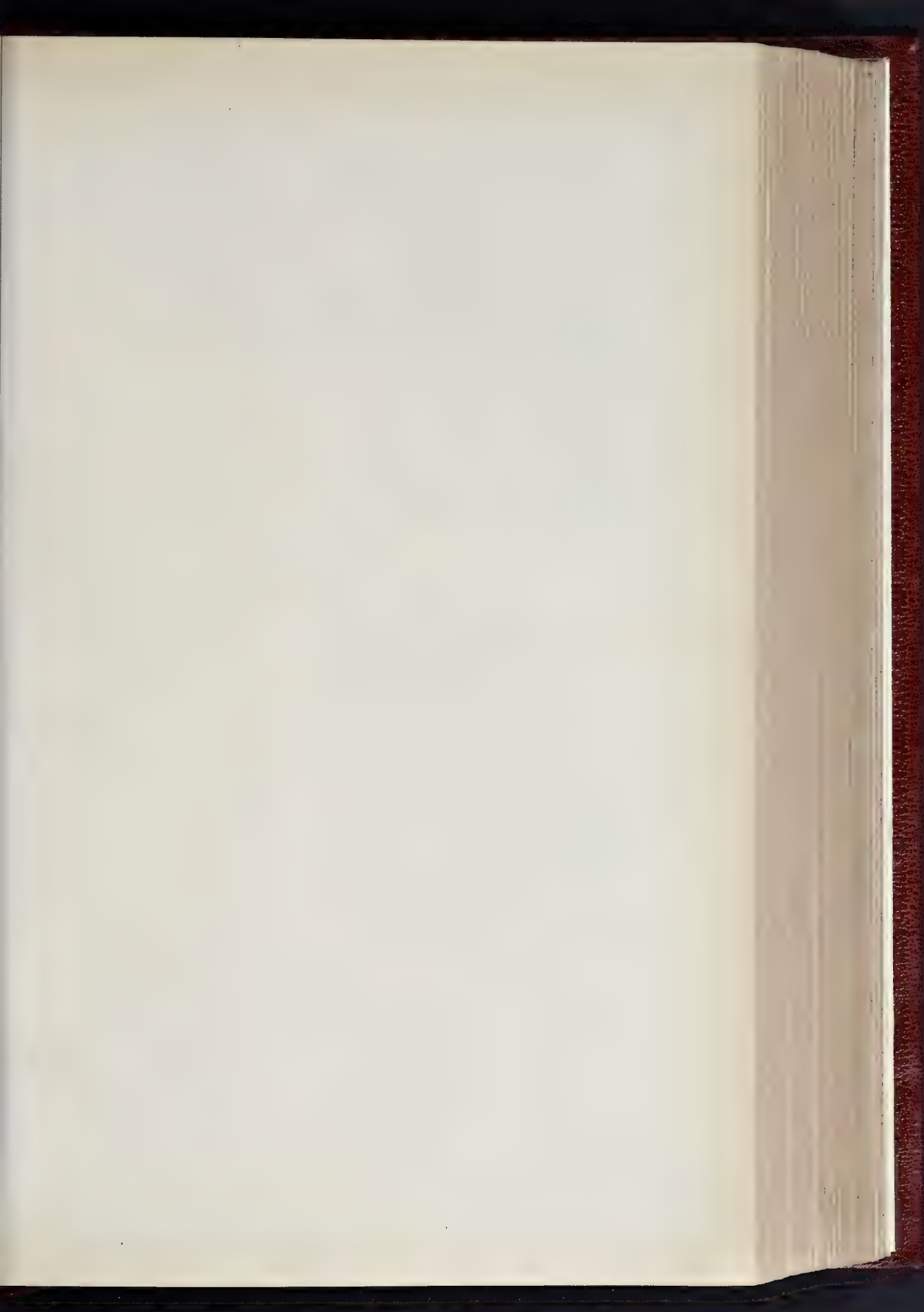
HOUSE AT WINDERMERE. ENTRANCE FRONT.—MR. M. H. BALLIE SCOTT, ARCHITECT

184 PHOTO SPRAGUE & CO. 174 & 5 EAST HARTING STREET FETER LANE, E.C.



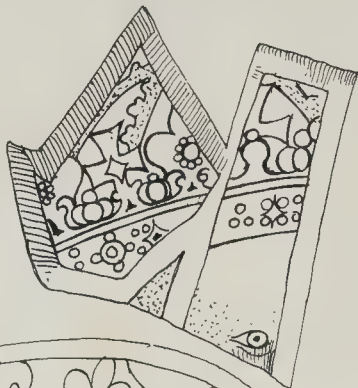
THE PHOTOGRAPHIC CO. LTD. 4, 5, EAST HARDING STREET, LONDON E.C. 4.

HOUSE AT COBHAM THE HALL—MR. M. H. BAILLIF SCOTT, ARCHITECT





Great Malvern.



*Iron.
Acton*



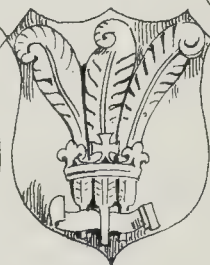
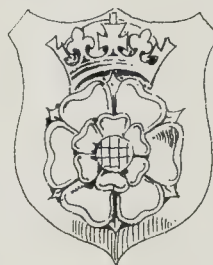
Trull.



*Great
Malvern.*



*Iron
Ac.*



Brympton.



Hereford.

Dee

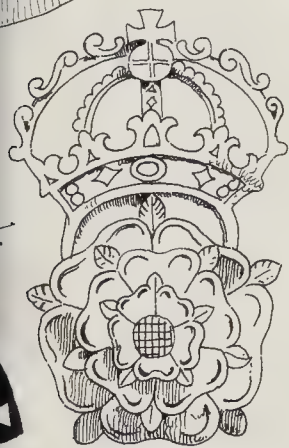




*Melcombe
Bingham.*



*Melcombe
Bingham.*



Pilney.

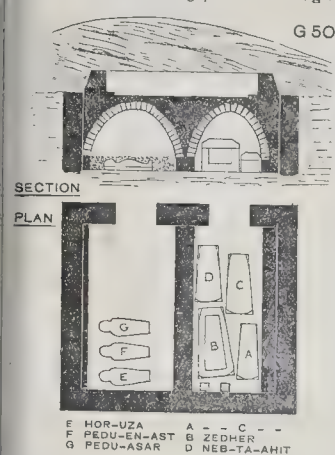
CROWNS.

*Some Mediæval examples
in Glass, Stone & Wood.*

Reynolds & Paul, del.

vases. These are mostly shown in brown silhouette elevation drawings, with the interior section and the few very simple forms of ornament indicated in white lines. This method of representation brings out exceedingly well the outlines of the vases, which are exceedingly varied and characteristic. There are also photographs and drawings of sculptures, inscriptions, pictorial work, amulets, and many other objects.

There is only one plate which can be called architectural, that giving sections and plans of the tombs at Abydos. The sections are of interest in regard to two points. One is, that their arched roofs are, roughly, of elliptical section, showing evidently the natural effort, in a very early structure, to avoid the weakness of the nearly flat top of the semi-circular arch. The other point is the curious termination of the tomb numbered "G 50," of which we give



a reproduction in the annexed diagram, and which shows above the roof what appears like the commencement of a pyramidal top, which is not continued. Professor Petrie is of opinion that it never was continued, as there was no sign on the ground of any debris of the remaining portion. This section shows also the elliptical form of the arch.

Architectural Drawing. By R. PHENÉ SPIERS, F.S.A. New and revised edition. London: Cassell & Co. 1902.

WE noticed at length, some years ago, the first edition of this excellent work, a most useful one for young architects, as it includes a synopsis of all that they really require to know in regard to architectural drawing.

The text has been revised, and additions and alterations made in order to bring it up to date. There have been some changes in the plates; four of the tinted examples have been omitted, and seven new plates substituted. One of these, which forms the frontispiece, is a beautiful tinted geometrical drawing of an elevation with super-imposed orders, by the author; we presume one of the studies of his Ecole des Beaux-Arts days. The inclusion of this drawing has suggested to the author the advisability of giving some little account of the line of study followed at the Ecole des Beaux-Arts. Hence we learn that so much importance is attached to an intimate acquaintance with the forms and proportions of the Classic Orders, that once in the year a subject is given called the "projet de l'Ordre," in which the special Order to be used is defined (though it may be based, at pleasure, on either the Greek, Roman or Italian form of the Order), and two months are given for the study of the subject and the preparation of the drawings. Whether such a system has a good or bad effect may be open to question. It will be thought by some that it is only deadening the fancy and imagination of the student, and leading him to the adoption of conventional precedents in architecture. But this we should say, depends on the good deal on the student himself. If he has genius, he will recognise this as a method in the study of proportion and design, and as a means to an end only; if he has no genius or originality, he may at all events learn from this

study to treat classic materials with refinement and correctness, which is better than using them clumsily and incorrectly; and he will be saved, perhaps, from the pitfall of eccentricity. On the whole, the balance is in favour of this severe scholastic training, only it should be diligently preached to the pupil that this is only a means of acquiring a trained eye in proportion and detail, and not intended to encourage him to think that architecture means the reproduction of the Orders.

Among the new drawings is an example of the black-line style of Mr. Fulton, a style which he introduced since the publication of the first edition of the book, and which has already had the compliment of a good deal of imitation. The book would certainly not have been complete for the present date without an example of it.

The first edition having, we gather, been exhausted, there can be no doubt that there is an opening for a new edition, for no student who wishes to study the best methods of architectural drawing could afford to overlook it. Drawing is not architecture, but it is an important agent in the study of architecture; and the method of delineation is an object of interest for its own sake, being a form of art in itself, even if the matter does not go further than the production of the drawing; and though the author's advice, that "the student when drawing should always have some special object in view beyond making a drawing," is excellent as a general rule, for one wants to turn his sketching studies to practical account, there is nevertheless time and occasion in life for now and then making an effective drawing of a picturesque piece of architecture purely for the pleasure of the work as a form of art.

Decorative Brushwork and Elementary Design. By HENRY CADNESS. 8vo. London: Batsford. 1902.

ADMIABLE indeed is Mr. Cadness's book. There are, of course, many books covering the subject which Mr. Cadness proposes to treat anew, but his work deserves a high place among them.

We are led from the contemplation of materials and their influences on design to a consideration of forms of ornament in general and of methods of expression. The book is a small one, and these latter questions naturally enough take the author a journey through the whole realm of art; but conciseness and brevity, with no loss of clearness, is noticeable in the author's treatment of his subject, and controversial points have been carefully avoided.

In so small a manual it must have been difficult to know where to draw the line—all applied art could not be dealt with, and indirectly "brushwork" may be connected with every form of it. It is only fitting, therefore, that flat ornament, such as that employed for textile fabrics, should find the greater share of notice. In this connexion it seems strange, however, that the treatment of stained-glass design should find no place, whilst some space is apparently wasted in the discussion of mouldings.

It is pleasant to note the author's introduction of some plates showing the design and execution of illuminated manuscripts. The choice of examples seems not, however, very happy. English fifteenth-century work bears no comparison, either for design or execution, with the work of the fourteenth century (Flemish or English), and it is really surprising to observe that of the other examples one is chosen from an Italian manuscript of the sixteenth century (when the art was completely degraded) whilst the other exhibits but a poor specimen of fifteenth-century work in Italy.

The plates of illustrations generally are good. Exception may, perhaps, be taken to the architectural details, which are uninteresting and rather too small.

The index seems workable, and the book is well printed and serviceably bound.

The Fascination of London.—Chelsea. By G. E. MITTON, edited by Sir WALTER BESANT; and **Westminster.** By Sir WALTER BESANT and G. E. MITTON; with a chapter on the Abbey by Mrs. A. MURRAY SMITH. London: Adam & Charles Black. 1902.

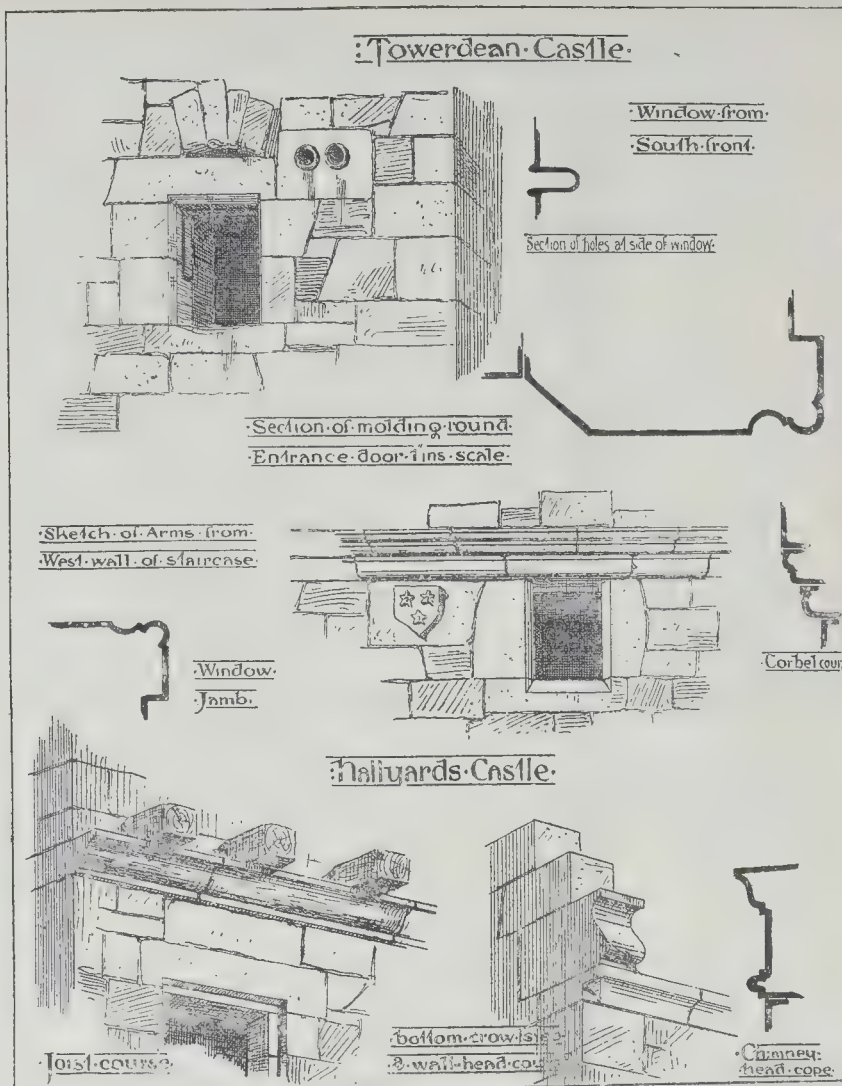
THESE little volumes, to be followed shortly by similar books dealing with Hampstead and the Strand, are the first instalment of a series based, it seems, upon the contents of two books on the parishes of London as compiled

by the late Sir Walter Besant and his staff of coadjutors. We gather from the "prefatory note" of each volume that the larger two books will be issued in accomplishment of Sir Walter Besant's original scheme, and that the volumes of his survey of the history of London as a whole, as finished by him to the end of the eighteenth century, will be published in due course.

Having lately described in our own columns the topographical changes which have occurred in the two localities during the nineteenth century, we need not follow the authors' footsteps. Of the two "booklets," we consider the one upon Chelsea to be the better work. Mr. Mitton does not attempt to crowd too much into a small compass. He has evidently taken considerable pains to identify places which have been greatly altered, as well as to trace the sites of buildings that have disappeared. In citing Paradise-walk, he says, "In it is a theatre built by the poet Shelley, and now closed." He had in mind, perhaps, the theatre built by Sir Florence Shelley on the west side of Fife-street, which was sold in October, 1896, when the site was taken for Shelley-court. As the names of some architects are given, we may point out that Mr. J. M. Anderson's name is printed as "Mr. Granderson" in the notice of the Scots National Church of St. Columba, in Pont-street; the initials of Sedding, architect of Holy Trinity Church, Sloane-street, appear as "F. R." instead of "J. D.," those of Scott as "G. A." Other misprints include "Rysbach," and "Thorne" for Thoms, the antiquary and founder of *Notes and Queries*.

Sir Walter Besant returns to his somewhat imaginative picture of Westminster—"a place of throng and moil as far back as the centuries before the coming of the Romans. . . . During the two hundred years of war and conquest by the Saxons, Westminster, quite forgotten and deserted, lay with its brambles growing over the Roman ruins, and the weather and ivy pulling down the old walls of villa and stationery camp piece-meal." In her chapter upon the Abbey, the authoress of "The Roll Call of Westminster Abbey" does herself and her theme but scant justice. To the very brief list of distinguished alumni of Westminster School we may add the names of Sir Christopher Wren, Sir Edward Poynter, Bart., Professor Cockerell (who designed the act-drop and scenery, painted by Fenton, for the play), G. J. Vulliamy, and Gwilt—the boys call a plate or trencher a "gwilt." The school is more ancient than the authors lead one to believe. At the commemoration on All Souls' Day, 1899, was displayed a collection of thirteenth to sixteenth centuries MSS., one being "Expense Eleemosynii" of 1281-5. There are records of a payment of salary to the "Magister Scholarium," temp. Edward III., and a "play" in 1473-4. The account of "Up School" omits to mention it was the monks' dormitory, and that the recess at its north end was the "shell" from which the "form" therein took a name that other schools have adopted. Three of the exhibitions are to Trinity, Cambridge, not to Trinity College, Oxford. Since it is claimed for the two books that they are "up to date," we may observe that the (former) Ordnance and Transport Office in Canon-row, latterly occupied by the Civil Service Commissioners—a building distinguished by its Ionic portico upon a flight of steps, and a spacious circular hall, built in 1876 (and not "in 1784") from designs by William Pilkington (not, as is commonly stated, by William Atkinson)—was pulled down two years ago to make way for an addition to the adjacent headquarters of the Metropolitan Police force; and that the Charity Commissioners, at the request of the Apothecaries' Company, framed a scheme in December, 1898, for transferring the Physic Garden at Chelsea to a new managing body. Moreover, "Holbein's Gate," demolished in 1750, appears in the view entitled "Whitehall in 1755"; Archer's original designs for St. John's Church, Westminster, did include four angle towers; and Vauxhall Bridge-road forms no part of the site of Millbank Penitentiary. Each book has an index, and a modern map with neither scale nor cardinal points.

Garden Cities of To-morrow. Being the second edition of "To-morrow: A Peaceful Path to Real Reform." By EBENEZER HOWARD. London: Swan, Sonnenschein & Co. 1902. This is a very Utopian publication, which is based on the theory that an attempt should be made to unite, for the purposes of habitation,



Reproduced from "Scottish Architectural Details," by Mr. J. W. Small.

town and country. It is so fanciful, and the projects suggested are so impossible of realisation, that it does not appear desirable to comment upon it at length. We may, however, draw attention to one point in regard to what the author fancifully calls "Garden City," which has some practical importance; that is, that land immediately around the city should not be built over, but that there should be a space of open country between the different blocks of buildings. A practical example of this may be actually seen in the city of Adelaide, where a large open space of park lands and gardens intervenes between it and North Adelaide. There is no doubt that such intervening spaces ought to be purchased by municipal bodies in this country. It is a noticeable feature in the increase of modern London that the squares and so-called gardens are much smaller than they were in former times. Take any of the squares about South Kensington and compare them with Russell-square, for example, and the difference is seen at once. Thus there is ultimately less fresh air in the newer part of London than in the older.

Scottish Architectural Details. By JOHN W. SMALL, F.S.A.Scot. Stirling: Enneas Mackay: London: Gibbings & Co. 1901.

This is the second edition of a book which was formerly published, with a limited number of copies, under the title "Leaves from My Sketch Books." The present title is a better because a more definite one, as the sketches are all of Scottish work, and therefore to English architects who are not so familiar with the smaller peculiarities of Scottish architecture they may have value, as illustrating a special subject, which would not attach to such a more mixed collection as might be implied by the former title. And they may be specially useful to architects who are carrying out work in Scotland, as introducing them to various characteristic details which only a considerable acquaintance with Scotland and its ancient architecture could have enabled a sketcher to collect.

These are not show drawings of picturesque buildings, but scraps of detail of special interest from their character or their rarity; and very curious many of them are; in some

cases not only interesting as historic facts, but also suggestive for new ideas in the detail of buildings. They consist of such things as two doorways from the Castle Hill, Edinburgh, with carved heads; an old candlestick of peculiar design; characteristic forms of windows; fireplaces; metal and woodwork, &c.

The plate devoted to bits of Towerdean and Hallyards Castles, of which we give a reduced reproduction, is a typical example of the kind of things which the drawings illustrate. Towerdean Castle, the name of which is not familiar to us, is in the village of Gorebridge, some twelve miles south of Edinburgh, and is described as being in a ruinous condition; but, as the author says, various points of interest exist in the remains. From Hallyards we have a moulded stone projecting course for taking the ends of joists, which the author notes as unusual; the decorative treatment of the lowest corbelstep in one of the gables; from Towerdean the curious incident of the two narrow circular holes cut in the wall of the castle near one of the windows (see upper part of illustration), for which the author says he can offer

no explanation. We should be disposed to think that they were for affixing some kind of signal, but if any of our readers have a better suggestion to offer, we shall be glad to have it.

A Guide to Epsom. "Homeland Handbooks" Series. By GORDON HOME. London: The Homeland Association; Epsom: L. W. Andrews & Son. 1902. 9d.

THIS is one of the series of which we have noticed several before, which deal with the history, character, and associations of English localities. In the case of Epsom the main interest lies rather in social than in architectural history; but the small volume, in addition to the accounts of celebrated persons who visited Epsom, and of the often very dissipated doings at "Epsom Wells," contains sketches and descriptions of the old and existing buildings of the town, and of some of the country houses round about. Those who are visiting Epsom as travellers or tourists would find their interest much increased by the possession of this little book; but the majority of visitors to Epsom in the present day probably consider the racecourse the only piece of scenery worth attention.

The Earth in Relation to the Preservation and Destruction of Contagion, together with other Papers on Sanitation. By GEORGE VIVIAN POORE, M.D., F.R.C.P., &c. London: Longmans, Green, & Co. 1902.

DR. POORE is well known as an ardent advocate of the utilisation of sewage, and his new book is to a large extent occupied by a re-statement of his views in the light of recent knowledge. The first half of the book contains the Milroy Lectures delivered by Dr. Poore at the Royal College of Physicians in 1899, and is divided into fourteen chapters, some of which appear to have very little bearing on the subject stated in the title. The author discusses the principal pathogenic bacteria in their relation to the soil, and declares that "it is incontestable that soil-diseases (so-called) are most rife precisely in those spots where the ground is not cultivated"—that is to say, in the crowded centres of population. He argues from this and other facts that the danger of applying excreta to cultivated land is not so great as is commonly supposed. The experience of the Manchester Corporation at Carrington Moss furnishes matter for one of the chapters, and leads up to the author's conclusions, which may be briefly summarised as follows:—Dung is absolutely necessary for the maintenance of the fertility of the soil; there is "no proof of any danger arising from the use of dung for agricultural purposes"; for financial reasons it is highly desirable that dung should be so used; modern methods of sewerage and sewage-disposal are, therefore, wrong in principle; and destroy "the only chance of getting a living from agriculture." Dr. Poore has very little to say about ordinary sewage-farms, although these are serious attempts to utilise the manurial contents of the sewage, but probably the failure which has so often followed these attempts has no discouragement for him, as he is strongly opposed to the water-carriage system of drainage. Perhaps the most interesting chapter to the architect is that containing an account of Dr. Poore's cottage and garden near Andover. The faeces are collected in an earth-closet, and the wastewater from the scullery sink (which appears to be the only "sanitary fitting" in the house) is discharged through a basket strainer containing straw into a small iron filter filled with broken clinker, and passes thence through a perforated iron channel into a filtration gutter 24 ft. long, 18 in. wide, and 18 in. deep. The rainwater is ingeniously filtered and stored in an underground tank, from which it is pumped for domestic use. The garden has an area of 1½ acres, and the ordure and house refuse from about 100 persons are applied to it daily. The results appear to be very satisfactory financially, and Dr. Poore is convinced that the garden might take with advantage "at least double the quantity" of ordure, "if not more." This experiment is worth repeating in other country districts, but it is obviously less suitable for large towns, where the daily collection and removal of such "night-soil" would almost certainly be attended with nuisance. Earth-closets, again, are seldom kept in a proper manner; the writer has just spent some weeks in a small seaside village where they are in

general use. The earth is conspicuous by its absence, and the stench is in some cases most objectionable. The book is well worth reading, and is a valuable and interesting contribution to the discussion of some much vexed questions.

The Country Gentlemen's Estate Book, 1902. Edited and compiled by WILLIAM BROOM-HALL. London: The Country Gentlemen's Association, Ltd. 1902.

THIS is the official year-book of the Country Gentlemen's Association, and contains a varied assortment of articles on matters of interest to country gentlemen, estate agents, architects, and others engaged in the management of rural property. Among the contributors architects, surveyors, engineers, estate agents, sportsmen, barristers, accountants, veterinary surgeons, pisciculturists, agriculturists, and arboriculturists are represented, and horticulturists also will find matter of interest in some of the 600 pages which the book contains. To architects the most interesting contributions are those by Mr. Charles Carter on "Entrance Lodges, Gamekeepers' and Gardeners' Houses"; by Mr. John M. Hotchkiss on "Labourers' Cottages"; Mr. by Edmund R. Foley on "The Home Farm Buildings at Deepdene, Dorking"; and by Mr. E. Sidney Wilson on "The Building of Stables and Farmsteads." All these articles are illustrated, and, while exception may be taken to some of the details of plan and elevation, the designs on the whole are of good character. A short article by Mr. Wm. Stevenson on "Building Timber" may also be mentioned. We have noticed very few errors, and, although the book contains a long catalogue and price list of the goods supplied by the Trading Department of the Association, we have pleasure in recommending it to those who have no purchases to make, but who are in any way concerned in the management or enjoyment of country estates.

Pipes and Tubes: Their Construction and Jointing, together with all necessary Rules, Formulae, and Tables. By PHILIP R. BJÖRLING, Author of "Mechanical Engineer's Pocket-book," &c. London: Whitaker & Co. 1902.

WE are not acquainted with any other book dealing solely with this subject, and Mr. Björling's work may therefore be accepted as a welcome contribution to technical literature. The author is a hydraulic engineer, and it is only natural that he should deal more fully and more ably with this part of his subject than with some others. The chapters on cast-iron, wrought-iron, and steel pipes and joints for water-mains contain a good deal of valuable information in a small compass, and many kinds of ball-and-socket joints, swivel-pipe joints, and expansion joints are also described and illustrated. The chapter on drain-pipe joints makes mention of nearly all the most important patents, but it is a mistake to recommend clay as a jointing material, and the gradients stated on page 9 as the "usual inclinations" are utterly inadequate. The rules for the thickness of lead service pipes (page 97) grossly over-estimate the strength, and have clearly not been adopted by the author in calculating the table on page 221; according to the rules, a 3 in. pipe for a head of 200 ft. requires to be 1 in. thick, which gives a weight of little more than 14 lbs. per foot, but according to the table the weight of such a pipe ought to be 5 lbs. per foot. There is a misprint in the last of the rules just referred to, R being printed instead of D. Among the omissions may be mentioned galvanised-iron pipes and tin-lined iron pipes for domestic services, waste-pipes, and soil-pipes; gas-pipes are merely mentioned incidentally in the text and in one table, and are not included in the index. These are matters which ought to find a place in the next edition of the work.

Dowding's Wages Tables Calculated for Wages Payable by the Hour. Compiled by EDWARD DOWDING. London: King, Sell & Olding; 1902.

THIS is an admirably arranged little book for saving the trouble of computing sums in wages paid by the hour. It gives in tabular form the amounts for hours and quarters of hours from one to seventy-two, for wages from 3d. per hour to 12d. per hour, ascending by farthings. The whole numbers, 3d., 4d., 5d., &c., are printed in red on cut margins, as in a

ledger, so that they can be turned to at once. The book ought to be very useful to those who frequently have to pay fractional wages or fractional times.

Correspondence.

OSCILLATION IN SPINNING MILLS.

SIR.—Can you or any reader give the name of a book, paper, or Society Transactions treating upon the cause and cure of oscillation in the buildings of tall spinning mills.

The one under consideration did not vibrate to any extent until the velocity of the looms was increased some 50 per cent, when this movement has become serious.

The mill walls are substantially built, and it is some five stories in height. W.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

6.—ANALYSES OF SOME GOOD AND BAD ANCIENT AND MODERN MORTARS.—SELENITIC MORTAR.

IN the years 1802 and 1803, Mr. John Hughes published in the *Builder* analyses of a number of mortars taken from some of the castles and abbeys erected in the British Isles between 1000 and 1270 A.D. The most important of the deductions drawn from his analyses are:—

1. The proportions of lime vary largely, and the mortars containing the largest proportions are not invariably those in the best condition at the present time. Seldom, however, does the proportion of sand to lime in these old mortars exceed 2 to 1 by weight (say equal parts by measure of lime and sand).

2. The mortars in the best condition are invariably those which contain the largest proportions of silica soluble in 10 per cent. caustic soda solution.

The following selections from his analyses illustrate these points:—

	Rochester Castle.	Corfe Castle.	Caepphilly Castle.
Quality of Mortar.			
	Bad.	Good.	Good.
Probable date of erection about A.D.			
	1188.	1000.	1200.
Water lost at 212 deg. Fabr.	3	24.2	2.60
Combined water and volatile matter	1.48	4.02	7.74
Lime	28.67	31.95	1.49
Magnesia	18	28	1.87
Potash	16	20	2.2
Soda	24	15	29
Oxide of iron	40	95	3.01
Alumina	30	13	1.34
Sulphuric acid	29	26	3.4
Carbonic acid	20.60	22.80	9.53
Chlorine	10	05	01
Gelatinous silica, soluble in soda	1.60	7.59	9.85
Insoluble matters (sand)	45.02	26.51	49.12
	100.00	100.00	100.00

It will be observed that the proportion of lime in the mortar of Rochester Castle is slightly less than in that of Corfe Castle, but much larger than the proportion present in that of Caepphilly Castle. The proportion of active silica, which Mr. Hughes calls "gelatinous" silica, is much smaller in the Rochester Castle mortar than in either of the other mortars. The small proportion of combined water in the Rochester Castle mortar also shows that very little hydrated silicate of lime is present.

The physical qualities of the three mortars are referred to by Mr. Hughes in the following terms:—

Rochester Castle.—Of Rochester Castle practically only the keep remains, and that stands by virtue of its massiveness rather than by any excellence of its mortar.

Corfe Castle.—Of Corfe Castle the late George Godwin, in his prize essay, "On the Nature and Properties of Concrete," tells us that Smeaton visited it, and found that its solidity did not consist in having been built with large hewn stones throughout, for the filling-in of the walls consisted of rough rubble

and fragments from the quarries, the interstices being entirely filled up with mortar poured in a fluid state, and the whole mass had in time become thoroughly cemented together. As a consequence, when the castle was destroyed in 1046, the walls when blown up did not fall into small pieces, but were split up into huge masses, which rolled bodily down into the moat below, where they remain still intact, the native builders finding it easier to obtain fresh stones from the nearest quarry rather than from these masses of cemented masonry.

Caerphilly Castle.—The sample analysed was taken from the leaning tower of Caerphilly Castle, Monmouthshire. The splendid character of the mortar is amply proved by the fact that the tower withstood the attempted destruction in the time of Charles II., and still remains in its leaning position.

Hughes's Test for Active Silica.—The estimation of the proportion of active silica present in mortar is made as follows:—

Two grammes of the finely ground mortar are first evaporated with hydrochloric acid to complete dryness on a water bath; the insoluble residue is then treated with dilute hydrochloric acid, and the insoluble matter filtered off, ignited, and weighed. This insoluble matter is then boiled for half-an-hour with 100 cc. of a 10 per cent. solution of caustic soda, which dissolves all the gelatinous or amorphous silica, leaving the crystalline and coarser sand unaffected. The sandy matter insoluble in the soda solution is filtered off, ignited, and weighed. The difference in the weight of the insoluble matter before and after treatment with the soda solution represents the quantity of active silica present.

In Portland cement the silica should be wholly present as calcium silicate, which is readily soluble in hydrochloric acid. In freshly made lime mortar the active silica is usually partly present as calcium silicate soluble in hydrochloric acid and partly present in a form insoluble in hydrochloric acid, but soluble in 10 per cent. soda solution. The active silica in Portland cement may therefore be estimated either by Hughes's test or by ascertaining the quantity soluble in hydrochloric acid. The active silica in lime mortar can only be satisfactorily determined by estimating the silica soluble in soda (Hughes's test) because colloidal silica insoluble in acid may slowly react with lime to form calcium silicate.

In applying the soda test it must be remembered that silicate of alumina—the main constituent of clay—is more or less soluble in boiling caustic soda. The soda filtrate containing the dissolved silica should be examined for alumina, before ascribing the loss in weight wholly to dissolved silica.

Attention has repeatedly been drawn by Mr. Hughes in the pages of the *Builder* and elsewhere to the extreme importance of the presence of a considerable quantity of silica soluble in dilute soda in mortars of good quality, and analyses made by the writer support his statement.

Samples of mortar taken from a portion of the old London wall built by the Romans circa 300 A.D. had the following average composition. The mortar was obtained from the wall uncovered at the Old Bailey in 1900, and contained water-worn pebbles. For analysis the whole of each sample, including the pebbles, was crushed to powder:—

London Wall. Date of erection circa 300 A.D. Per cent.	
Water (lost at 212 deg. Fahr.).....	1.74
Combined water and organic matter	2.77
Earthy matter (Dibdin and Grimwood test)	1.49
Sand, including pebbles	65.60
Silica, soluble in acid	1.20
Oxide of iron .....	.66
Alumina .....	.71
Lime	1.11
Magnesia .....	.04
Carbon dioxide	8.21
Sulphur trioxide .....	.17
Other matter and loss .....	.27
	100.00
Silica soluble in 10 per cent. soda (Hughes's test)	9.90

It will be observed that the proportion of silica soluble in soda is high, while that soluble in hydrochloric acid is low. It is probable that the proportion of soda-soluble silica was increased by the presence of the crushed pebbles, but the mortar was in excellent con-

dition and of great strength, a fact which was due no doubt to the presence of active silica in considerable proportion.

Minimum Proportions of Lime and Silica.—No standards have yet been generally adopted for the minimum proportions of lime and active silica to be permitted in mortar. No satisfactory lime or cement mortar contains less than 9 per cent. by weight of calcium oxide, and a cement mortar should not contain less than 2 per cent. of silica soluble in hydrochloric acid. A lime mortar should not contain less than 5 per cent. of silica soluble in 10 per cent. soda solution.

It is probable that the minimum percentages allowed should be higher than the proportions here mentioned, but the whole question of mortar analysis requires careful consideration by an authoritative committee. This committee should fix minimum standards for the essential constituents of mortars, and either agree upon a definition of "earthy matter" or obtain the deletion of the term from the London County Council by-laws.

Some Good and Bad Modern Lime Mortars.—The following examples of good and bad mortar are taken from a number of analyses published by Messrs. Dibdin & Grimwood in their communication to the Society of Public Analysts. The good mortar was made by mixing 1 part of lime with 3 of broken brick by volume.

	Good Mortar.	Bad Lime Mortar.
Moisture, water of hydration, &c.	31.33	21.1
Lime	10.85	6.0
Lime carbonate	1.97	8.4
Lime sulphate	0.61	1.7
Iron oxide and alumina	3.55	1.4
Silica soluble in acid	1.11	0.7
Sand, grit, broken brick, &c.	45.99	49.3
Earthy matter	1.37	10.4
Loss on ignition	3.28	4.0
	100.00	100.0

The large proportions of water show that the analyses were made with freshly prepared mortar. The figures for compounds other than water would, of course, increase in proportion with the loss of water by evaporation. The lime mortar referred to as "good," would not be a good lime mortar according to Mr. Hughes unless a considerable proportion of active silica soluble in soda was present in the matter quoted as "sand, grit, broken brick, &c." The analyses would certainly be of more value if the proportion of silica soluble in soda were also given.

The following analysis, by Mr. Hughes, of a bad modern mortar from Frimley, Hants, may be compared with the analyses of the good mortars from Corfe Castle and Caerphilly Castle, previously mentioned. The Frimley mortar was so bad that the walls for which it was used had to be condemned and rebuilt soon after erection:—

	Very Bad Lime Mortar.
Water (lost at 212 deg. F.) .....	.40
Combined water and volatile matter	1.36
Lime	8.41
Magnesia .....	.71
Potash .....	.71
Soda .....	.24
Oxide of iron	1.08
Alumina .....	.67
Sulphuric acid .....	.39
Carbonic acid	1.21
Chlorine .....	.12
Gelatinous silica, soluble in soda	3.95
Insoluble matter (sand)	79.25
	100.00

Cement Mortars.—The valuation of cement mortar from chemical analysis is more difficult than that of lime mortar, for the value of the cement is mainly due to the proportion of silica soluble in acid it contains—i.e., to the proportion of calcium silicate present. The estimation of the lime is of itself of little value, for the cement might be adulterated with lime or with chalk. Portland cement contains an average of only 18 per cent. of silica. Assuming the weight of a cubic foot of Portland cement to be 86 lb., and that of an equal volume of sand to be 100 lb., the proportion of 1 of cement to 4 of sand by volume is found to be 1 of cement to 4.65 sand by weight. Therefore a mixture of 1 part cement and 4 parts sand by measure contains only 3.18 per cent. soluble silica by weight.

The following analysis of a cement mortar by Dibdin & Grimwood shows by their method of calculation from the soluble silica that the

mortar was composed of 1 part of cement to 3.5 of sand by volume. The proportions actually used were supposed to be 1 of cement to 4 of sand.

	Good Cement Mortar.
Moisture, water of hydration, &c.	7.72
Lime	11.97
Lime carbonate	1.94
Lime sulphate	0.99
Iron oxide and alumina	4.90
Soluble silica	3.45
Earthy matter	0.96
Loss on ignition	2.42
Sand and grit	67.65
	100.00

A sample of excellent cement mortar examined by the writer, which was taken from a large bulk of mortar employed for a building recently erected, and said to be made by mixing one part of Portland cement with three parts of Leighton Buzzard sand, gave the following results:—

	Good Cement Mortar.
Water (lost at 212 deg. F.)	3.04
Combined water and organic matter	2.60
Earthy matter (Dibdin & Grimwood test)	5.38
Sand, grit, &c.	67.44
Oxide of iron and alumina	2.15
Silica soluble in acid	3.45
Lime	10.85
Lime carbonate	3.22
Lime sulphate	0.71
Other matter and loss	1.08
	100.00

Silica soluble in 10 per cent. soda (Hughes's test)

The earthy matter was found to consist partly of oxide of iron and partly of silica soluble in soda.

Selenitic Mortar is made by mixing selenitic lime or selenitic cement with sand. Selenitic cement was invented by General Scott, and is made by grinding a mixture of plaster of Paris (sulphate of lime) and hydraulic lime. The proportion of plaster of Paris required usually varies between 4 and 7 per cent. according to the character of the lime employed. If the lime requires more than 7½ per cent. of plaster of Paris to give it the desired qualities, it must be mixed with sufficient clayey lime to reduce the proportion of plaster of Paris required below 7½ per cent.

It is claimed that selenitic lime makes stronger mortar than any other lime, and that it may be mixed with a larger proportion of sand; and mortar made with selenitic lime sets much more rapidly than ordinary lime mortar.

As sulphate of lime is soluble in water, the addition of plaster of Paris cannot permanently increase the hydraulic property of any lime.

Selenitic lime derives its name from the mineral *selenite*, a crystalline form of hydrated sulphate of lime having the formula (Ca SO₄ · 2 H₂O).

A mortar made by mixing one part by volume of selenitic lime with four parts of sand was found to contain 1.7 per cent. of sulphate of lime. Mortars made with ordinary lime always contain small proportions of sulphate of lime, and the atmosphere of towns slowly changes carbonate of lime exposed to its influence into sulphate of lime. The presence of 1.7 per cent. of sulphate of lime in a mortar would not therefore necessarily prove that artificially prepared selenitic lime had been used in its manufacture.

COMMONS AND FOOTPATHS PRESERVATION SOCIETY.

A MEETING of the General Committee of the Commons and Footpaths Preservation Society was held on Thursday, July 31, at 25, Victoria-street, Westminster. An important communication addressed by the Right Hon. G. Shaw-Lefevre to the Wiltshire County Council on behalf of the Society with reference to the enclosure of Stonehenge was approved. After pointing out that the recent inquiry held by a committee of three members of the County Council was not a judicial proceeding, Mr. Shaw-Lefevre stated:—

"The Society, with a very large experience of cases affecting the rights of the public to roadways and footpaths, fortified by the advice of their solicitor, and of an eminent King's counsel of the Western Circuit have arrived at a conviction that the Judges of the Supreme Court would hold that the public have a right to the user of the roads which lead to the monument, and which have been blocked by the fence as now erected. The Society, therefore, cannot but hope that the Wilts County

Council, without itself undertaking to decide the question at issue, will be of opinion that this is a case which ought to be submitted to the Courts of Law for a decision. It is a case, not only of great importance in itself, but one which may determine many others of a similar character in other parts of the country. It appears to the Society to be obviously one which it was the intention of Parliament in passing the Act of 1893 should be undertaken by a County Council and not left in the hands of private individuals.

The Society, therefore, would suggest that the County Council of Wilts, if unwilling itself through its own legal advisers to undertake legal proceedings in vindication of the rights of the public, should at least undertake to guarantee the costs of such proceedings on the part of the Society to the extent of 600*l.*, for which the Society will undertake that the case shall be adequately and fully presented in a Court of Law.

"The Society have been willing to believe that the owner of the land on which Stonehenge is situated, when erecting the much complained of and hideous barbed-wire fence round the monument and charging an entrance fee of 1*s.* a head, was actuated only by a desire to protect the monument and to raise funds for its guardianship. They have pointed out that there is a much simpler and to him less costly way of effecting such security, namely, by adopting a simple deed as indicated by the ancient Monument Act of 1882, under which, without the consent of the Treasury, the Government would *ipso facto* be charged with the duty of doing whatever may be necessary to protect and safeguard the monument. Under this process the owner would lose none of his interest in the monument, whatever it might be, except that he could not thereafter sell or otherwise dispose of it."

Mr. Edward North Buxton, who drew the scheme for the purchase of the extensive open space at Lambourne and Grange Hill, Essex, was proceeding satisfactorily. Up to the present he had received promises amounting to about 5,000*l.* from private contributors, while various local authorities in Essex had agreed to provide 13,000*l.* altogether. Mr. Buxton announced that he had been able to secure the offer of an additional area of 12 acres of land at Grange Hill, adjoining the L.C.C. Asylum at Claybury, while the trustees of Earl Cowley had promised to dispose of their interests in the two Woodford Bridge Greens (4½ acres in extent) for 150*l.*, provided the whole scheme is carried out. A further rectangular block of 12 acres of well-wooded land at Lambourne, lying on the Romford-road, could also be secured, and it was of the utmost importance that it should be included in the general scheme, for it projects into the land already offered to the public. The total area now embraced in the proposed open space will amount to no less than 87½ acres, offered to the public for the sum of 32,000*l.* A hope was expressed by the Society that the Corporation of the City of London would eventually make a grant of 10,000*l.* towards the sum of 14,000*l.* still needed to complete the purchase, on the understanding that the 800 acres of common and farm land at Lambourne are placed under the control of the City. It is also hoped that the London County Council will consent to the purchase of the Grange Hill portion of the scheme, and that the subscriptions will be forthcoming from members of the public in order that the most comprehensive proposal for the extension of Metropolitan open spaces which has been before the public for upwards of twenty years may be carried out in its entirety.

At a meeting of the Wiltshire County Council on Tuesday, Lord Edmond Fitzmaurice, M.P., made a statement with regard to Stonehenge. He said he had received a letter from Sir Edmund Antrobus inviting him to Amesbury to an interview on the subject. In his (Lord E. Fitzmaurice's) opinion it opened up a reasonable prospect of successful negotiations. A notice on the agenda paper with reference to Stonehenge was withdrawn at Lord Edmond Fitzmaurice's suggestion.

GENERAL BUILDING NEWS.

KING EDWARD VII. HOME FOR NURSES, NORTH STAFFORDSHIRE INFIRMARY, STOKE-ON-TRENT.—In the competition recently advertised in our columns for the proposed new Home for Nurses at the North Staffordshire Infirmary, Stoke-on-Trent, thirty-eight sets of designs were received. Mr. H. R. Price, of Manchester, was appointed assessor to adjudicate upon a number of designs selected by the Committee. The award was considered by the Committee on August 21. The successful competitors are Messrs. R. Stephen Ayling, of Westminster, and A. R. P. Piercy, of Stoke-on-Trent, in whose hands the commission to carry out the work has been placed. The site is a very fine one, on rising ground, and the building will contain about 100 bedrooms for nurses and sisters, large sitting-rooms, library, servants' rooms, sick rooms, and the usual offices. It is proposed to lay the foundation-stone in October next. The whole of the necessary funds have been subscribed, the King leading the list with a donation of 10*l.*

SHEFFIELD TOWN HALL EXTENSION.—The Sheffield Corporation Improvement Committee considered the proposed extension of the Town

Hall on the 30th ult. It is intended to extend the building on the piece of land facing Norfolk-street and South-parade. The committee decided to consult Mr. E. W. Mountford, the architect for the building, and also to entrust him with the work of extension.

ROWTON HOUSE, WHITECHAPEL.—This building, which has just been opened, is the fifth of a series of "Poor Men's Hotels," known as "Rowton Houses," the property of Rowton Houses, Limited. It has been erected on a site near St. Mary's, Whitechapel Station, and has its entrance frontage in Fieldgate-street. The site consists of two adjoining parallelograms, the larger of which forms the frontage to Fieldgate-street, and has a frontage of 192 ft. by a depth of 129 ft.; the smaller has a back frontage of 75 ft. by a depth of 67 ft., with a total superficial area of 20,500 sq. ft. An abundance of light and air on all floors has been secured by the provision of wide forecourts on all sides of building, and in addition a large inner courtyard, 50 ft. wide, open at its eastern end. Advantage has been taken of the large area of the site to place all the dayrooms used by lodgers (with the exception of reading-rooms) on the ground floor. The elevations are finished in pressed Leicester facing bricks, relieved with Flemish bricks and dressings of pinky buff terra-cotta from Mr. J. C. Edwards, Raubon. The whole of the interior walling, excepting where glazed bricks are used, is built with Fletton bricks. All brickwork throughout the building has been built in Portland cement mortar. The roofs to the front elevations are covered with green slates, nailed direct upon stone breeze concrete slabs, carried upon stone concrete structure; all other roofs are flat concrete and steel construction, covered with asphalt. The ground floor of the site is covered with a thick bed of concrete, upon which, where wooden floors are laid, is solid oak wood blocks, and to other floors cement and granite chippings. The floors are of fireproof throughout, formed of concrete and steel, and the stairs and landings are in Portland cement concrete. To avoid a cavity between the surface of the concrete and the flooring, the floorboards are nailed directly upon the concrete in the cubicle floors. Special care has been exercised in the planning and execution of all the sanitary work, both in the portion underground and the plumber's work. Access is immediately obtainable to any portion of the underground work by the placing of inspection manholes at every change in direction of pipes and in positions that enable all junctions to be easily accessible. Iron pipes, with coated interiors, are used wherever it has been necessary to carry them under the building. A system of electric lighting has been adopted giving the official on each floor of cubicles control of the lights upon that floor; the various rooms on basement and ground floors are controlled separately, one from another, and, in addition, the superintendent has complete control, in the office and meter-room, over all the various sections. Water-closets and urinals are placed outside the buildings in the courtyard, at the north-east of the building, and cut off from the building by means of a cross-ventilated lobby. The work throughout is constructed in white glazed brickwork. The lodgers' cubicles are approached by three fireproof staircases, built in ivory glazed brickwork, two situated at the eastern boundary of the site, one adjoining office, and all at the extreme end of the cubicle corridors. The disposition of the staircases renders it an impossibility for the lodgers to be trapped by fire, in the event of an outbreak, as the cubicle corridors run from staircase to staircase, thereby leaving open a way for retreat in the event of accident to one staircase being blocked. In addition each floor is divided by divisional walls into sections, which would check, if not stop, the progress of a fire horizontally. The sectioning of the floors also enables isolation and efficient fumigation in the event of a case of contagious disease. In the reading-room a large portion of the wall-space is occupied by a series of panels emblematic of "The Seasons," painted by Mr. H. F. Strachey, of Stoney Mead, and presented by him to Rowton House as a practical demonstration of the interest taken by the artist in the work. Each season is represented by a single figure and also by a larger composition. Mr. H. B. Measures is the architect under whom the whole building has been carried out.

BAPTIST CHURCH, HULL.—The foundation and memorial stones of the new Free Baptist Church on the Boulevard, Hull, were laid a few days ago. The new church, which is Gothic in style, from designs of Mr. T. Brownlow Thompson, architect, Hull, will be of brick, with brick and stone dressings, and will have a spire 110 ft. high. It is intended to accommodate 550 persons, with provision for galleries and increase the sittings to 750. The interior of the building will be of red-wood, of which the seats, which will be open, will also be constructed. There will be an open rostrum, with marble-lined baptistry in front; also large parlour for the deacons, minister's vestry, and retiring-rooms. It is intended to add schoolrooms later. The cost, including fittings, will be 6,000*l.*, irrespective of the site. The schoolrooms will be an additional 2,000*l.*

CHRIST CHURCH, LANCASTER GATE, W.—At a sitting of the Consistory Court in St. Paul's Cathedral on the 25th ult., Dr. Tristram, K.C., Chancellor of the Diocese of London, granted to the vicar and churchwardens a faculty authorising

them to effect certain alterations and improvements in the church. The faculty extends to the removal of the organ into the east transept gallery, the enlargement of the instrument, and the raising of the floor of the existing organ-chamber to the level of the chancel, and so to provide sittings for those members of the congregation who had occupied seats in the east transept gallery, together with an additional entrance to the chancel. The lights will be transferred from a window, filled with stained glass, which the organ will thus block out, into a window in the south-east end of the church, which is the only one that is now not filled with coloured glass. On the other hand, the shifting of the organ will open out four windows previously blocked out under faculty. The improvements will cost an estimated sum of 2,500*l.*, towards which amount 1,500*l.* is already subscribed. The organ, by R. Harris, 1681, and rebuilt by Willis, was formerly in Winchester Cathedral. It was reconstructed by Bishop & Son twenty-seven years ago.

THE ANGEL TAVERN, ISLINGTON.—This well-known public-house, which really stands within the limits of Clerkenwell parish, is being rebuilt by Messrs. W. H. Lascelles & Co., of Bunhill-row, contractors, after plans and designs made by Messrs. E. J. Eadie & Meyers, for the owners, Messrs. Truman, Hanbury, Buxton, & Co.

PALACE OF VARIETIES, GLASGOW.—The new Pavilion Palace of Varieties, Glasgow, to be built at the corner of Renfield-street and Renfrew-street, will be erected from the designs of Mr. Bertie Crewe, of London. The elevations will be executed in salmon pink terra-cotta, and the windows will be glazed with pinked glass. Towers at the angles of the building will be surmounted by electric lights, and another light will be upheld by the principal figure in a group of statuary in the centre of the Renfield-street front. The grand entrance hall is in the Renfield-street elevation. It will have doors of polished mahogany, marble mosaic floor, and the marble dado, and panelled walls, and from its stairways of polished marble mosaic will lead to the stalls and circle. At the head of the circle stairs is the foyer, treated in a similar manner, from whence mahogany doors lead direct to the lower part of the circle, and another short staircase leads to the upper portion. The auditorium has a width of 76 ft. On the ground floor of the auditorium are stalls and pit. On the first tier is the grand circle, which has eight rows of seating, containing some 340 tip-up chairs, with raised lounges and promenades separated from the seats by marble balustrading. Four private boxes are provided, two reached by the proscenium and two at the back of the hall, where there is also a fireproof cinematograph chamber. Over the circle is a gallery, with fourteen rows of seating and with promenades. There will be lounges for the sale of tea, coffee, cigars, &c., in all parts, and retiring rooms have been provided. The electric light will be used, and the heating will be by low pressure. The stage will have a width of 70 ft., and 18 ft. to the gridiron floor. The dressing-rooms are in a separate fire-resisting block.

THEATRE, LIVERPOOL.—Hengler's Circus, in West Derby-road, has been rebuilt, and will in future be known as the Royal Hippodrome. The architects for the reconstruction of the building were Messrs. Bertie Crewe & A. Sheldermine, of London. The chief entrance, which is in West Derby-road is fitted with mahogany and glass doors, one leading to the stalls and circle, and the other to the pit. The floor and steps leading from the entrance are laid in mosaics, and the foyer is also decorated in the same manner. The full width of the stage is 95 ft. by 40 ft., and the proscenium opening is 40 ft. by 38 ft. The pit, which will accommodate 1,000 persons, is fitted with continuous seats upholstered in red velvet. In the gallery, which is approached by two staircases 6 ft. wide, there is sitting room for 1,500 persons. There are also eight stage boxes and four at the back of the circle, behind which there are lounges. Adjoining the stage are seven dressing-rooms for the artistes, each being supplied with hot and cold water. The galleries are supported by solid steel pillars. The building is fitted throughout with electricity and gas. From the pit and stalls there are six exits, and from the gallery two, each 6 ft. wide. The Hippodrome will accommodate 4,500 persons. The building contractors were Messrs. W. Tomkinson & Sons, Liverpool; the other firms engaged in the work being:—Decorations, Messrs. De Jong & Co., London; electric lighting by the National Electric Wiring Co.; heating by Messrs. Dawson, Stalybridge; gasfittings, fireproof curtain, and fire hydrants by Messrs. Vaughan & Brown, London; hardwood fittings by Messrs. Dean & Co., Birmingham; and mosaic work by Messrs. Diespeker & Co., London. Mr. George Sheen has carried out the duties of clerk of works.

NEW LAUNDRY, CLEVEDON.—The Clevedon and Portishead Steam Laundry was recently opened. This laundry, which has been erected from drawings prepared by Mr. T. J. Moss-Flower, C.E., Bristol, and carried out under his supervision, occupies a large area of ground at Clevedon close to the sea. The buildings have been specially designed and constructed with every convenience, and with every regard to the requirements of sanitation, thus ensuring safety both to the customers and the workers. An artesian well, at a cost of several hundred pounds, has

been sunk, and the company's water has also been laid on. The building was erected by Mr. W. A. Green, builder, of Clevedon; the Liddle Engineering Co. supplied the machinery and laundry fittings; and Messrs. Mather & Platt the "Archbutt-Deeley" softening apparatus. Blackman's fans are used to ventilate the buildings.

ISOLATION HOSPITAL, MELTHAM, YORKSHIRE.—The cornerstone has just been laid at Cop Hill, Meltham, of an isolation hospital, which is to serve the requirements of the Colne and Holme Valleys. The building, which is to be lighted by electricity generated on the premises, is estimated to cost 25,744*l.*, and will accommodate fifty beds. There will be three pavilions and an isolation block. Mr. J. Berry is the architect.

FOREIGN.

UNITED STATES.—A Government Commission has been appointed to prepare plans, and to report on a site and designs, for the proposed memorial to Abraham Lincoln in Washington. The members of the Commission have already agreed to recommend a site not far from the Washington monument and near the site of the proposed bridge across the Potomac to Arlington. The general character of the memorial has not yet been decided upon. Extensive excavations made at Milwaukee, Wisconsin, have brought to light the remains of an ancient village. Grooved stone axes, hammer-stones, arrow and spear heads, and great quantities of flint chips have been found; the work of excavation is in the care of the Wisconsin Natural History Society.

AUSTRALASIA.—The Council and members of the Institute of Architects of New South Wales have waited on the Mayor of Sydney requesting him to give an assurance that, before the proposed New Building Act is submitted to Parliament, the Institute might be afforded an opportunity of looking over the provisions of the measure, with a view to suggestions of architects being made to assist in the direction of producing as workable and perfect an Act as possible. A large boot factory is to be erected in Collingwood; Mr. F. Stapley, of that place, is the architect. At a recent meeting of the Melbourne and Metropolitan Board of Works, it was agreed that the wages of bricklayers employed by the Board should be reduced from 11*s.* per day per week of forty-eight hours to 10*s.* per day. The interior of the new theatre at Auckland (N.Z.) is to be of modelled fibrous plaster, and the general scheme adopted is French Renaissance. The architects are Messrs. W. Pitt, of Melbourne, and Messrs. Maloney & Son, of Auckland. In connection with the contracts for the erection of two new pavilions at the Prince Alfred Hospital, Sydney, the Master Builders' Association of New South Wales has informed the State Minister of Works that they cannot agree with the conditions of tendering imposed by the Public Works Department, and that their members will not tender for the work. As the association is a very strong body it is, therefore, doubtful whether the work will be proceeded with unless the conditions are modified. Banking premises are about to be erected in Sydney for the Union Bank of Australia; Messrs. Baxter & Boyne, of Melbourne, are the contractors. Mr. H. G. McKinney, M.L.A., has been elected chairman of the engineering section of the Royal Society of New South Wales. The plans of Mr. J. Warren Scobie, architect, of West Maitland, have been accepted, in competition, for extensive additions to the Tenterfield (N.S.W.) School of Art.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Messrs. Runtion & Barry, architects, of Hull, have removed their offices from Savile Chambers to Victoria Chambers, Bowalley-lane, Hull.

MANCHESTER SHIP CANAL.—According to the half-yearly report to June 30, the directors are in negotiation for the provision of 500,000*l.* by an independent company for the construction on a portion of the racecourse site of a large dock and transit sheds to be leased to this company for 99 years at a fixed percentage on the amount expended. Power will be reserved to determine the lease on short notice, either during construction or after completion of the works on payment of the amount expended, plus a small premium. The consent of the Corporation of Manchester to the lease has been obtained in accordance with the provisions of the company's 1807 Act of Parliament. The engineer's report states that the depth of water in the Ship Canal and Docks has been fully maintained by means of the dredging plant throughout the entire length of the waterway. Some slight diminution of the quantities of silt and sludge deposited in the upper reaches of the canal and docks has been experienced. The special dredging operations for the deepening of the channel in the estuary of the Mersey, which forms the access to the canal at Eastham, have made good progress. A considerable quantity of the rock which is to be removed has been blasted and dredged in the length immediately below Eastham Locks. The approaches to Irlam Ferry on either side of the canal have been considerably improved, the work having been

carried out in accordance with plans which were approved by the District Councils concerned. Shed No. 9, on the north side of Dock No. 8, has been walled in, fitted up, and rendered suitable for the banana trade. The station-master's office at Salford has been completed and is in use; certain other office extension works are in hand. Three new locomotive engines and four new locomotive steam cranes have been provided, and are in use for dock traffic. Since possession of the racecourse was obtained in the early part of the present year, considerable progress has been made with the railway extension works authorised by the Act of 1900. The bridge which is to carry the through railway over the L. & Y. Railway is nearly completed. The retaining walls and embankments throughout have been finished, and the laying of the permanent way has been begun. The construction of the last section of the main road on the boundary of the company's property has also made good progress. The formation of another service railway, which will render a further area of the property recently acquired by the company available for the storage of timber, is in hand. The embankments and slopes of the canal generally are in good condition, and the works throughout have been efficiently maintained. The transit shed on the north side of No. 8 dock, constructed by the Manchester Ship Canal Warehousing Co., Ltd., has been completed, and is in use for traffic purposes.

HOLY TRINITY CHURCH, STEPNEY.—On Thursday, July 31, Dr. Tristram, K.C., Chancellor of the Diocese of London, gave judgment in an important case recently heard in the Consistory Court. In September, 1900, Dr. Tristram had ordered a faculty to issue for a proposed enlargement of the east aisle of the church, which is at the north end of the church, to form a side-chapel and the erection of a clergy and a choir vestry on either side of the south end, with a parish-room over the two vestries to extend across the south end. The parish-room, having a capacity for 250 persons, was intended for vestry meetings, missions, and other religious services, Sunday schools, and similar purposes. The cost of the alterations was estimated at 2,000*l.* But Lord Trevelyan, as chief ground landlord in the parish, and whose father had given the site of the church and its graveyard, took exception to the altering of the front entrance of the church so as to render it out of keeping with the original design, and suggested that the vestries and parish hall should be built at the north, instead of the south end. On June 27, 1901, the Court issued a faculty, in default of any opposition thereto, to authorise the building of a clergy and choir vestry on the north-western side, with a parochial hall abutting against the end of the chancel. In November last, after the work had been begun, the London County Council proceedings under the Dissolved Burial Grounds Act, 1884, and in March filed a petition for revocation of the supplemental faculty, on the grounds that the Act forbids the erection of any buildings upon any dissolved burial-ground, excepting for the purpose of enlarging a church, chapel, meeting-house, or other place of worship, and that, in the opinion of the projected parochial hall, not come within those exceptions. Dr. Tristram, having satisfied himself as to the cause of the Council's non-appearance to the previous citation, made an order in April for a further hearing of the case. In the result he has adjudged that while the Court had jurisdiction to issue a faculty for the erection of a vestry hall, the situation proposed and communicating with the church, the desired faculty should be so worded as to preclude the room from being used for secular objects, and that he felt able to authorise its use as a vestry room for ecclesiastical and charitable purposes. He also proposed to make a rule, under Geo. IV., c. 53, that in future the Council should be served with due notice of any application made to the Court for a faculty to enlarge a building standing on a closed burial-ground.

THE MEN'S SHELTER, ALL HALLOWS CHURCH, LONDON-WALL.—The Rector of All Hallows announces his inability to carry out his project for the erection of a shelter, to be used in the day time, in the parish churchyard. The resources at his present command are not equal to the heavy cost of the requirements of the District Sanitary Authorities and the London County Council. The latter body required that, consequent upon the excavations made, the floor of the building should be carried up to a depth of 3 ft. 6 in. and that the expected expenditure of 190*l.* It is stated that the Corporation had approved of the original intention to lay a bed of concrete so as to seal the ground, and that the Medical Officer of Health made a subsequent demand, for reasons of sanitation, that the ground should be excavated to a depth of 3 ft. (and since to a depth of 3 ft. 6 in.) and that all human remains be removed and reinterred. The excavation and reinterment has cost 215*l.*, the Burial Board claimed 106*l.* 15*s.* 6*d.*, and the Medical Officer of Health claimed 21*l.* as their fees.

APPOINTMENT.—Mr. C. H. Brodie, A.R.I.B.A., has been appointed their Surveyor by the Directors of the National Provincial Bank and English Museum of Practical Geology, JERMYN-STREET.—We are asked to state that the Museum will be closed as usual from the evening of August 8 until the morning of September 10, 1902.

OLD WOODEN WATER CONDUITS.—The laying of new gas mains in Finsbury-pavement has been the cause of a discovery in the shape of old trunks or trees which were in old times laid as water conduits. Finsbury-pavement is on the northern edge of the City at Moorgate-street, and the conduits were found barely 4 ft. below the surface, helping to support the ground on which for some hundreds of yards the North Metropolitan tramcars run. The trunks of trees, as they were raised from their bed, proved to be in a wonderful state of preservation. They had been hollowed out to a bore of 6 in. or 8 in., the trees in some cases being from 4 ft. to 6 ft. in girth. One end of each length had been pointed to fit into the hollow of the next, some of the trees being 20 ft. or more in length. There is an opinion that they must have been 150 years in the ground. They are supposed to have been laid for the waters of the New River Co., from the reservoir at Clerkenwell to the once fashionable parts of the City across Finsbury Fields.—7*Times*.

HOME FOR CRIPPLED CHILDREN, SOUTHPORT.—The Bradstock Lockett Home for Crippled Children has just been opened at Southport. The site of the home is situated about 50 yards to the east of the Marshside-road, parallel to the inner sea embankment. The main building stands back from the proposed new road, from which it is approached by a broad drive. The laundry block and stable are arranged upon the north-east corner of the site, and form a protection to the boys' ward from the winds coming from that quarter; the girls' ward being similarly sheltered by the projection of the administration block. The principal entrance, in the centre of the south front, opens into a tiled vestibule, and thence by a short corridor into the main hall, from which the main corridor runs east and west to the boys' and girls' wards. The visitors' waiting-room, the recreation-room, and chapel, all facing south, are entered from the south side of the corridor, and the dining-room, kitchen, and lady superintendent's private stores from the north side. The boys' and girls' wards are 40 ft. long, 22 ft. wide, and one story in height, and contain sixteen beds each. The wards are warmed and ventilated by Shorland's double-fronted plaster stoves, and the ventilation is by Tobin's tubes and gratings, and the special hopper sashes provided at the bottom of each window, the upper sashes being also made to open. The schoolroom has at one end an open arch, through which is a raised chancel, which is screened off by a revolving shutter when the room is used for teaching or other purposes. The recreation-room, adjoining the schoolroom, contains the children's play lockers ranged round the walls, the tops forming a continuous seat. Just across the hall, and next to the kitchen, is the general dining-room of the building, 25 ft. long and 20 ft. wide. A special ward, entered from a separate corridor, is placed near the isolation ward for doubtful cases the doctor may wish to keep under observation. An isolation block, containing a ward for four beds, nurses' duty room, and stores, &c., is placed on the first floor. All the rooms and corridors on ground floor, except bathrooms, latrines, and kitchen department, are laid with pitch-pine blocks upon a concrete foundation. The premises are lighted throughout by electricity. The main fronts are faced with Accrington red bricks, relieved by bands and dressings of Longridge stone. The roofs throughout are covered with Westmorland green slates, finished with red terra-cotta ridge tiles. The architects were Messrs. W. H. Ellison & Son, of Liverpool. Messrs. Duxfield Bros., of Southport, were the contractors.

LEGAL.

IMPORTANT BUILDING DISPUTE AT NORWOOD.

THE CASE of the Perpetual Investment Building Society v. the Mayor, &c., of Camberwell, and Hutchings v. the Same, came before Mr. Justice Darling and a common jury in the King's Bench Division, on the 24th and 25th ults, the hearing concluding on the 31st ult.

Mr. Ellis Hill appeared for both the plaintiffs, and Mr. Low, K.C., and Mr. Henric for the defendants.

Mr. Ellis Hill, in opening the case, said that the actions, which would be tried together, were brought by both sets of plaintiffs against the defendants to recover damages for alleged negligence, the alleged negligence being that defendants, in carrying a drain underneath a portion of the houses which belonged to the plaintiffs, had neglected to shore up the houses and to properly fill up the excavation made, the consequence being that a portion of each subsided, became dangerous, and had to be pulled down and rebuilt. The main defect was, however, in the drainage.

The Perpetual Investment Building Society were the owners of a house known as No. 349, Crystal Palace-road, Norwood, Mr. Hutchings being the owner of the adjoining house, No. 347, Crystal Palace-road. These houses were semi-detached, there being a passage some 7 ft. or 8 ft. wide, which ran between the two houses. In April, 1901, the defendants served notices on both the plaintiffs to abate a nuisance which occurred in a drain which carried the sewage from the houses into the common sewerage

which ran up and down the Crystal Palace-road. When the plaintiffs came to open the ground to see what was the matter, it was discovered that the drain in question carried the drainage of four houses in the road, and therefore the plaintiffs were not responsible for the nuisance, because under the Metropolitan Management Act if a drain took the drainage of more than one house then the drain became a sewer and all sewers under the Act became vested in the Local Authority—in this case in the defendants. Therefore when the plaintiffs opened the ground and found that the drain was a sewer taking the drainage of several houses they denied that they were the guilty parties which caused the nuisance, and alleged that the defendants, who owned the sewer, were responsible. The result was that the plaintiffs communicated these facts to the District Council, and they set to work to remedy the nuisance, and in July of last year they began to make the excavation which led to the destruction of the back additions of both of the plaintiffs' houses. When defendants came to the place between the two houses where the drains branched off they opened them up and carried the excavation under the back additions of both Nos. 347 and 349, Crystal Palace-road. After the defendants had re-laid the drains, filled up the excavation, and finished the work towards the end of July or beginning of August it was discovered that the back additions of both houses were giving way. It went on so quickly that the plaintiffs and the middle of August the London County Council served the plaintiffs with notice that the back additions had become dangerous, and that the plaintiffs must shore them up. That was done, but afterwards the back additions were declared to be still dangerous and the plaintiffs had to pull them down and rebuild them. When the back addition to No. 349 was pulled down it was found that the foundation was completely cut away, and instead of being built up with concrete or with brickwork and cement, defendants had simply put a sort of concrete inside it which did not contain the proper amount of cement, which was perfectly useless, and which accounted for the collapse of the building. In No. 347 the same cutting away was done, but in this case the defendants had not filled up the place with concrete at all, but simply with earth. The plaintiffs admitted that the defendants were quite within their rights in making the excavations, but they said that the defendants ought not to have touched the back additions to these houses or interfered with the foundations without shoring up the back additions so as to ensure that no movement would take place. Plaintiffs also blamed the defendants for not having, after they had cut away the walls to the back additions, filled them up properly.

Mr. Low, in answer to his Lordship, said he thought that there was a large crack crossing the wall, whether the defendants in what they had done had been guilty of negligence.

Mrs. Sophia Moore, examined by Mr. Ellis Hill, said she was the wife of W. R. Moore, the tenant of No. 349, Crystal Palace-road, and she remembered the people employed by the defendants coming to relay the drain there. After they had laid the concrete outside the side door of the back addition, she noticed that there was a large crack crossing the concrete. The crack was about 3 in. wide. Afterwards she and her husband were ordered to leave the house, as it was not safe. Subsequently there appeared a crack in the wall which you could put your arm through. She first saw the crack in the concrete the morning after the men had finished relaying the drain.

Cross-examined by Mr. Low: They took possession of the house on June 24, 1901. No hole had been dug before they came in.

Wm. Cator, examined by Mr. Ellis Hill, said he had been employed by a Mr. Porter to connect up the drain. That was after a portion of it had been laid by the defendants' people. He saw how they had filled in the excavation which they had made.

They filled it in, underneath the wall, with concrete which was very bad, or poor. It was either bad cement, or there was not enough cement in it. Defendants' men had cut away the footings of the wall above the pipe, but that they were obliged to do. He saw the back addition after it had begun to subside. The crack in the cement was nearly opposite to the place where the drain went through the walls. He saw no signs of "giving way" before the defendants' men had done the work. The soil that was being excavated was stiff clay.

Cross-examined by Mr. Low: The concrete footings of the walls were cut away. He saw some way, one of the defendants' men, cut them away. There were about 18 in. of concrete footings under the walls.

Mr. H. S. Saunders, an architect and surveyor, A.R.I.B.A. dangerous structures surveyor to the district, examined, said he was called in after the subsidence had taken place about the time of the dangerous structure notice. He had heard the account given by plaintiffs' witnesses as to how the holes in the foundations were filled in. That was not the proper way. It was not right to carry the drains under the back additions without shoring up. In his opinion the cause of the subsidence of the back additions was want of due precaution in carrying out the work.

Cross-examined by Mr. Henlé: He had not examined the concrete laid by the Local Authority. He had no knowledge of what the concrete was, or of the foundations of the houses as they originally stood. The walls, unquestionably, were properly "toothed" all the way up.

This being the plaintiffs' case, his lordship suggested that it would be advisable to have an examination of the concrete under the adjoining houses, which were admitted to have been built at the same time as those in question. If the concrete there was found to be proper concrete, it would more or less settle that question. The other matter in dispute was that of the alleged negligence in not properly "shoring up." That could be discussed after the examination of the concrete had been made.

Mr. Ellis Hill, after consulting his clients, said that he was willing that this course should be adopted, trial holes being dug in the presence of two expert witnesses.

The case accordingly was ordered to stand over for the examination of the concrete, when it was decided that his lordship should resume the hearing of the case without the assistance of the jury.

The jury were accordingly discharged.

On the 31st ult. the hearing of the case was resumed, when Mr. Saunders, recalled and examined, said that on the previous Saturday, together with Mr. Mullins, the Surveyor to the Council, he visited the adjoining houses and trial holes were dug. Three holes were made at No. 345, at the back. With regard to the holes nearest No. 347 there was no concrete. There were two footings which were very good ones. The walls should have had concrete. The hole at the end of the back addition had no concrete. There was a third hole, and there he found concrete in the footings to the extent of 4 or 5 in. in thickness. The concrete was not mixed as it should have been. He made a hole in No. 351 and found 7 in. of concrete under the bricks. It was burnt ballast, badly mixed, and the particles were loose. It was not proper to put in the drains without shoring up the houses.

Cross-examined: The drains should have been carried round the houses, and not through the houses.

Mr. Hill: And then we should have been left our right to support from the soil between the pipe and the footings of the wall?

The witness replied that that was so.

His Lordship: Taking these houses as built in the ordinary suburban London way, the only question appears to be what should the defendants have done? Should they have shored up or not?

Mr. Low agreed that this was the main question. He would call his expert witness as to this.

Mr. Ellis Marsland, District Surveyor to the London County Council, examined, said he was well acquainted with the houses in question, having condemned the back additions. He examined the buildings before he condemned them. He was aware that the defendants had put in a new drain under the back additions.

Mr. Low: What, in your opinion, caused the state of things you saw there?

The witness: The shallowness of the foundations, the drought and a large tree growing in the rear of the two back additions. There was a shrinkage of soil, that being clay. In my opinion the local authority was guilty of no negligence in the way they did their work. I have a list of some thirty houses in the neighbourhood of East Dulwich that sunk during this dry summer and the re-building of portions became necessary.

His Lordship: On the evidence of the witness his lordship expressed himself satisfied and said he would hear Mr. Hill.

Mr. Hill submitted that the defendants, by doing as they had done, had deprived his clients' buildings of the right of support and had been negligent and therefore liable.

His Lordship, in giving judgment, said it was for the plaintiffs to prove their case, and he was not at all satisfied that that which had occurred to these houses, which were badly-built houses of the speculative building type and could not last long, was in any way due to anything done by the defendants. Holding that view of the case, no point of law arose. The plaintiffs had not discharged the burden of proof which was incumbent upon them, and there must, therefore, be judgment for the defendants in each case with costs.

INJURY TO BUILDINGS AT LIMEHOUSE.

THE case of G. Angus & Co., Ltd., v. W. Gibbs, Ltd., came before Mr. Justice Kekewich in the Chancery Division on the 1st inst. It was an action by the plaintiffs against the defendants to recover damages in respect of injury to premises, and for an injunction restraining the continuance of the piling of sand, &c., against plaintiffs' wall so as to cause injury to their premises.

Mr. Warrington, K.C., and Mr. Dill appeared for the plaintiffs; and Mr. Stewart Smith, K.C., and Mr. Stone for the defendants.

Mr. Warrington, in opening the case, said the action was brought by the plaintiffs, the lessees in possession of a house and wharf at Limehouse, for damages for injury done to a portion of the premises by the defendants, and for an injunction restraining or permitting the injury occasioned by allowing the

heaping against the eastern wall of the plaintiffs' premises of a quantity of sand, gravel, and ballast. The learned Counsel said that a quantity of sand, gravel, and ballast had been heaped against this wall by the defendants, and it had had the effect of forcing it inwards. The statement of claim alleged, and he thought he should be able to prove, that the plaintiffs' premises were entitled to lateral support from the defendants' house which had been pulled down. It was on the site of the old house that the heap of stuff had been placed. He thought it would turn out that the damage was occasioned by the withdrawal of the support which had weakened the plaintiffs' wall and rendered it subject to damage by external pressure. The houses were two old houses at Limehouse on the north bank of the river. The wall of plaintiffs' house, which had adjoined the defendants' house, had been rendered unsafe, and if the pressure continued it would be much further damaged. Complaint had been made to the defendants requiring the immediate removal of the sand, gravel and ballast and some part of the sand had been removed but not the gravel.

The defence set up was that the defendants were in no way liable for the damage done and that the damage was not due to any act on their part. Lately extensive dredging operations had been going on in the river, and this, it was alleged, had caused the shifting in the sand, &c., beneath the foundations of the plaintiffs' wharf, which had in turn caused the damage to the wall complained of.

Evidence was then called on behalf of the plaintiffs bearing out Counsel's opening statement.

Mr. Egerton, civil engineer, examined, stated that in his opinion the cracks in the wall were due to sand, &c., which defendants piled against it. The stuff was piled some 12 ft. high against the wall, and extended into the yard some 25 ft.

Cross-examined: He did not think that the recent dredging operations in the river had occasioned the damage by a shifting of the subsoil. It was true that many of the cracks in the wall did extend towards the river.

Evidence of a similar character was given by Messrs. Leslie & Cooper, civil engineers.

A builder was called who stated that he estimated that the cost of rebuilding the wall at 120*l*.

This was the plaintiffs' case.

On behalf of the defendants, Mr. R. Kerr, civil engineer, gave evidence. He said that in his opinion the shifting of the subsoil had caused the cracks in the plaintiffs' wall. He did not think they were caused by pressure from the outside. There was every indication that the bottom portion of the wall had slipped away from the top portion. Near the cracks the wall was practically plumb.

Cross-examined: He went on the roofs of the premises, and saw that the wall had a slight twist in it, but no bulge due to pressure.

Mr. J. M. Knight, civil engineer, late Surveyor to the Mile-end Vestry, stated that he had examined the *locus in quo*, and found that the plaintiffs' was a very old building. He examined the cracks in the wall, and in his opinion they were due to a movement in the front wall caused by a subsidence. The cracks, in his opinion, were not due to lateral pressure.

Cross-examined: There was a small crack in the wall on the opposite side of the building, but this was not serious. He attributed the cracks to subsidence vertical and lateral towards the river. He thought that 25*l*. would cover the damage done.

After hearing other evidence, his Lordship, in giving judgment, said that in this case, as in many others, he had to deal with conflicting evidence, and it was evidence which was exceedingly difficult to understand. Expert evidence was exceedingly difficult to deal with when it was evidence of opinion. He had to consider such evidence in the present case, but he had no doubt himself that the weight of evidence was strongly in favour of the cracks having been caused by lateral pressure. He found the suggestion that the cracks had been caused by something else not in accordance with the facts in the case. He thought that the lateral pressure of sand, gravel, and ballast had caused the damage complained of. He had not the materials in this case to properly assess the damages, but he thought that 40*l*. was quite sufficient. If he had given too little the plaintiffs had themselves to blame. His judgment, therefore, was for the plaintiffs for 40*l*., with the injunction asked for and costs.

Judgment accordingly.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

7,108.—WATER SUPPLY (DOMESTIC): J. & M. Craig, and R. Hight.—The invention is applicable to both siphon-discharge and valve cisterns. The inventors lay a branch pipe in communication between the customary inlet-cock and the flushing pipe. As the cistern becomes filled an after-flush will be delivered, whilst an orifice obviates siphoning.

7,122.—CONSTRUCTION OF SOUND-PROOF AND FIRE-PROOF BUILDINGS: H. J. Young.—Metallic joists, girders, and standards, ribbed recessed casings, corrugated ribbed tiles, and concrete, &c., are used in the construction. Netting or lathing

July 15.—By J. NICHOLSON, GRAVES, & CO. (at Sheffield).	
Sheffield, Yorks.—The Neepsend Rolling Mills, 4 acre 5 1/2 yds., ut. 53 yds., &c. 58l. (as a going concern).	£10,000
July 16.—By JAMES ELEY (at Boston).	
Frampton, Lincs.—Frampton House and 63 a.	5,275
Farmhouse and 73 a.	4,450
Enclosure of land, 3 a. 2 r. 31 p., f.	280
Four cottages and 2 a. or 18 p., f.	620
Kirtlington, Lincs.—Enclosures of land, 27 a. 1 r. 2 p.	2,200
July 22.—By FOX & VERGETTS (at Peterborough).	
Northampton.—Eight freehold farms, 86 a.	
2 a. 29 p. f.	1,415
Peterborough, Northants.—Fengate-rd., three cottages and 1 a. or 18 p. f.	205
Storey, Northants.—Farmhouse and 8 a. 8 p., f.	720
Storey's Bar-rd., building land, 6 a. 2 r.	880
Padbury, Northants.—Farmhouse and 30 p. f.	1,970
First Drive, &c., various enclosures, 113 a. 2 r.	6,405
North Drive, Osier Holt, &c., 23 a. 2 r.	200
Middleham, Northants.—Various enclosures, 195 a. 1 r. 2 p. f.	7,150
Arford, Hunts.—Three enclosures, 30 p.	310
A freehold fen field, 5 a. or 18 p.	100
Arford, Hunts.—Glinton Fox Cover, 9 a. 3 r.	510
Over Waterville, Hunts.—Three enclosures, 9 a.	480
30 p.	130
Woodhouse, Hunts.—Freehold house and 10 a.	180
Stanground, Hunts.—Two freehold cottages and 1 a. 1 r.	130
July 23.—By J. CARTER JONES & SONS (at Boston).	
Girtin, Lincs.—A freehold estate, 211 a. or 39 p.	9,605
By W. J. MAY & SONS (at Camelford).	
Kew, Cornwall.—Whitelake Enclosures, 12 a.	300
Trewarth, Cornwall.—Farm and mill, 300	3,500
Mosley of Wooten's Farm, 117 a. or 32 p., f.	540
Antegates, &c., Cornwall.—Trethra and Lobus Farm, 276 a.	7,500
Teath, Cornwall.—Moyley & Trevelyan's Farm, 28 a. 2 r. 1 p., f.	260
Moyley of Hightwells and Restarick Farm, 209 a. 38 p.	390
By W. DEW & SONS (at Denbigh).	
Denbigh, Denbigh.—Dreogoch Isaf and Uchaf and 50 a.	3,500
July 24.—By GRIMLEY & SONS (at Banbury).	
Bewdley, &c., Worcester.—The Bewdley Estate, 913 a. 3 p. 7 r. f., including the Manor of Fawcote, 34 a.	34,540
By BAXTER, PAYNE, & LEPPER (at Eritb).	
Eritb, Kent.—High-st., eight freehold building sites	1,830
Bexley Heath, Kent.—Pickford-rd., Glenhorth, f. y. r. 314 to 8.	315
Gritwell, Oxon.—Inkerman Farm, 165 a. f. y. r.	2,025
1020.	
OXFORD & CO. (at Eastbourne).	
Eastham, Sussex.—Woodside and 12 a. 19 p., f.	3,405

By PRINCIPAL HUDSON (at Southgate), Southgate, 1 and 2, Sydney-villas, f., w.r. 364 88.	£395	Old Hurst, Hunts.—Enclosures of land, 43 a. r. 29 p. f., f., w.r. 600.	£450	Bayswater.—5 and 7, Norfolk-rd. (S), ut. 43½ yrs., g.r. 184, y.r. 189.	£1,000
By Messrs. IRELAND (at Fakenham), Twynford, Norfolk.—A freehold and copyhold farm, 91 a. r. 20 p.	2,000	July 29.—By CHANCELLOR & SONS, Norwood.—39, Central-hill, f., y.r. 451.	800	Lepton.—High-st., f.g.r. 404, reversion in 79 yrs.	750
July 25.—By BIDWELL & SONS (at Cambridge), Cambridge.—28, Green-st. (S), f., y.r. 641.	1,150	Turnham Green.—1, Heathfield-ter., f., y.r. 201.	330	Chislehurst, Kent.—6 to 10, Victoria Cottages, w.r. 612 188.	870
12, Trinity-st. and offices, f., y.r. 1501, subject to annuities of 87½, lives aged 73 and 66.	2,500	Mortlake.—7½, High-st., f., w.r. 62.	205	1 to 5, Victoria Cottages, ut. 77 yrs., g.r. 101, y.r. 781.	500
Cherrythorn, Cambs.—Enclosures of land, 9 a. 3 r. 16 p., f., w.r. 600.	310	By DEBENHAM, TEWSON, & CO., City of London.—7, Aldermanbury (three-tenths share), area 1,240 ft., f., y.r. 600.	3,700	By F. JOLLY & CO., Poplar.—44 and 46, Glengall-rd., and 25, Marsh- field-st., ut. 39 yrs., g.r. 84, y.r. 721 168.	450
Everden, Cambs.—Freehold farmhouse, and 3 a. 3 r. 30 p., f.	550	Hamstead.—94, Greenford-gdns., ut. 36½ yrs., g.r. 171 108, p.	1,500	62 to 68 (even), Glengall-rd., ut. 39 yrs., g.r. 121 168, w.r. 934 128.	525
Enclosures of land, 4½ a. 3 r. 20 p., f.	1,020	By L. FARMER & SONS, St. John's Wood.—94, Abbey-rd., ut. 55½ yrs., g.r. 101, e.r. 651.	570	Millwall.—205, West Ferry-rd. (S), ut. 9 yrs., g.r. 24 108, y.r. 401.	165
Barwell, Cambs.—Freehold house and 4 a. 0 r. 23 p., f.	720	By FIELD & SONS, Blackfriars.—21 and 23, Stamford-st., area 3,200 ft., f., p.	3,000	By G. PEARCE & SONS, St. Luke's.—164, Whitecross-st. (S), f., w.r. 651 48.	930
Enclosures of land, 39 a. 1 r. 10 p., f.	901	By R. TIDY & SON, Ilalington.—25, Englefield-rd., ut. 37½ yrs., g.r. 71, y.r. 501.	480	De Beauvoir Town.—16 and 18, Church-rd., ut. 11 yrs., g.r. 941, y.r. 831.	430
Freehold farmhouse and 5 a. 1 r. 8 p.	290	By MESSRS. SPILLMAN (at Great Yarmouth), Great Yarmouth, Norfolk.—Ferry-rd., a freehold timber yard, area 0 a. 3 r. 30 p.	4,400	Hickling, Norfolk.—A freehold and copyhold farm, 97 a. 0 r. 31 p.	2,500
Reach, Cambs.—Enclosures of land, 9 a. 0 r. 26 p., f.	5	By FOSTER & CRANFIELD, Dulwich.—Fenwick-rd., f.g.r. 61, reversion in 71 yrs.	160	A freehold house and 17 a. r.	410
Swaffham Fen, Cambs.—Enclosures of land, 48 a. 2 r. 4 p., f.	720	By MULLITT, BOOKER, & CO., Notting Hill.—24, Lansdown-rd., f., p.	2,940	The Barn Field, 8 a. 0 r. 33 p., f.	230
Upware, Cambs.—The Field Farm 61 a. 1 r. 38 p., f.	1,700	Hyde Park.—20, Cambridge-st., ut. 19 yrs., g.r. 94, y.r. 851.	600	Three freehold cottages and gardens	105
Howes Farm, 165 a. 3 r. 38 p., f.	750	By REYNOLDS & EASON, Bethnal Green.—42 to 51 (odd), Punderson's gdns., f., w.r. 213 45.	2,190	The Stratham Field, 12 a. 3 r. 12 p., f. and c.	265
Enclosures of land, 8 a. 1 r. 24 p., f.	900	73, Punderson's-gdns., f., w.r. 441 45.	435	Marsh lands, 33 a. 1 r. 22 p., f. and c.	310
Wickham, Cambs.—Freehold ten land, 13 a. 0 r. 1 p. Waterbeach, Cambs.—Dog and Duck Farm, 35 a. 3 r. 28 p., f.	625	Hendon.—The Hyde, Vine Cottage, area 0 a. 0 r. 16 p. 10 p., f.	540	Runham, Norfolk.—The Horse Shoe p-h, f., y.r. 401.	1,947
Two freehold cottages and 2 a. 0 r. 11 p.	610	By SIM & RANDALL, Bethnal Green.—4 and 11, Thoydon-rd., ut. 48 yrs., g.r. 81, y.r. 781.	595	Ludham, Norfolk.—A copyhold occupation, 22 a. 2 r. 1 p., f.	660
Over, Cambs.—Enclosures of land, 44 a. 1 r. 16 p. Steeple Bumpstead, Essex.—Enclosures of land, 12 a. 1 r. 28 p., f.	1,500	4 and 6, Conyer-st., ut. 48 yrs., g.r. 81, w.r. 751 88.	630	A copyhold enclosure, 4 a. 0 r. 34 p.	120
Somersham, Hunts.—A rent-charge of 42 12s. 10d. By MESSRS. KEMLEY (at Epping), Epping, Essex.—Kendley-st., three enclosures, 16 a. 0 r. 33 p., f.	4,300	12 to 20, Lawford-rd., ut. 46½ yrs., g.r. 341 188, w.r. 397 128.	2,120	By FRANKLIN & JONES (at Oxford), Charlton-on-Otmoor, Oxon.—The Manor Farm, 39 a. 0 r. 38 p., f.	2,600
July 26.—By WALTON & LEE (at Carlisle), Lancaster, Cumberland.—Brown Hill enclosures, 17 a. 0 r. 23 p., f.	310	21, 3 and 5, Lawford-rd., ut. 48 yrs., g.r. 81, 13½ to 108, w.r. 1091 45.	680	Holts Farm, 61 a. 2 r. 17 p., f.	1,600
Hardest Farm, 157 a. 1 r. 39 p., f.	3,100	Bethnal Green.—4 and 5, Lawford-rd., area 1,450 ft., ut. 44½ yrs., g.r. 94, y.r. 1051 128.	465	First Close, 3 a. 3 r. 37 p., f.	150
Walton, Essex, Cumberland.—Low Wall Farm, 108 a. 2 r. 25 p., f.	4,300	20 to 26 (even), Burgoyne-rd., ut. 48 yrs., g.r. 104, w.r. 551.	2,350	A freehold holding, 5 a. 3 r. 35 p.	400
By H. J. WAT & SON (at Newport), Niton, Isle of Wight.—A freehold and 4 a. 0 r. 23 p., f.	450	20 to 21 (odd), Conyer-st., ut. 49 yrs., g.r. 71, w.r. 261 128.	2,600	Beeley, Oxon.—Ford Grounds enclosures, 19 a. 0 r. 15 p., f.	550
Lower Farm Mead, 11 a. 0 r. 37 p., f.	790	23, 25 and 27, Conyer-st., ut. 49 yrs., g.r. 121 128, w.r. 1201 128.	1,030	Waters Field, 10 a. 0 r. 25 p., f.	320
Enclosure of arable, 3 a. 2 r. 11 p., f.	360	3, 5 and 7, Olga-st., ut. 48 yrs., g.r. 161 168, w.r. 1451 128.	1,020	By T. LAVINGTON (at Devizes), Hedgington, Wilts.—New Mead, 2 a. 2 r. 30 p.	150
Shorewell, Isle of Wight.—A freehold cottage, y.r. 51 108.	155	0, Olga-st., ut. 48 yrs., g.r. 41 58, w.r. 1071 128.	230	Sunny Croft, &c., enclosures, 7 a. 1 r. 19 p., f.	355
July 28.—By S. BRADFORD, Chertsey, Surrey.—Guildford-st., the Ye Old Bell Inn, p-h.	9,300	1071 128, Roman-rd., ut. 48 yrs., g.r. 41 108, w.r. 421 128.	360	Rich Farm, 49 a. 0 r. 36 p., f.	1,700
Guildford-st., The King's Head Hotel and house adjoining, f., y.r. 621 108.	3,900	By W. ARMAN, Hornsey Rise.—2, Dresden-rd., ut. 80 yrs., g.r. 71 108, y.r. 471.	530	Wick Marsh, 9 a. 3 r. 18 p., f.	250
Horsell, Surrey.—Guildford-rd., the Harley Mow p-h.	1,075	Chalk Farm.—131, Elsworth-rd., ut. 62 yrs., g.r. 101 108.	1,100	Hanger Lands and The Copse, 2 a. 2 r. 3 p.	105
By BRADSHAW BROWN & CO., Bromley-by-Bow.—11, Abbott-rd., and 2, Portree- st., with building goodwill, ut. 71 yrs., g.r. 94 158, p. (including goodwill).	800	Barnsbury.—43, Arundel-rd., ut. 58 yrs., g.r. 81, e.r. 521.	450	Hanging or Hunger Land, 5 a. 3 r. 36 p., f.	105
98, Abbott-rd., ut. 71 yrs., g.r. 41 108, w.r. 281 128.	220	18 and 23, Sonning-st., ut. 57 yrs., g.r. 141, e.r. 81 108.	50	Four freehold cottages and 0 a. 2 r. 20 p.	775
Canning Town.—1 to 29 (odd), Agate-st., ut. 65 yrs., g.r. 101 108, w.r. 3121 128.	900	Hornsey.—18, Church-lane, ut. 98½ yrs., g.r. 81 88, y.r. 541 128.	540	The Manor Farm, 39 a. 2 r. 30 p., f.	1,900
37 to 101 (odd), Remond-rd., ut. 58 yrs., g.r. 101 108.	775	By DEBENHAM, TEWSON, & CO. (at Tenbury), Knighton-Tenbury, &c., Worcester.—The Bickley Estate, about 80 a., f. (in numerous lots).	21,215	Land's Meads, 9 a. 2 r. 33 p., f.	500
Cubitt Town.—150 to 185, 195 to 201 (odd), Stebon- chester-rd., ut. 6 yrs., g.r. 1251 108.	310	By T. R. TULE OVEN & SON (at St. Clears), Llanhangell Abercromby, Carmarthen.—Pentre House Farm, 112 a. 1 r. 1 p. (in lots).	9,310	Mobley's and Little Woods, 4 a. 3 r. 4 p., f.	250
256, Manchester-rd. (S), ut. 38 yrs., g.r. 61, y.r. 261.	130	By T. E. AVER & CO. (at Tiverton), Rackentree, &c., Devon.—Tidders Estate, 1558 88, f.	1,350	July 31.—By H. V. CHAPMAN & CO., Fleet-st., Pemberton-rd. and 3A, Johnson's court (shop and workshop), area 1,750 ft., f., y.r. 1551.	3,625
Millwall.—104 to 110 (even), Mellich-st., ut. 97 yrs., g.r. 141, w.r. 1451 128.	1,215	Reigate, Surrey.—4 and 7, Doods-rd., f., w.r. 391 31, High-st. (S), beneficial lease for 10 yrs., y.r. 251.	565	Finsbury Park.—84, St. Thomas-rd., ut. 65 yrs., g.r. 41 58, y.r. 361.	360
112 to 118 (even), Mellich-st. (now building), ut. 97 yrs., g.r. 141, w.r. 1451 128.	330	Richmond Hill, Surrey.—3, Downe-ter., f., e.r. 1301.	1,810	Holloway.—5, Elford-rd., ut. 74 yrs., g.r. 61, y.r. 301.	305
By ELLIOTT, SON, & BOWEN, Marylebone.—84, Portland-p., and 8, Park-cres- news, ut. 81 yrs., g.r. 501, y.r. 3001.	1,550	Battersea.—31 and 33, Lavender-rd., f., w.r. 701 45. 54, Shelgate-rd., f., g.r. 331.	751	301, w.r. 1251 108.	340
By MESSRS. MITCHELL, MITCHELL, & POLIND, Soho.—Moort-st., the Cambridge-p., f.g.r. 1401, reversion in 64 yrs.	3,810	Wimbleton.—52 to 68 (even), Deburgh-rd., f., w.r. 181 68.	1,575	Dulwich.—Lordship-lane, a plot of freehold land, area 10,700 ft.	230
Ashford, Middlesex.—Ashford-rd., Ashford Lodge and 152 acres, f., p.	5,000	Belvedere, Kent.—25, 26, and 27, Picardy Hill (S), ut. 79 yrs.	760	By BELLHAM, WILLIAMS, & CO., Wimbleton.—20, Stanley-rd., ut. 81 yrs., g.r. 121, e.r. 601.	415
1 to 6, Ashford Lodge Cottages, f., w.r. 751 88.	750	Battersea.—10 to 16 (even), Afghan-rd., ut. 75½ yrs., g.r. 201, w.r. 1451 128.	1,320	By G. E. CURTIS & SHARP, East Ham.—45 to 49 (odd), York-rd., ut. 81 yrs., g.r. 101, w.r. 681 188.	330
Lepton.—98, 106, and 108, Frieth-rd., f., w.r. 801 148.	970	By H. C. BIGDEN, Battersea.—31 and 33, Lavender-rd., f., w.r. 701 45. 54, Shelgate-rd., f., g.r. 331.	751	50 to 64 (even), Rutland-rd., ut. 84 yrs., g.r. 301, w.r. 1251 108.	955
By KING & CHASEMORE, Pulborough, Sussex.—Enclosure of meadow, 5 a. 1 r. 38 p., f., y.r. 51.	110	Wimbleton.—52 to 68 (even), Deburgh-rd., f., w.r. 181 68.	1,575	Wyndham-rd., ut. 84 yrs., g.r. 211, w.r. 1251 88.	870
Old Sol Farm, 27 a. 2 r. 1 p., f., p.	410	Belvedere, Kent.—25, 26, and 27, Picardy Hill (S), ut. 79 yrs.	760	Updon Park.—121 and 123, Harold-rd., ut. 84 yrs., g.r. 71 108, y.r. 601.	800
By PROTHORPE & MORRIS, Leighton.—Barclay-rd. North, three freehold houses, e.r. 661.	1,080	Battersea.—10 to 16 (even), Afghan-rd., ut. 75½ yrs., g.r. 201, w.r. 1451 128.	1,320	Plow-rd.—44 to 54 (even), Donsdale-rd., ut. 81 yrs., g.r. 201 58, w.r. 1201 88.	800
Reigate, Surrey.—Somers-rd., Stoneleigh, f., y.r. 1601.	2,560	By JAMES T. PEAR (at Kettering), Reigate, Surrey.—4 and 7, Doods-rd., f., w.r. 391 31, High-st. (S), beneficial lease for 10 yrs., y.r. 251.	565	By FARRERBROTHER, ELLIS, & CO., Old Bond-st.—No. 30 (S), area 1,450 ft., f., p.	25,700
Holborn.—30 and 31, Hatton-gdn. (offices and warehouses), ut. 15 yrs., g.r. 2501, y.r. 2,0901.	1,700	Richmond Hill, Surrey.—3, Downe-ter., f., e.r. 1301.	1,810	By GREEN & SON, Limehouse.—Narrow-st., Oporto Wharf, area 3,350 ft., ut. 180 yrs., g.r. 61, y.r. 4001.	6,500
Hoxton.—39, 41, and 43, Arding-rd., ut. 34 yrs., g.r. 251, y.r. 1811.	1,475	Battersea.—31 and 33, Lavender-rd., f., w.r. 701 45. 54, Shelgate-rd., f., g.r. 331.	751	Hackney Wick.—Lea Conservancy-rd., manufac- turing premises, area 13,600 ft., ut. 66 yrs., g.r. 54, y.r. 1001.	1,065
Highbury.—46 and 48, Elford-rd., ut. 74 yrs., g.r. 121 128, y.r. 841.	810	Wimbleton.—52 to 68 (even), Deburgh-rd., f., w.r. 181 68.	1,575	By J. & R. KEAP & CO., Walworth.—305 and 308 Walworth-rd. (S), f., p.	2,700
By FULLER, HOBSON, SONS, & CASSELL (on premises), Bermondsey New-rd.—Chocolate and confec- tionary works, area 25,500 ft., ut. 38 yrs., g.r. 2001 (including plant, machinery, &c.).	9,000	Belvedere, Kent.—25, 26, and 27, Picardy Hill (S), ut. 79 yrs.	760	By C. & T. MOORE, Bealey Heath, Kent.—The Broadway, West Lodge, f., e.r. 1251.	1,400
By CUNNAN & ROBERTS (at Wrexham), Bangor-on-Dee, Flint.—Bangor Bank Farm, 114 a. 3 r. 1 p., f.	3,500	Battersea.—10 to 16 (even), Afghan-rd., ut. 75½ yrs., g.r. 201, w.r. 1451 128.	1,320	Buckhurst Hill, Essex.—Stag-lane, freehold building land, area 7,800 ft., y.r. 81.	210
By HOWKINS & SON (at Rugby), Barby, &c., Northants.—Onley Fields Farm, 180 a. 1 r. 22 p., f., y.r. 1351 148.	3,650	Holloway.—52 to 68 (even), Deburgh-rd., f., w.r. 181 68.	1,575	By EDWARD SMITH & CO., Rudgwick, Sussex.—Arun Bank, The Strawberry Gardens Fruit and Flower Farm, 5½ a., f., p.	605
Nine closes of pasture, 92 a. 1 r. 5 p., f.	1,650	Ealing.—Caldershaw-rd., f.g.r. 241, reversion in 994 yrs.	625	By STRIMON & SONS, Peckham.—42 to 52 (even), Queen's-rd., f., y.r. 3481 (in lots).	5,810
A freehold farm, 32 a. 1 r. 10 p., By BIDWELL & SONS (at St. Ives), Pitley, Hunts.—Stanley Farm, 120 a. 2 r. 15 p., f.	2,300	Oxford-st.—25, Market-pl. (S), ut. 18 yrs., g.r. 121, y.r. 921.	1,100	1 and 3, Harder-rd., f., w.r. 661 68.	830
Enclosures of land, 42 a. 2 r. 9 p., f.	850	By DAVID J. CHATTELL, Oxford-st.—25, Market-pl. (S), ut. 18 yrs., g.r. 121, y.r. 921.	1,100	5 to 21 (odd), Harder-rd., part f. and part ut. 71 yrs., g.r. 201, w.r. 2711 148.	1,260
Freehold ten land, 5 a. 1 r. 20 p.	1,490	Cambridge.—65, Abbey-st. (S), area 500 ft., y.r. 601.	1,200	100, Meeting House-lane, ut. 60 yrs., g.r. 61, y.r. 441 48.	255

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Clerk of Works	Coventry Corporation	£1. 5s. per week.	Aug. 14
*Clerk of Works	Ilington Borough Council	2s. 10s. per week	Aug. 16
*Estate Surveyor	Manchester Corporation	3s. per week	Aug. 18
*Clerk of Works	Norwich Corporation	3s. 3s. to 4s. 4s. per week	Aug. 20
*Architect's Assistant	London County Council	do.	do.

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Offices, Sowerby Bridge, Yorks	Coventry Corporation	S. Wilkinson, Architect, Sowerby Bridge	Aug. 12
Road Materials, &c.	Ilington Borough Council	J. E. Swindlehurst, Civil Engineer, St. Mary's Hall, Coventry	do.
Street Works	Epping U.D.C.	G. J. Creed, District Council Offices, Epping	do.
Club House, London-road	Grays (Essex) Working Men's Club	R. Rider, Maidstone-road, Grays	do.
Additions to Bath, New Ilington	Manchester Corporation	Superintendent, Osborn-street Baths, Manchester	do.
Office, High-street, Swansea	Great Western Railway Company	G. K. Mills, Paddington Station	do.
Sewerage Works, &c., Haulleigh-road	Frinton-on-Sea U.D.C.	T. W. Golds, Surveyor, Thorpe-le-Soken	do.
Street Works, Purcell-street, &c.	Gosforth U.D.C.	C. J. Baff, Surveyor, Council Offices, Gosforth	do.
Cemetery Works, Chadde Heath	Chadde, &c., D.C.	G. H. Brady, Architect, Little Underbank, Stockport	Aug. 13
Additions to Gasworks	Barrow Corporation	Town Clerk, Barrow-in-Furness	do.
Additions to Swimming Bath, Balliol-road	Boyle Corporation	Borough Engineer, Town Hall, Rye	do.
Additions to Schools, Kelly	Rugby U.D.C.	J. Houston, Architect, Dunfermline	do.
Works at Council Chamber	Rugby U.D.C.	D. G. MacDonald, Surveyor, Rugby	do.
Stabling, Albion Brewery	Halifax Brewery Co., Ltd.	Jackson & Fox, Architects, 7, Rawson-street, Halifax	do.
Additions, &c., Town's-yard, Robert-street	Harrrogate Corporation	P. Bagshaw, Engineer, Municipal Offices, Harrrogate	do.
House, College Road, Fraserburgh, N.B.		F. E. Wilson, Architect, Fraserburgh	do.
Additions to School, Maclefield		J. Wright, Architect, Maclefield	Aug. 14
Church, &c., Willington, Durham		J. Kelly, Architect, 406, Oxford-street, W.	do.
Bridge, Amport	Andover R.D.C.	J. Wormald, Surveyor, South Cottage, Andover	do.
Well Sinking, Tullaroan	Kilkenny R.D.C.	K. Comerford, Council Offices, Kilkenny	do.
Twenty Houses, near Bridgend, Glam.	Cefu Cribbwr Building Club	J. & F. J. Hurley, Architects, Tondra, Glam.	do.
Shelters at Hospital, Monsall	Manchester Corporation	City Architect, Town Hall, Manchester	do.
Additions to School House, Crewe	Aberavenny R.D.C.	J. A. Atkinson, Architect, High-street, Crewe	do.
Electric Power Station	Pontypridd U.D.C.	R. P. Wilson, Engineer, Victoria-street, Westminister, S.W.	Aug. 15
College Buildings, Millingar, Ireland	Bishop of Meath	J. J. O'Callaghan, Architect, 16, Nassau-street, Dublin	do.
Ore, &c., Depots, Jarroo-on-Tyne	Palmer's Shipbuilding Co., Ltd.	The Secretary, Jarroo-on-Tyne	do.
Sewerage Works	Anstruther Town Council	J. A. Atkinson, Architect, High-street, Crewe	do.
House, Manor-road, Aberystwyth		R. E. Winstone, 16, High-street, Aberystwyth	Aug. 16
Storage Reservoir, Earl's Barton	Fermoy R.D.C.	R. E. Middleton, Civil Engineer, 17, Victoria-street, S.W.	do.
Well Sinking, Aghern	Aylesbury R.D.C.	P. O'Neill, Workhouse, Fermoy	do.
Sewer, Herton		W. E. Stanley, Herton-road, Aylesbury	do.
Car Shed, Shop, &c., Liversedge, Yorks		British Elec. Traction Co., Ltd., 1, Adelphi-terrace, Strand, W.C.	Aug. 17
Hotel, Stables, &c., Aberaman		Smith & Davies, Architects, Aberdare	Aug. 18
Additions, &c., to Farm Buildings, Maclefield	Cardiff Corporation	H. Bewick, Architect, Newgate-street, Chester	do.
Foundations at Asylum, Whichchurch	Heywood (Lancs.) Town Council	Osley & Skinner, Architects, Baldwin-street, Bristol	do.
Sewers	Sevenoaks U.D.C.	J. Diggle, Civil Engineer, Heywood	do.
Pipe Sewer, Oak-lane	Sevenoaks U.D.C.	S. Towson, Civil Engineer, Council Offices, Sevenoaks	do.
Stone Bridge, Llanar, &c.	Water Board	G. & F. W. Hodson, Engineers, Loughborough	do.
Private Dwelling House	Westbury Estate Office, Wood Green	Estimate Office, 3, Walgrave-road, Turnpike-lane, Horney	Aug. 19
Stable, &c., St. Buryan, Cornwall	Gosport Corporation	G. Gow, Trecothan Office, Truro	do.
Granite Road Metal	Northampton U.D.C.	T. Swadlow, North-street, Northampton	do.
Corporation of Water Tower at Hospital near Gravesend	Corporation of London	County Surveyor, Guildhall, E.C.	do.
Laying Tar-paving to Schools, Ashford	Ashford School Board	Jeffery & Lacy, Architects, Ashford, Kent	do.
Reconstruction of Drainage System, Kingsworth Ind. Sch.	Kent County Council	City Surveyor, Maidstone	do.
Laying Pipes (16 miles)	Ilfracombe U.D.C.	O. M. Prouse, Civil Engineer, Town Hall, Ilfracombe	Aug. 20
Reservoir, Hkeston	Water Board	G. & F. W. Hodson, Engineers, Loughborough	Aug. 21
Electric Power Station and Car Sheds	Pontypridd U.D.C.	R. P. Wilson, Engineer, 66, Victoria-street, S.W.	Aug. 22
*Fixing Iron Bands round Chimney Shaft, Tooting	Metropolitan Asylum Board	Office of Board, Embankment, E.C.	Aug. 27
*Repairing Tax-paving, Grove Fever Hospital, Tooting	do.	do.	do.
*Erecting Bath Room, New Fever Hospital, Hampstead	do.	do.	do.
*Raising Ceilings, &c., Exmouth Training Ship Infirmary	do.	do.	do.
Asylum, Caerleon, Mon.	Newport Corporation	A. J. Wood, Architect, 22, Surrey-street, W.C.	Aug. 28
Pipe Sewer and Surface Water Drain, &c., Mill Hill	Irwin & Co., Ltd., M.P.	Sponner & Cobbold, Architects, 17, Red Lion-square, W.C.	do.
Building Church at Baslemore, Surrey	The Building Committee	E. Woodhouse, Architect, 88, Mosley-street, Manchester	Aug. 31
*Generating Station, Streetsford, Manchester	Streetsford U.D.C.	F. E. T. Lawrence, Architect, 22, Buckingham-street, W.C.	Sep. 9
*Additions, &c., to Schools, Bush Hill Park	Enfield School Board	R. P. Wilson, Engineer, 66, Victoria-street, S.W.	Sep. 10
*New Infirmary	Bristol Guardians	R. Hammond, Engineer, 64, Victoria-street, S.W.	Sep. 11
*Coal Stores (including Steel Work and Builders' Work)	Metropolitan Borough of Hackney	T. Roderick, Architect, Aberdare	No date
Alterations, &c., to Station Hotel, Abertillery	Trustees of E. Lewis	J. Crawshaw, Architect, 1, Norman-drive, Ecclestone	do.
Two Villas, Moorhead, Shipley	Mr. R. Payne	G. E. Smith, Architect, 16, Victoria-road North, Southsea	do.
Business Premises, Elm Grove, Southsea		W. H. Tuck, Stoke Ferry	do.
Chapel and School, Stoke Ferry		Burton & Percival, Architects, Stamford-st., Ashton-under-Lyne	do.
House and Shops, Abonyne, N.E.		P. Grant, Abonyne	do.
Stables, &c., Gate Burton, Gainsborough		E. F. Green, Architect, Gainsborough	do.
Two Houses, Gosforth, Yorks		J. Fisher, 75, Pilgrim-street, Leeds	do.
Bakery, Stables, &c., Heywood		Openshaw & Gill, Architects, Bury, Lancs.	do.
Warehouse, Armitley, Leeds	Messrs. H. Bartley & Co.	F. W. Wholes, Architect, Upper Wortley-road, Leeds	do.
Bungalow, Bury, Bradford		W. H. H. Marten, Architect, Chesapeake Chambers, Bradford	do.
*New Nurses' Home, &c., at Infirmary, Withington	Chorlton Union	J. B. Broadbent, Architect, 15, Cooper-street, Manchester	do.

PUBLIC APPOINTMENTS.

Nature of Work.	By whom Advertised.	Premiuns.	Designs to be delivered
*Designs for University Buildings, Cape of Good Hope	Agent. Gen. for Cape of Good Hope	400L, 200L, and 100L.	Jan. 31

Those marked with an asterisk (*) are advertised in this Number.

Competitions, p. iv.

Contracts, pp. iv, vi, viii, & x.

Public Appointments, xix.

111, Abbey-st., E. y.r. 35L	350	By CHAMBERS & GIRT.	By THOMAS WOODS.
63, Bermondsey-st., E. y.r. 35L	500	Hackney—33, Cadogan-ter., ut. 151 y.r.s., E.T.	Houslow, Middlesex.—Bath-rd., Sherborn Villa,
38, Decima-st. (warehouse), E. y.r. 40L	370	4L 10s., W.T. 39L	f., E.T. 60L
Brixton—11, Barrington-rd., ut. 204 y.r.s., E.T.	370	By Messrs. COBB.	Wandswoth—Nos. 265 and 266 (shops), ut.
8, E.T. 60L	240	Walton-on-Thames, Surrey—Broad-lane, en-	30 y.r.s., E.T. 15L, y.T. 140L
9, Bankton-rd., ut. 72 y.r.s., E.T. 6L 6s., E.T. 26L	610	clousures of freehold land, with cottages and	
Camberwell—170, The Grove, ut. 21 y.r.s., E.T.	1,195	buildings thereon, area 95 a. 1 r. 6 p.	
20L 10s., y.T. 55L	265	(and) 64 a. 2 r. 10 p., E.T.	
54, Camberwell-grove, E. y.r. 40L		Hastings, Kent—New Barn Farm, 199 a. 1 r.	
Chichester—141 and 143, Beaufort-st., ut. 718 y.r.s.,		28 p., E.T.	
E.T. 21L, y.T. 140L		By NOTT, CARTWRIGHT, & ETCHES.	
Greenwich—175, South-st. (S), ut. 50 y.r.s., E.T.		Tooting—42, Elmfield-rd., ut. 88 y.r.s., E.T.	
5L, y.T. 35L		6L 10s., E.T. 45L	
August 1.—By C. H. BROWN.			
Holloway—48, Campbell-rd., ut. 89 y.r.s., E.T. 6L,			
W.T. 26L			

Contractions used in these lists.—E.g. for freehold ground-rent; i.e. for leasehold ground-rent; i.e. for improved ground-rent; i.e. for ground-rent; i.e. for rent; i.e. for freehold; c. for copyhold; l. for leasehold; y. for estimated rental; w. for weekly rental; y. for yearly rental; ut. for unexpired term; p. a. for per annum; y. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard.

PRICES CURRENT OF MATERIALS.

* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest, quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.	
£ s. d.	
Hard Stocks	1 13 0 per 1,000 alongside, in river
Soft Stocks	1 10 0 " " " "
Grizzles	1 10 0 " " " "
Facing Stocks	2 12 0 " " " "
Shippers	2 7 0 " " " "
Flatons	1 8 0 " " " "
Red Wire Cuts	1 12 0 " " " "
Best Fareham Red	3 12 0 " " " "
Best Red Pressed	5 5 0 " " " "
Runbore Facing	5 5 0 " " " "
Best Blue Pressed	4 6 6 " " " "
Do., Bullnose	4 11 0 " " " "
Best Stourbridge	4 6 0 " " " "
Fire Bricks	4 6 0 " " " "
GLAZED BRICKS	
Best White and	
Ivory Glazed	
Stretchers	13 0 0 " " " "
Headers	12 0 0 " " " "
Quoins, Bullnose	17 0 0 " " " "
and Flats	17 0 0 " " " "
Double Stretchers	17 0 0 " " " "
Double Headers	16 0 0 " " " "
One Side and two	19 0 0 " " " "
Ends	19 0 0 " " " "
Two Sides and one	20 0 0 " " " "
End	20 0 0 " " " "
Splays, Chamfered	20 0 0 " " " "
Squints	20 0 0 " " " "
Best Dipped Salt	
Glazed Stretchers	12 0 0 " " " "
and Headers	12 0 0 " " " "
Quoins, Bullnose	14 0 0 " " " "
and Flats	14 0 0 " " " "
Double Stretchers	13 0 0 " " " "
Double Headers	14 0 0 " " " "
One Side and two	15 0 0 " " " "
Ends	15 0 0 " " " "
Two Sides and one	15 0 0 " " " "
End	15 0 0 " " " "
Splays, Chamfered	14 0 0 " " " "
Squints	14 0 0 " " " "
Second	
White and Dipped	
Salt Glazed	0 0 0 " " " "
Thames and Pit Sand	7 3 per yard, delivered.
Thames Ballast	31 0 per ton, delivered.
Best Portland Cement	31 0 per ton, delivered.
Best Ground Blue Lias Lime	25 0 " "
NOTE.—The cement or lime is exclusive of the ordinary	
charge for sacks.	
Grey Stone Lime	120s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks	26s. 6d. per ton at rly. dpt.

STONE.

£ s. d.	
Caister in blocks	1 11 per ft. cube, deld. rly. depot
Bath	1 8 " " " "
Farleigh Down Bath	1 8 " " " "
Beer in blocks	1 6 " " " "
Grimsill	1 10 " " " "
Brown Portland in blocks	2 2 " " " "
Darley Dale in blocks	2 4 " " " "
Red Corshill	2 5 " " " "
Josephine Red Freestone	3 3 " " " "
Red Mansfield	2 2 " " " "
Hard York in blocks	2 10 " " " "
" 6 in. sawn both sides	
landings, 10 sizes	£ s. d.
(under 40 ft. sup.)	2 8 per ft. super.
" 6 in. Rubbed Ditto	3 0 " " " "
" 3 in. sawn both sides	
slabs (random sizes)	1 3 " " " "
" 2 in. self-faced Ditto	0 9 " " " "
Hopton Wood (Hard Bed) in blocks	2 3 per ft. cube.
deld. rly. depot	
" 6 in. sawn both	
sides landings	2 7 per ft. super.
deld. rly. depot	
" 3 in. do.	1 25 " " " "

SLATES.

£ s. d.	
6x10 best blue Bangor	12 0 per 1000 of 2400 at rly. dep.
" best seconds	11 10 " " " "
6x8 best	6 17 6 " " " "
6x10 best blue Portlana	
do.	11 7 6 " " " "
6x8 best blue Portlana	6 5 0 " " " "
6x10 best Eureka un-	
fading green	13 10 " " " "
6x8 "	7 10 0 " " " "
6x10 permanent green	10 10 0 " " " "
6x8 "	10 0 0 " " " "

TILES.

£ s. d.	
Best plain red roofing tiles	41 6 per 1,000, at rly. depot.
Hip and valley tiles	3 7 per doz. " "
Best Broseley tiles	48 6 per 1,000 " "
Hip and valley tiles	4 0 per doz. " "
Best Rubion Red, brown or	
brindled Do. (Edwards)	57 6 per 1,000 " "
Do. ornamental Do.	60 0 " " " "
Hip tiles	4 0 per doz. " "
Valley tiles	3 " " " "
Best Red or Mottled Staf-	
fordshire Do. (Peckes)	50 9 per 1,000 " "
Hip tiles	4 1 per doz. " "
Valley tiles	3 8 " " " "

WOOD.

BUILDING WOOD.—YELLOW.	
At per standard.	
£ s. d.	
Deals: best 3 in. by 11 in. and 4 in.	13 10 0 15 0 0
by 9 in. and 11 in.	
Deals: best 3 by 9.	

PRICES CURRENT (Continued).

WOOD.

At per standard.	
£ s. d.	£ s. d.
Battens: best 2 in. by 7 in. and 8 in.,	10 10 0 11 10 0
and 3 in. by 7 in. and 8 in.	
Battens: best 2 in. by 6 and 3 by 6	0 10 0 less than
	7 in. and 8 in.
Deals: seconds	1 0 0 less than best
Battens: seconds	0 10 0 " " "
2 in. by 4 in. and 2 in. by 6 in.	8 10 0 9 10 0
7 in. by 4 in. and 3 in. by 5 in.	8 0 0 9 0 0
Foreign Saw Boards	
2 in. by 12 in. by 12 in.	0 10 0 more than
	battens.
2 in.	2 0 0 " "
Fir timber: Best middling Daing	At per load of 50 ft.
or Memel (average specifica-	
tion)	4 10 0 5 0 0
Seconds	4 5 0 4 10 0
Small timber (8 in. to 10 in.)	3 12 6 3 15 0
Swedish balks	2 15 0 3 0 0
itch-pine timber (50 ft.)	3 0 0 3 10 0
Jointed Wood	
White Sea: First yellow deals,	At per standard.
3 in. by 11 in.	22 0 0 23 0 0
3 in. by 9 in.	20 0 0 21 0 0
Battens, 2 in. and 3 in. by 7 in.	16 10 0 18 0 0
Second yellow deals, 3 in. by 11 in.	18 0 0 20 0 0
3 in. by 9 in.	16 10 0 18 10 0
Battens, 2 in. and 3 in. by 7 in.	13 0 0 14 0 0
and 9 in.	
Battens, 2 in. and 3 in. by 7 in.	14 0 0 15 10 0
Petersburg: first yellow deals, 3 in.	11 10 0 12 10 0
by 11 in.	
Do. 3 in. by 9 in.	20 0 0 21 0 0
Battens	17 0 0 18 0 0
Second yellow deals, 3 in. by	23 0 0 24 0 0
11 in.	
Do. 3 in. by 9 in.	15 0 0 16 10 0
Battens	13 10 0 14 10 0
Third yellow deals, 3 in. by	11 10 0 12 0 0
11 in.	
Do. 3 in. by 9 in.	13 10 0 13 10 0
Battens	10 0 0 11 0 0
White Sea and Petersburg:	
First white deals, 3 in. by 11 in.	14 0 0 15 0 0
" 3 in. by 9 in.	13 0 0 14 0 0
Battens	12 0 0 13 0 0
Second white deals, 3 in. by 11 in.	13 0 0 14 0 0
" 3 in. by 9 in.	12 0 0 13 0 0
Battens	9 10 0 10 10 0
Pitch-pine: 2 in. battens	10 10 0 11 0 0
Under 2 in. thick extra	10 10 0 11 0 0
Yellow Pine—First, regular sizes.	36 0 0 37 10 0
Broads (12 in. and up)	2 0 0 more.
Oldtimers	24 10 0 25 10 0
Seconds, regular sizes	20 0 0 21 0 0
Yellow Pine Oddments	20 0 0 21 0 0
Kauri Pine—Planks, per ft. cube.	0 3 6 0 4 6
Danish and Swedish Oak Logs	
Large, per ft. cube	0 6 0 0 7 0
Small	0 2 3 0 2 6
Wainscot Oak Logs, per ft. cube	0 5 0 0 5 6
Dry Wainscot Oak, per ft. sup.	0 10 0 11 0 0
inch	0 0 7 0 0 8
2 in. do.	0 0 7 " " "
Dry Mahogany—	
Honduras, Tabasco, per ft. sup.	
as inch	0 0 9 0 0 11
Selected, Figury, per ft. sup. as	
inch	0 1 6 0 2 0
Dry Walnut, American, per ft. sup.	0 10 0 11 0 0
as inch	0 10 0 11 0 0
Teak, per load	16 0 0 17 0 0
American Whitewood Planks—	
Per ft. cube	0 3 0 0 3 6
Prepared Flooring—	Per square.
2 in. by 7 in. yellow, planed and	0 13 0 0 16 6
matched	
2 in. by 7 in. yellow, planed and	0 13 6 0 17 6
matched	
2 in. by 7 in. yellow, planed and	0 15 0 1 0 0
matched	
2 in. by 7 in. white, planed and	0 11 0 0 12 6
matched	
2 in. by 7 in. white, planed and	0 11 6 0 13 6
matched	
2 in. by 7 in. white, planed and	0 13 6 0 15 6
matched	
6 in. at 6d. per square less than 7 in.	

JOISTS, GIRDERS, &c.

In London, or delivered	
£ s. d.	£ s. d.
Railway Vans, per ton.	
Roller Steel Joists, ordinary sections	8 5 0 8 15 0
Compound Girders	8 2 6 9 5 0
Angles, Tees and Channels, ordi-	
nary sections	7 17 6 8 17 6
Fitch Plates	8 5 0 8 15 0
Cast Iron Columns and Stanchions,	
including ordinary patterns	7 2 6 8 5 0

METALS.

Per ton, in London.	
£ s. d.	£ s. d.
IRON—	
Common Bars	7 15 0 8 5 0
Staffordshire Crown Bars, good	
merchant quality	8 5 0 8 15 0
Staffordshire "Marked Bars"	10 10 0 " "
Mild Steel Bars	9 0 0 9 10 0
Hoop Iron, basis price	9 5 0 9 10 0
" galvanised	16 0 0 " "
" (And upwards, according to size and gauge.)	
Sheet Iron, Black—	
Ordinary sizes to 20 g.	10 0 0 " "
" 20 g. to 24 g.	12 0 0 " "
" 24 g. to 26 g.	12 10 0 " "
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AUGUST 16, 1902.

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The Abbey and the Coronation Ceremony.



HE great ceremony in Westminster Abbey on the 9th may be said to have been a splendid success, both in regard to picturesque effect and in view of the fact that, as

far as we could perceive—for one cannot see all over a transeptal church except from one point—there was not a hitch in the performance of the ceremony, which speaks very well for the care with which everything was prepared and rehearsed. Nor, we believe, was there anything in the way of an accident among the numerous audience.

Given the condition that the Abbey Church was to be treated as a spectacular area—on which we have something to say afterwards—the Office of Works, in whose hands the interior was we believe unreservedly placed, may be congratulated on the manner in which the seating and the decoration were carried out. The architectural design of the building was of course practically ignored, but that was inevitable under the conditions given. The aisles were reduced to double-tiered slopes of seating, the upper tier of which rose nearly to the apex of the arcade; the piers rose from the midst of this as from a sea of brilliant dresses and upholstery. A great portion of the transepts was also double-tiered, the upper story of seats however, not extending up to the crossing. The area of the crossing was the ceremonial centre of things. Nearly under the eastern arch was placed the throne on which the King was to sit during the most important portion of the investiture and the crowning; some little distance in the rear of this, and nearly under the western arch of the crossing, were the two State chairs which King and Queen were to occupy after the ceremony of crowning. Thus the principal actors in this great scene were brought within the view of as many as possible of the "assistance." Those occupying the nave westward of the choir screen

could have seen nothing of it; but on the other hand they had the *coup d'œil* of the procession up the nave, which must have had a fine effect; but no one could see both.

The decorative hangings in front of the tiers of seats were probably purposely kept rather quiet and low in tone, so as not to compete too much with the dresses; which gave the real splendour and colour to the scene. They consisted of dark and light figured stuffs hung in alternation, with an effect which was rich and at the same time quiet and subdued. The presence of hundreds of people wearing the richest and gayest dresses they could command, many of them curious and picturesque costumes of historic authenticity, and hardly to be worn except on an occasion such as this, produced on the mind a kind of impression of having got back for a moment to some great fête of the Middle Ages, when the upper classes, so far from eschewing splendour of costume, relied on it as one mark of distinction. The ladies' dresses, it is true, brought one back to modernity, when seen near at hand; but the distant effect, from the south transept, of the brilliantly dressed assemblage in the gallery of the north transept, was splendid and quite harmonious as a whole. In a kind of private box arranged above the north stalls of the choir was visible the figure of an eminent R.A., with easel and palette, busily making coloured sketches of the scene, which we presume will be commemorated in an important picture. It is certainly a scene to be remembered, and within the building everything seemed to be a complete whole; we had got out of the atmosphere of ordinary life into a temple of quasi-mediæval splendour, and one forgot the outside world altogether. When the crowd of spectators broke up the unifying element was lost; and it was a truly *bizarre* effect, in the cloisters and in Dean's-yard after the service, to see this crowd of people in all kinds of different types of costumes, waiting for their very un-mediæval carriages, and jostling with servants in the liveries of modern lackeydom.

This was probably not only the best-managed but the most artistic of Coronations in the Abbey during the modern period of

our history. Among other things, we could not but notice the high-class character of all the music employed at the service; some of the modern compositions, written for the occasion, perhaps smelt of the lamp a little too much—some of us could recall an old anthem to the words "I was glad" which has a good deal more of spontaneous inspiration than the one with which we were served; still, it was all high-class music, written with serious intent and admirably executed, and probably this has hardly been the case in any Coronations held in the Abbey during the eighteenth and nineteenth centuries. But perhaps the most impressive element of all this great ceremonial lies in the dignity and gravity of the wording of the time-honoured sentences in which the Sovereign is addressed at each step in the investiture. Consider for instance the address with which the symbolical sword is presented—"with this sword do justice, stop the growth of iniquity, protect the Holy Church of God, help and defend widows and orphans, restore the things that are gone to decay, maintain the things that are restored, punish and reform what is amiss and confirm what is in good order: that doing all these things you may be glorious in virtue"; &c. It is impossible to carry to a loftier pitch the conception of the office of a ruler; and an even more grave emphasis is given in the succeeding presentation of the Imperial Orb with the cross on it, where the holder of it is exhorted to remember, when he sees this orb under the cross, how "the whole world is subject to the power and empire of Christ"; a sentiment certainly more mediæval than modern, at least in connexion with a State ceremonial.

And this leads us to the criticism which we would venture to make, both on moral and architectural grounds, as to the treatment of the Abbey on these occasions. This is not of course, a church journal, nor, in one sense of the words, a religious journal, and we do not meddle with questions either of creed or of ecclesiastical polity. But we wish to range ourselves with those who take serious things seriously; and as a question of the fitness of things, we should be inclined to ask, considering that the Coronation service is in its character essen-

tially a religious service, and is meant to be so, and is accordingly held in the most ancient and venerable church of the capital, originally founded by an English King—is it the most suitable way of treating the Abbey, to do everything that can well be done to destroy its ecclesiastical character for the occasion, and transform it, as far as possible, into a theatre? That is what it really comes to; and we would suggest that as this is intended to be a religious service, the church should be left as a church, and the spectators be content to be seated as in a church, and leave the building in its natural architectural dignity and solemnity, instead of covering up all its architecture by temporary erections of a decidedly unecclesiastical character. A dais might be formed at the crossing to enable the chief ceremony to be better seen, but that would not materially interfere with the character of the building. Of course fewer spectators could be accommodated; but they would become a "congregation" and not an "audience."

From the point of view of the fitness of things, too, it might surely be asked whether it is entirely suitable that a building intended for daily religious service should be closed to worshippers for the best part of a year, merely for the purpose of providing seats for an audience for one day. The Abbey, as a church, could be prepared for the ceremony in a week, without interrupting the services. All this time is required only to transform it into a theatre, and to destroy almost all its resemblance to a church. The ceremony would be far more really impressive if the Abbey Church were left to appear as what it really is, instead of being transmogrified and secularised in appearance.

Then there comes the question of the Abbey as a fabric—a question which at all events is entirely within our province. So far as we were able to observe, the temporary galleries were fitted into their places between the piers in a careful manner, and it is to be hoped that the building will not be found, this time, to have sustained any material injury; but it seems impossible that such an amount of work can have been erected in the interior without leaving some of its mark behind it; not to speak also of the danger of fire when such a forest of timber is stacked in the building. And then there comes the question, how often is this to happen? The last reign was fortunately a very long one, and after an interval of more than sixty years this great installation may not have seemed out of the way. But whatever our wishes for the longevity of the present Sovereign, we know that he cannot in the nature of things reign for anything like the period allotted to his predecessor; and if we were to have a succession of comparatively short reigns, and the Abbey were to be knocked about and disguised in this way every time, it would suffer most seriously, in its appearance certainly, and perhaps in its structure also.

We hope therefore that the next Coronation may be made the occasion for establishing a precedent for holding the ceremony in the Abbey as a church, and simply as it stands (merely seating the nave); a procedure which will be much more suitable from the architectural, the structural, and, in our opinion, from the religious point of view also.

THE MONASTERY OF ST. LUKE OF STIRIS.

SINCE the eleventh century there has existed in a remote region of the province of Phocis, on the north of the Gulf of Corinth, a remarkable example of Byzantine architecture of the eleventh century, which, even since the days when the cultivated portion of Western European society began to look upon ancient buildings as things, has remained almost unknown save for the occasional notice, unaccompanied by adequate illustration, of some archaeologist or man of letters who had wandered out of the beaten track. This is the Monastery of St. Luke of Stiris, a saint of the Greek Church born in Macedonia towards the close of the ninth century; who became a typical holy man, seeking solitude and retirement from the world, in which search he eventually settled in this out-of-the-way region in Phocis, where he died in the middle of the tenth century. It is probable, it is indeed a tradition, that a church dedicated to Saint Barbara (why to that saint in particular is not evident) was by his desire erected near the spot where he dwelt. That church, if it was built, no longer exists, but a monastery arose on the spot, with two churches, or a double church, attached to it, one of which in all probability stands on the site of the original one built by order of the saint, from whom the monastic establishment takes its name.

Of the monastery, little of the original buildings remain, but the double church stands in a fair state of preservation, considering its age, and appears to be a remarkable example of Byzantine art, of which, through the fine illustrative and descriptive volume of Messrs. Schultz and Barsley,* those who have not personally visited it can now for the first time obtain an adequate idea. It is indirectly owing to the establishment of the British School at Athens that we owe this exhaustive study and illustration of a building the interest of which is entirely different from that which attaches to the monuments of classic Greece. It was undoubtedly for the study of the latter that the School was at first and ostensibly founded; it seems to have been to these two of its members that it occurred that the later ecclesiastical remains at Athens were also worthy of study and illustration. The attention directed to them is not indeed entirely new. Just sixty years ago Conchaud issued his work, "*Choix d'Églises Byzantines en Grèce*," a thin folio fairly illustrated as far as plans and architectural views were concerned, but displaying none of the interest in Byzantine detail which architectural students of the present day feel. He, though visiting Greece for the purpose of studying Byzantine churches, missed this remarkable example in Phocis, to which probably there was nothing to guide him. Another French writer, though not with a French name, M. Diehl, a member of the French School at Athens, published a paper upon it among the publications of his school, which we have not seen; our present authors give it high praise in regard

* "*The Monastery of St. Luke of Stiris, in Phocis, and the dependent Monastery of St. Nicholas in the Fields, near Skripou, in Boeotia.*" By Robert Weir Schultz and Sidney Howard Barsley, lately members of the British School at Athens. Published for the Committee of the School by Macmillan & Co. London: 1901.

to the author's analytical description] of the iconography, but as it contained no illustrations save the plan and a few outlines in the text, there was ample room for a fully illustrated monograph, and this the two ex-members of the British School at Athens have now furnished, and so completely as to leave little to be done after them.

The plan of the two churches, which we are enabled to give, presents a curious puzzle, in the apparently quite unreasonable distortion of the lines of the smaller church. The authors go into the explanation of this in a passage which is an interesting and clever piece of architectural reasoning.

The two plans, as will be seen, represent different but familiar types of Byzantine planning. The larger is the type with a broad low dome covering the central space and abutting against long piers; the smaller church represents the type in which a small dome raised on a high drum is supported on four pillars in the centre of floor; the dome, or rather cupola, rising high above the rest of the roofs. As these two types occur at the same periods, they do not in themselves afford any evidence as to which of the churches was first built, though the awkward manner in which the two are connected renders it extremely improbable that they were built together; and the fact that the north-eastern wall of the large church is out of parallel with the adjoining wall would in itself lead to the conclusion that the smaller church existed first, with a different orientation from that adopted for the larger one. After carefully examining the building at the junction of the two churches, however, the authors came to the conclusion, for reasons stated on p. 22 of their book and illustrated by an enlarged plan of the walls at this point, that though a church then existed on the site of the smaller one it was not the church now standing; but that after the building of the large church the smaller one, which may have become ruinous, was rebuilt, but for convenience sake the old foundations of the north and south walls were followed. At the same time the cross walls of the narthex and the east end, and the central piers, were set out on lines nearly parallel (and probably intended to be quite so) to the cross walls of the larger church, with the object of bringing the smaller one a little more into uniformity with the lines of the larger one. This reasoning seems the best explanation, and a tolerably probable one, of the curious obtuse angle formed by the longitudinal and the transverse lines of the small church. In the latter the cross would no doubt originally have been normal to the east and west axis line. The authors draw attention to the lines of an old foundation, shown by single lines outside the smaller plan (8 ft. 6 in. from the north-east angle of the church and 2 ft. from the south-east angle), as possibly indicating the original line of the east wall; but this would be as much out of right angle one way as the existing crosswalls are the other way; and we should be inclined to think that the existing line of the north and south walls is the same as that of the previous church; if the original lines were deviated from at all, the walls might as well have been brought in line with those of the large church. In the main, however, we have little doubt that the authors' reasoning is right, and that this small church is a rebuilding on the lines of a previous one, but with the line of the cross



walls altered to agree as far as possible with the large church. And if so, we may add the conclusion that this earlier small church was the actual church traditionally erected, as before mentioned, by the wish or command of the Saint himself.

The admirably drawn isometrical section, which authors and publisher have kindly

allowed us to reproduce from the original drawing, sufficiently illustrates the constructional system of the two churches (see lithographs); and the section and elevation give a general idea of the architectural treatment. As usual in Byzantine churches, the interior of the large church is encrusted with marble panelling and mosaics, though

it seems probable that these are not all of the date of the building itself. Among the numerous coloured drawings is one showing the marble pavement of the great church, in which the broader surfaces appear to consist largely of a warm-tinted yellowish marble, divided into large panels by borders of dark-green mottled marble, with lighter-

coloured borders in some places, of a grey tint. The narthex is similarly treated in large squares of the yellowish marble with mottled borders; but it is noteworthy that the square spaces of the porches in the two transepts are treated with a much more minute and elaborate design in marble inlay, of which a separate coloured drawing is given on a larger scale (plate 31). This is a design in which the main lines are formed by two concentric circles, a pattern of eight subordinate circles growing out of the centre one and filling the space between them. The actual centre is a circular panel of dark green surrounded by successive zig-zagged rings of yellow, red, white, and black; and the spandrels formed between the circles in the outer portion are all filled up with varied geometrical diapers. This pavement is quite a study in floor decoration, and the fact that these two rich pavements occur at the north and south transept entrances seems to indicate that these, and not the narthex entrance, were regarded as the most important and sacred approaches. The marble pavement of the small church is also shown, to a much larger scale than that of the great church, evidently on account of the minute elaboration of the borders; the general design is in parallelograms of the yellowish marble, like that used in the great church, with dividing panels of darker and more strongly coloured mottled marble; but these border panels have themselves borders, in minute and elaborate decorative patterns. A colour-printed section of the great church, looking east, shows the general scheme of colour in marbles and mosaics, and a section of a portion of the interior on a larger scale shows the character of the polychromatic design in a more effective and detailed manner than is possible on the smaller scale of the general section. These are very well done, and they must evidently represent an immense amount of careful and conscientious work in the preparation of the drawings.

The texture of the outer surface of the walls, as indicated in the drawings, is very picturesque in appearance, partly from its very irregularity of construction. The materials of the walls are blocks of marble removed from the site of the old city near the monastery, squared blocks of tufa stone, and very thin red bricks or tiles, with very thick mortar joints, the mortar joint usually as thick as the bricks it separates. "The south and east walls of the small church are treated in a much more elaborate manner than the walls of the great church. Here only a few of the large angle blocks are of marble, the remainder being smaller blocks of tufa stone. A fine system of surface decoration is carried out on these walls. Between the courses are lines of brick zig-zags, and between the blocks in each course is a small ornamental panel formed of bricks arranged in patterns, almost all of which are different." A peculiar method of obtaining patterns on the ends of the bricks is described and illustrated. The bricks are about $1\frac{1}{2}$ in. thick, the ends showing flush with the mortar; and the ends are cut into patterns by simply splaying away portions of the edge. When they were subsequently bedded in the mortar only the cut ends show, the splayed-off portions being buried in the mortar. Plate 11 in the book shows the curious variety of effects obtained by this means. Another peculiar source of effect

is from the thin marble slabs which fill the lower portions of the window openings. These are carved with animals, or with patterns in interlacing ornament, the slabs being in their full thickness only about $1\frac{1}{2}$ in., the sunk portions of the carving in many places leaving them only about $\frac{1}{2}$ in. thick, and through these thinner portions a good deal of light penetrates. There is a suggestion in this as to the effect which may be obtained by the use of semi-transparent thin marble slabs; a source of effect with which we have often thought that more might be done in modern buildings, where cost is no object. Some of the value of an illustrative work of this kind consists really in its suggestion of ideas which would be quite capable of being further worked out in modern architecture. Byzantine buildings are a store-house of suggestions in detail. In this respect we may notice the curious collection (plate 26) of capitals of smaller arcades and windows in the two churches; flat-shaped octagon shafts formed by cutting off the angles of a parallelogram, and capped with wedge-shaped cubical blocks expanded to a widely spreading abacus; these look like the *origines* of one form of decorative Byzantine capital, but without the carved ornament.

The window openings are partly filled (in the lower portion) with these semi-transparent slabs, four of which are seen in the west elevation in our plate; the middle portion is closed by shutters, those existing being of wood, but the authors are, we think, quite right in their conjecture that the shutters here were formerly of thin marble; the upper portions of the windows are marble plates pierced in various ways; sometimes merely with round openings equally spaced; in some cases the openings are connected by a surface ornament which unites them all into one design. This treatment is shown in the lithograph plate, reproduced from the original drawing, of the tympanum of the west doorway of the great church. In this case, as in some others, the circular openings are cusped. The authors, in their description of the windows of this type, say, "These were commonly made of a hard plaster cast in a mould"; but it is not quite apparent whether "these" refers to the cusplings only or to the whole window head.

The iconography of the great church is minutely described in the text, and accompanied by a key plan showing the position of all the figures referred to. Unfortunately, many of the mosaics are gone, and in some places their original position has been filled up with fresco paintings; but it is probably this partial destruction of the mosaics which has enabled the authors to trace out the method employed in fixing them. The foundation, they tell us, was a rough coat of plaster laid on the brickwork, roughened to receive a second coat of finer stuff, evidently of a quick-setting character. On this the subjects of the mosaics were sketched in tone with a brush, and the cubes pressed into this from the face, forcing up the stuff forming the matrix, so as to produce a key to hold the cubes. For the details as to the subjects we refer the reader to the book.

Appended to the volume is a short chapter describing the smaller church of St. Nicolas in the Fields (*τῶν καμίων*), near Skripou in Boeotia, which was a dependency of the monastery of St. Luke of Stiris. The plan,

though on a much smaller scale, is strikingly similar to that of the great church at Phocis except that there is no narthex, and was almost undoubtedly an imitation of it; but in section the drum of the dome is raised higher in proportion, and the cupola consists of a dome of semicircular section and plan fitted upon an externally octagonal drum. It is a well-proportioned church, and the interior column and capital, of which a large drawing is given, shows fine design and workmanship. While referring to this, we may mention also as among the most interesting illustrations of the volume, the large drawing on plate 21 of the capital of a pillar in the small church at Phocis. This, though showing the general outline and proportion characteristic of a Byzantine capital, retains more of the reminiscence of the Classic capital than is usual in late Byzantine work, only the angle volute resolved into the form of two thin and delicate spirals which nearly meet at the right angle of capital, but do not touch or merge into each other. This capital is one of the instances of what we have before remarked as to the suggestiveness of Byzantine details as a whole it is somewhat angular and harsh in composition, but it contains the foundation of a novel treatment of the materials of the Classic capital.

While the authors and publisher have very liberally allowed us to reproduce sufficient drawings to give the architectural structure of the church, these form only a very small portion of the mass of illustrations included in this volume, which may be said to be one of the finest architectural monographs produced in this country in late years, and brings before us full illustrations of what is in every respect a very remarkable and interesting ancient building, which, from its out-of-the-way position and comparatively few architectural students are likely to have the opportunity of examining for themselves.

ROMAN NOTES: 1902.

SUMMER-TIME in Rome is always a busy period for builders and those who have to do with the monumental part of the city. Each successive season the old palaces are being altered and modernised during the absence of their owners—native or foreign—as the case may be—and in some these alterations are of a certain importance in these latter days of artistic refinement and financial prosperity.

The beautiful little palace of the Farnesina, that gem of old Italian street architecture, usually ascribed to Peruzzi, is still in the hands of the restorers under the direction of the architect, Signor Gui. It would appear to be Government property, and, as a consequence, the work upon it is fitful and lengthy to an extreme. When finished, it will prove one of the most interesting of street designs. The neighbouring palace of the Cancellaria (belonging to the Pope), one of the grandest of all the Roman palaces, has a squalid, neglected appearance, but still it has no need of any substantial repair. The same may be said of the Palazzo Massino on the opposite side of the way, another of Baldassare Peruzzi's designs.

An interesting little house of the fourteenth century—the Palazzo Anguillara, in Trastevere—has recently been restored, and

is now being fitted up as a museum for that portion of the city. At first sight one is struck by the singular resemblance to the "Bargello" of Florence, although it is on a very much smaller scale. The same arcades, with octagonal columns, decorate the first floor of the interior courtyard—with the same sort of external staircase leading up to them. The whole forms an interesting sketch (of a restored kind) of Roman mediæval work, and will be an object to attract students of that period.

The interesting district of S. Martin di Monti has of late years been freed from the squalid accumulations of ruinous houses such as used to disfigure some parts of Rome, and the examples of mediæval towers which still serve to mark the position of the feudal strongholds whence the barons terrorised the city have been made more visible. A few other interesting remains of massive brickwork in the style of the ancient Romans, although of mediæval date (the local style of construction surviving throughout the ages, as was so often the case in former days) have been preserved in this once turbulent "Rione" or district of the "Monti."

A change is manifesting itself in the architectural development of modern Rome. At the time of the unification of Italy—in the seventies and eighties of the nineteenth century—the vast speculation of the banks and landlords resulted in the creation of the immense quarters filled with "blocks of flats"—or, as they are called in the more grandiloquent Italian, "Palazzi." Many of these quarters, such as the Esquilino or the Prati di Castello, are still filled with the unfinished blocks, now fallen to ruin and looking rather like ancient remains bearded with the usual long grass and weeds. In the last quarter of the nineteenth century the city was overbuilt with accommodation for a class of mercantile and bureaucratic employees which never reached those proportions expected and hoped for by the rash speculators. As a consequence the supply of houses far exceeded the demand, and the Government and public opinion had to intervene at this period of innumerable failures, and stem the tide of wild speculation and attendant disaster. Nowadays speculative buildings of a very different class are springing up. To meet the demands of an affluent class which is steadily increasing every year in Rome, the suburban properties outside several of the gates are being sub-divided into small villa lots, and the well-to-do residents—native and foreign—no longer content with the old-time style of living in the gloomy (and often very unhygienic) old palaces of the old noblesse, are flocking out into these new villa suburbs. In other words, Rome is becoming like most other cities in this respect, and the people are beginning to build their homes along the innumerable tram-lines which now stretch out into the Campagna. Thirty years ago such a system would have been impossible: at that time there was still a sense of insecurity outside the walls of the city. Little can be said for the artistic or architectural character of these modern villas, which are of a very different type from the gigantic piles which were known as the Roman villas in olden days. They are all in the inoffensive, uninteresting style associated with Italy during the nineteenth century, and for the present the *style nouveau* of Northern Europe, which is disfiguring so many towns of France and

Germany, and has even penetrated as far as Turin, is not yet noticeable.

The change in the manner of life of the Romans is associated with the formation of the new and splendid Museo Nazionale in the Baths of Diocletian. Here are being collected together the fragments of classical art unearthed during the past few years in the building of modern houses, and to them are added the small collections of individuals who, having pulled down the old villas for modern building estates, are at a loss where to house the ponderous marbles which used to be collected in such places in former times. Of these collections the most surprising is the splendid group of marbles from the Villa Ludovisi, and the recently unearthed decorated tomb with its contents found on the Farnese property, near the Ponte Molle. The Ludovisi marbles are equal in interest to anything of the kind in Rome, and their arrangement in the monotoned halls of a museum certainly is an advantage for students, who can now study them without the disturbing surroundings of faded splendour in a neglected private house.

The immense monument to Victor Emmanuel, which has been so many years in course of erection at the end of the Corso, still seems but half completed. The unreasonable delay in the work affords the little halfpenny journals of the city a constant theme for gibes upon the Ministry of Public Works. According to the latest reports in these sources of public information, it would appear that the colossal equestrian statue of the king, originally designed by the deceased Venetian sculptor Chiaradia, is to undergo serious modifications at the hands of another sculptor named Galli. These alterations are presumably due to certain changes in public taste in such things during the past quarter of a century. The new model is to be completed within two years and a half—a sufficiently liberal allowance of time for an entirely new design, one would suppose. At present the remains of the Palazzo Torlonia, on one side of the Piazza Venezia, are being cleared away, and a portion of the Palazzo Venezia, on the opposite side of the new square, in front of the huge monument, will shortly share the same fate.

It is difficult, if not impossible, to criticise this tremendous national effort to perpetuate the memory of a great revolution in its present state. In one respect it represents the period which it is intended to commemorate. It was designed without any consideration for academic precedents, and the detail is evidently intended to be original and "emancipated." But like most efforts of the kind the result is unsatisfactory—more especially as there is a want of that imagination which sometimes makes such efforts interesting. The decorations are merely commonplace, and the jumbling up of the "Orders" in the same story produces a meretricious appearance. The general effect of the monument with the long straight Corso in front of it will be a splendid example of the "vista" treatment of city streets, and a striking addition to the large number of such streets already existing in Rome. At night time these long new streets in every direction, lit up with innumerable lights, have a particularly surprising effect, and serve more than anything else to remind the visitor of the vast alterations which have taken place in the famous old

city since the disappearance of the temporal power of the Popes.

The Roman antiquities of the classical age and the recent excavations conducted by the Ministry of Public Instruction are so much commented upon in other English journals that we need hardly refer to them. One monument of this period is exciting some local interest at present. The so-called Theatre of Marcellus, an interesting fragment of the Imperial age, has been cut up into squalid houses and shops ages ago, and, as there is some popular demand for its conversion into a national monument, the private owners of the property are desirous of making as much profit out of it as possible, and for that purpose are offering it for sale by auction. The Government will, of course, intervene, and those who purchase such a property will do so with the obligation to conform to the rigorous new law of June 12 last, which deals with such matters.

The condition of the Tiber is a matter which is again exercising the minds of the Government and the public. It is singular that this river should have sunk into a condition of such uselessness since ancient times. Twenty centuries ago Rome owed much of its greatness to being a secure and inland seaport. At the present day the ruined wharves are incapable of accommodating more than a few fishing vessels, which manage to ascend the stream in spite of the constantly shifting sandbanks. This choking of the river and destruction of once flourishing industries has been more especially noticeable during the last few years, in spite of efforts to avert the evil, and the embanking of the river within the city boundary seems rather to have increased it than otherwise. Fifty years ago it was still possible to transport the immense monolithic columns used in rebuilding St. Paul's outside the Walls by water carriage to Rome, and about that time also the great Prince Torlonia was enabled, by means of the Tiber and its confluent, the Aniene, to transport the marbles and obelisks from Egypt which adorn his villa at Sacco Pastore. Nowadays the fishing vessels can hardly reckon on more than a metre of water in summer time, and in a few more years even this trifling navigation will be abandoned, unless the Government makes a serious effort to restore the river.

NOTES.

GENERAL political changes do not come within the province of this journal, but two of the recent alterations in the Administration are noteworthy. Lord Windsor has succeeded Mr. Akers-Douglas at the Office of Works. The new First Commissioner, being the owner of a large property and interested to some extent in the fine arts, is more likely to take a broad and liberal view of his work than a gentleman who had been simply and solely a capable party official. Lord Windsor, too, comes to the post not jaded by Parliamentary work, and with a fresh mind. The other appointment to be noted is that of Mr. Austen Chamberlain to be Postmaster-General. The Post Office frequently is unreasonably blamed for trifling faults, which can hardly be avoided in a Department concerned with so many details. The really weak place in the management of the Post Office is a dislike to large changes, and an incapacity to recognise the needs of men of business. Mr. Austen Chamberlain

possesses a good deal of his father's vigour, and it may be hoped that he will impress on the permanent officials the necessity of being up to date.

Technical Education Expenditure. THE recent Parliamentary return showing the amount spent on technical education by Local Authorities in England and Wales is of more than usual interest in view of the legislation which is now pending. In round numbers the total amount expended on technical education in England, and exclusive of the sums allocated to intermediate and technical education under the Welsh Intermediate Education Act, 1889, was something over one million. This amount is no doubt insufficient for a country such as England, but it may certainly be doubted whether full value has been obtained for this comparatively moderate sum. It is important to note that the sum of sixty thousand pounds odd, a portion of the amount which forms the residue received under the Local Taxation Act (Customs and Excise), was appropriated to the relief of the rates. Under the Bill before Parliament, Local Authorities will in future be obliged to spend the whole sum received under this Act on technical education, so that, apart from the rates, the substantial sum of 60,000*l.* can at once be devoted to education. The fact that only twenty-eight Local Authorities raise sums by loan on the security of the local rate under the Technical Instruction Act, shows, we fear, that there is considerable indifference and apathy on the part of ratepayers in regard to technical education, especially as only twenty-eight Local Authorities are devoting funds to technical education out of the rate levied under the Public Libraries and Museums Acts. It is pretty clear, therefore, that not only is more technical education needed in this country, but that the general public will also have to be educated as to the need for a good system of technical instruction before Local Authorities, whether in towns or counties, will venture to spend much money from the rates on this subject.

Workmen's Compensation. THE conundrums furnished by the Workmen's Compensation Act are gradually being solved by the courts. The case of the Great Northern Railway Company *v.* Whitehead is the second decision which has been given on Section 6 of the Act. The first decision, *Long v. Great Northern Railway*, decided that if a workman recovered compensation from his employer he could not under Section 6 pursue any other legal right against another person for damages arising out of the same matter; the present case shows that if compensation is recovered from an employer under circumstances which create a legal liability in some other person the employer "shall be entitled to be indemnified by the said other person." The Great Northern Railway Company had been compelled to pay compensation to one of their employees, but they alleged the accident to have been caused by the negligence of the defendants in unloading a van, and, on proof of such negligence, were held entitled to recover from the defendants not only the compensation they had been compelled to pay, but also, as the words of the Act are "to be indemnified," the taxed

costs they had incurred in the arbitration in which the compensation had been assessed. There is one hard case under the Act on the point of indemnity. Under Section 4 an undertaker who employs a contractor can be sued direct by one of the contractor's workmen either for compensation under the Act or for damages outside the Act, and they are liable to pay such compensation as "would be so payable if such contractor were an employer to whom this Act applies." But under the proviso in the section which gives them the right to be indemnified in respect of sums so paid "by any other person who would have been liable independently of this section," they can only recover in case the contractor has been negligent and so caused the accident, or it he is an undertaker within the Act. If by some technicality the contractor does not answer this description, the person employing the contractor has no claim for indemnity, but has to bear the expense of the compensation and costs. (See Cooper and Crane *v.* Wright.)

Uniformity in Structural Steel. At a recent meeting of the International Association for Testing Materials, held at Atlantic City, U.S.A., a discussion was raised on the question whether a uniform quality of steel might advantageously be adopted in ordinary constructional work. Although mild steel, having an ultimate resistance not exceeding about 30 or 32 tons per square inch, is very largely employed by engineers, specifications frequently prescribe metal of higher resistance, and there is considerable diversity of opinion as to the precise qualities to be exhibited by what is generically described as "mild" steel. The subject is an interesting one, for complete standardisation can only be attained by uniformity of quality as well as of rolled sections. Of course, distinctive qualities of metal will always be required for rivets and pins, and for special members of a structure, but a great point would be gained if engineers could agree to adopt a standard grade for every-day purposes. At the meeting to which we refer, the general consensus of opinion appeared to be that a single quality would answer for all ordinary structures such as bridges or buildings, though it must probably be assumed that a softer metal would be demanded for rivets and pins. Architects very seldom give trouble with regard to the exact constitution of steel required, but some engineers are apt to cause much avoidable inconvenience to manufacturers, and consequent delays, by the insertion of needlessly stringent stipulations in their specifications.

Refuse Clinker Concrete. THE modern refuse destructor places at the disposal of architects and contractors a useful conglomerate for the making of concrete and mortar, and we learn that this material has been largely employed in connexion with the general work of the St. Pancras Borough Council for the past six or seven years. On being subsequently opened up the concrete has been found to attain extreme hardness and toughness, and according to experiments conducted in the year 1896 by Messrs. Kirkaldy & Son, it appears to possess greater crushing strength than concrete made with Thames ballast. One noteworthy

fact demonstrated by the tests in question is that the clinker can be satisfactorily used as taken from the furnace mouth, containing all classes of material and dust, but after large metal tins have been picked out. Although concrete of this description can hardly be so impervious as concrete made with ballast, it is quite suitable for foundations, and for enclosing drains or other conduits, where strength is the first consideration. In cases where the concrete is required to be in thinner layers and of finer quality, as in fire-resisting floors, the clinker should be used after crushing and sifting. In this form the material is also excellently adapted for making lime or cement mortars. The Borough Engineer of St. Pancras and several of the District Surveyors have expressed complete satisfaction with concrete and mortar mixed with clinker, and the staff of the Health Department are instructed to approve the use of clinker in the concrete required for embedding all new drains. Every facility is afforded by the Council for the supply of clinker in any desired condition, and arrangements have been made for the supply of lime mortar, ready for use, from the destructor works. The utilisation of all by-products from establishments of the kind is, of course, a matter of importance to Municipal Authorities, and it is to be presumed that no difficulty will be encountered in obtaining supplies of the material in any district where a refuse destructor is in operation.

A Steel-faced Dam. THE largest steel-faced reservoir dam yet built was completed last year at Victor Colorado, U.S.A. This dam is 405 ft. in length at the top, 220 ft. in length at the base, 148 ft. in cross section at the base, and 20 ft. at the top, and from the bed rock to the level of the spillway its height is 70 ft. The steel facing-plate rests against a wall of heavy granite boulders laid dry, the blocks measuring from 20 to 80 cubic feet each, with loose granite filling in the interstices. The steel face was built up of plates measuring 15 ft. wide by 5 ft. high by $\frac{1}{2}$ in. thick for the first eight courses, being then reduced to $\frac{3}{8}$ in. and finally to $\frac{1}{4}$ in. in thickness. The plates are riveted up to form a single sheet by means of horizontal butt straps and vertical angle bars, while the bottom and ends are finished with two pairs of angle bars riveted through the plates, and the entire facing is concreted into channels cut in solid rock. A space 6 in. in width was left between the metal and the granite wall to permit a filling of sand, gravel and sedimentary deposit to be applied. This filling was allowed to become thoroughly dry before the admission of water to the reservoir, and the riveted joints were all carefully caulked after the manner adopted in boiler making. The reservoir, which was formed in connexion with a water power undertaking, has an area of about 130 acres, and a capacity of more than 100 million cubic feet of water. In this case the steel facing merely takes the place of the clay puddle wall familiar in this country, while all pressure is resisted by the granite structure.

A Proposed Bridge Across the Strand. THE Works Committee of the Westminster City Council have under their consideration a scheme which has been framed by Sir John

Wolfe Barry, an Alderman of the Council, for building a bridge across the Strand. Sir John Barry proposes to relieve the congestion and conflict of traffic at the crossing with Wellington-street by means of an iron bridge, having one span where it crosses the Strand, for carrying traffic from the north and south along easy gradients to begin at Tavistock-street and the northern abutment of Waterloo Bridge respectively. The block plan amongst the drawings shows that the projected bridge and its approaches would extend along the west side of Wellington-street, taking in the site of the auditorium of the Lyceum Theatre and the east side of Savoy-street, which has a steep gradient-rate. The scheme is one of several which its author has propounded from time to time, including bridges or subways at Oxford-street (Tottenham Court-road), Ludgate-circus, Piccadilly-circus, and Hyde Park-corner.

KEW GARDENS.

A DEPARTMENTAL Committee will shortly be appointed for carrying out the details of the transfer of Kew Gardens from the Office of Works to the Board of Agriculture. The Botanical Gardens have their origin, in respect of their present uses, in the 11 acres which in 1840 were committed to the management and control of the Woods and Forests Department, with Sir W. Jackson Hooker as their director. That garden of but 11 acres owed its scientific character to the care of Augusta, widow of Frederick, Prince of Wales, who employed Sir Joseph Banks in their improvement, and engaged as gardeners John Haverfield and William Aiton. Aiton had been a pupil in the Physic Garden at Chelsea. Kew House—also known as the White House, and afterwards as the Old Palace, and pulled down in 1803—had been leased to her husband; George III. bought the freehold from the Capels in 1781. Evelyn records some visits he paid there to Sir Henry Capel, citing the orangery and myrtilum, with the carefully tended fruit trees. For example, on August 27, 1678, he dines "at Mr. Hen. Brouncker's, at the Abbey of Sheen," the Carthusian monastery of Jesus of Bethlehem, founded, together with St. Bridget's nunnery at Lion on the opposite side of the river, by Henry IV. in expiation for Richard II.'s deposition and death, and now the site of the Observatory built in Old Deer Park, Richmond, by George III. for facilitating observations of the transit of Venus on June 3, 1769, and designed by Sir William Chambers. After dinner Evelyn walks to Ham to see the Duke of Lauderdale's house and gardens:—

"Hence I went to my worthy friend Sir Henry Capel (at Kew), brother to the Earl of Essex; it is an old timber house, but his garden has the choicest fruit of any plantation in England, as he is the most industrious and understanding in it."

Sir Henry, Lord Lieutenant of Ireland, and created (1692) Baron Capel of Tewkesbury died s.p. in 1696; at his widow Dorothy's death Kew House passed, 1721, to Lady Elizabeth Capel, daughter of the second Earl of Essex, who in 1717 had married Samuel Molyneux, astronomer and politician, and secretary to George II. before his accession. Kent, who enlarged the Palace in 1731, and Sir Adam Smith, and Lancelot Brown after them, planned the pleasure-grounds, which were further improved in 1757-62 for Princess Augusta, by Sir William Chambers, who designed the old Orangery (since a museum or ligneous specimens), several temples, the mosque, pagoda, Alhambra, Gallery of Antiques, and the Palladian bridge to the island in the lake, which are described and illustrated in his "Treatise on Civil Architecture," fol., 1759, and his "Plans, Elevations, Sections, and Perspective Views of the Gardens and Buildings at Kew," fol., 1765. Goupy designed the Temple of Confucius, and Kent the adjacent semi-octagonal seat, Sir Jeffrey Wyattville the Doric "Pantheon," Decimus Burton the Great Palm and Winter Garden Houses, and the entrance-gates, Kew Green; Sir James Fergusson was honorary architect of the gallery erected in 1880-2, during the

directorship of Sir J. D. Hooker, for the valuable collection of botanical paintings made from Nature in the tropics and other parts of the world by Miss Marianne North, who generously presented them, together with the building, to the nation. Within the past three or four years a north wing has been added to the Temperate House—by Burton in 1860—and the Herbarium has been enlarged. The Palace, which in January, 1808, Queen Victoria ordered to be opened as a public museum appertaining to the Gardens, is the "Queen's Lodge" familiar to the readers of Mme. D'Arbly's diary. Formerly known as the "Dutch House," of which Queen Charlotte bought the fee-simple, it was built temp. James I. on the site of the "Dairie House" by Sir Hugh Portman, a trader to Holland, who is mentioned in the Sydney Papers, 1595, as "the rich gentleman that was knighted by her Majesty at Kew." On the lawn in front stands a sundial, set there by William IV. to mark the site of Kew House, and bearing an inscription to commemorate the astronomical observations conducted in 1723-7 by Molyneux and James Bradley in the observatory which the former had fitted up at the house. Bradley's observations of γ Draconis, continued by him at Wanstead, led to his two great discoveries—the aberration of light and the nutation of the axis of the earth. At Kew they resumed Hooke's attempts to determine stellar annual parallax, using a zenith-sector of 24 ft. radius, with a small arc, and showing single seconds by a vernier supplied by Graham.

The grounds, about 15 acres, belonging to the "Queen's Cottage," and affording, in their free and unspoiled woodland, the sanctuary and home of a great variety of birds that are very rarely to be seen near London, were opened in the spring of 1890. The cottage, thatched, and covered with ivy and other creeping plants, contains four rooms and a china-closet, with diamond-paned windows, and is said to have been built as a tea-house for King George III. and Queen Charlotte.

Kew Gardens, where William Cobbett asked for and obtained employment as a gardener's boy when he first came to London from his home at Farnham, now extend over an aggregate of 297 acres, the public were first admitted on certain days in 1819, but fifty years before that time a collector of plants had been sent to the Cape of Good Hope, and similar expeditions were subsequently made to other countries.

It is supposed that the five large round metal-bronze medallions removed four years ago from a house belonging to the Crown on Kew Green are relics from the Palace. The medallions, nearly 3 ft. in diameter, and executed in high relief, represent occurrences, treated in the heroic or monumental style, in the career of Louis XIV. They are described in the *Athenæum* of July 30, 1898, by Lady Dilke, who surmises that they belonged to a series of thirty-six ordered for the decoration of four groups of columns at the corners of the Place des Victoires, in Paris, where stood the bronze statue of that Sovereign raised by the Duc de la Feuillade and destroyed in 1795. On the pedestal of the statue, now replaced with one of Louis XIV. by Bosio, were six similar alto-reliefs sculptured by Desjardins, which are preserved in the Louvre, having been rescued by Caffieri, some of whose decorative work in bronze is included in George IV.'s collections at Buckingham Palace and Windsor. Lady Dilke cites Père Menestrier's volume on the medals of the reign of Louis le Grand (Paris, 1695), containing a "Veuve de la Place des Victoires, 1685," and a list of the inscriptions on the thirty-six medallions; the list includes the subjects of the five Kew medallions.

King George III.'s Collection, now at the British Museum, contains many plans, views, and drawings of the grounds and buildings we mention. Amongst them are a large-scale plan, drawn in 1771 by Peter Burrell, H.M.'s Surveyor-General; Jean Rocque's rare surveys of 1734 and 1748, with elevations of the King's Palace, Kew House, and the Dairy House; aqua-tints (1798) of the White House, &c., after F. J. Manskirsch; a view (1776) by P. Sandby, R.A., of the Prince's House; and W. Woollett's set of fine prints of White (Kew) House and the lake, with the great swan. The Palace that was erected in 1802-11 for George III. by James Wyatt, who carried out some extensive repairs at Kew House, was not completed, and was ultimately demolished in 1827-8. It was constructed mainly of cast iron

after an invention patented by Wyatt, at a cost of some 500,000*l.*, and of 500*l.* yearly for current repair.

COMPETITIONS.

MARKET HALL AND SHOPS, OLDHAM.—In the recent competition for new market hall and shops, Oldham, the design of Messrs. Leeming & Leeming, Victoria House, 117, Victoria-street, Westminster, S.W., has been placed first. The second premiated design was by Messrs. Winder & Taylor, Union-street, Oldham; and the third by Messrs. A. Neill & Son, 38, Park-row, Leeds.

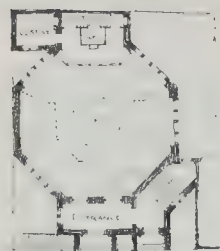
BATHS, OLDHAM.—The first premiated design in the competition for public baths, &c., Oldham, was that sent in by Messrs. A. R. Groome & Grant, 2, St. Peter's-square, Manchester. The design placed second was by Messrs. A. R. Groome & Grant, 2, St. Peter's-square, Manchester; and the third premiated design was sent in by Messrs. H. Cheetham & Barlow, Union-street, Oldham.

CREWE MUNICIPAL BUILDINGS.—Forty-four sets of designs have been submitted by architects in competition for the Crewe Municipal Buildings. The Corporation have appointed Messrs. Woodhouse & Willoughby, of Manchester (Fellows of the Institute of Architects), their professional advisers to adjudicate and report upon the designs.

SCULPTURAL WORK, CARDIFF NEW TOWN HALL.—The Cardiff Town Hall Committee had before them on the 5th inst. the report of Mr. Goscombe John, A.R.A., Mr. Lancaster, and Mr. Rickards on the competitive sculptural designs intended for the new Town Hall and Law Courts. Fourteen designs had been received, and these were exhibited to the members at the Town Hall. Five groups had to be selected—four large and one small—and the expenditure on the four large groups will, it is stated, be 1,000*l.* each. Designs Nos. 14, 13, 1, 9, and 6 were selected by the assessors as suitable for the large designs, and No. 7 for the east front. Out of the first five four will have to be chosen, and the final selection was left to the assessors. The names of the sculptors whose designs have been selected for the final competition are:—No. 14, Mr. Paul R. Monford, 26, Larkhall-rise, Clapham, S.W.; No. 13, Mr. Paul R. Monford, 26, Larkhall-rise, Clapham, S.W.; No. 1, Mr. Henry Poole, 4, Wentworth Studios, Chelsea; No. 9, Mr. David M'Gill, 7, Camden Studios, Camden-street, London, N.W.; No. 6, Mr. Alfred Turner, 2, Stratford Studios, Kensington, W.; No. 7, Mr. Albert H. Hodge, 7, St. Paul's Studios, Talgarth-road, West Kensington, London. The figures when executed will be from 8 ft. to 9 ft. high. The successful designs will be exhibited to the public.

BUILDING SCHEMES, NEWCASTLE.—Several building schemes for Percy-street and North Jesmond have been considered by the Newcastle Town Improvement Committee. The Percy-street rebuilding scheme is being proposed by Mr. Handyside, who has acquired for the purpose the sites, 37 to 55, Percy-street, covering about two acres of ground. He proposes to erect a double-alcove arcade, to be entered from Leazes-lane, and opening out into Percy-street, with shops on each side, making four rows of shops in the arcade, and a row of shops on either hand of the entrances in Percy-street, as well as in Leazes-lane. Altogether there will be ninety-two shops included in the scheme, which was broadly approved of. Plans have been presented by Mr. C. W. Mitchell for the erection of a large number of dwellings near Jesmond Towers, with a frontage into Osborne-road, and also into Jesmond Dene-road. The property will consist mainly of villas and semi-detached villas. The site comprises 1½ acres. The general plan is for four blocks of villas, and the main avenues through will be named Mitchell-avenue and Tower-avenue.

POST OFFICE, PLYMOUTH.—The new Plymouth Post Office in Guildhall-square will be externally of Portland stone with granite base. The whole building, when completed, will cover an area of 16,206 sq. ft. The present instrument room, situated in the second story, will be divided into departmental offices, whilst the new instrument room, to be in the second story of the new section, will cover an area of 2,900 sq. ft. The sorting office will also be enlarged to the extent of 3,600 sq. ft. The present portion of the building was erected in 1885, and the part now being built is by Messrs. Laphorne & Co., contractors, of Plymouth, whilst Mr. K. G. Saunders is clerk of the works, and Mr. W. J. Laphorne foreman of the works. The architect is Mr. W. T. Oldrieve, of H.M. Office of Works.



KINGSGATE CHAPEL: HOLBORN.
ARTHUR KEEN ARCHITECT

KINGSGATE CHAPEL.

THIS chapel is being rebuilt for the second time, and it will be used in the future in connexion with the Baptist Church House, which it adjoins, and with which it will be connected at the ground floor and gallery levels.

The octagonal plan was adopted because there are existing buildings along one side of the site which would otherwise have made it impossible to get light and ventilation under the gallery.

There is a good schoolroom with a classroom, &c., in the basement. The ceiling of the chapel starts as a spherical dome running out into the corners of the octagon and finished with a circular cornice above which a ceiling of umbrella form is carried up to the central lantern. Oak and plaster are being used for the interior work. The exterior is in red hand-made bricks, with Portland stone dressings and a tile roof.

The contractors are Messrs. Higgs & Hill, and the architect Mr. Arthur Keen.

UNDERGROUND CONVENIENCES.*

IN view of the prevailing tendency to provide more sanitary conveniences for the public of either sex, a paper embodying the notes and ideas of one who has had the opportunity of constructing five in a busy and progressive

* A paper read by Mr. J. Rush Dixon, A.M. Inst. C.E., Engineer and Surveyor to the Metropolitan Borough of Shoreditch, before the Incorporated Association of Municipal and County Engineers, at the annual meeting, held at Bristol, July 10, 11, 12, 1902.

district of the Metropolis may interest some of the members of this Association.

It will be generally admitted that these underground structures are a great sanitary acquisition and improvement over the older-fashioned wood or cast-iron above-ground kiosks, which are more or less unbecoming, and are such an obstruction in busy thoroughfares, besides having proved to be favourite resorts of pickpockets, when not under the immediate surveillance of an attendant. The proportionate requirements of the female sex were hardly recognised hitherto, as evidenced by their reluctance when provision was first made for them, but which has now given way to the appreciable usage that the women's sections are now almost as largely patronised as the portions arranged for men.

Site and Arrangement.

The sites chosen for these structures are naturally those where there is abundance of pedestrian traffic, and, more often than not, the shape of the space allotted requires considerable ingenuity in planning, to get the most out of it with a satisfactory arrangement of the sections.

Referring more particularly to conveniences in busy thoroughfares, the shape is generally either triangular with rounded corners, or oblong, and the latter may be regarded as the best, allowing as it does of a better placing of entrances, of straight staircases, and of a general squareness of arrangement below. Well-arranged conveniences have also been built in the form of a full circle.

The shape of some conveniences is commented upon rather freely by those who know that the difficulties one has to contend with, when instructed to provide a convenience of stated accommodation on a given site, but it is soon explained on looking into the circumstances.

As an instance of the difficulties so often in the way of ideal planning, the case of one convenience in Shoreditch may be quoted, where in scheming the arrangement of the triangular structure, the author was confronted on two sides close up by double tram-lines, which could not be diverted, and on the other side with close abutment on a large egg-shaped sewer, whose invert was very little below the floor level of the convenience. The roof of this convenience had also to form a suitable refuge in view of the place being recognised as a dangerous crossing. Such stricture on every side is not, however, usual, and by under-cutting on one or more sides, the plan at the floor level can often be very much improved.

Up to the present, conveniences have been arranged to include in the men's section urinals, water-closets, lavatories, and dressing-rooms, with attendant's office and storerooms, the latter usually occupying the space under the stairs.

To the women's section a rather less area is allotted, but it also comprises urinets, water-closets, lavatories, and dressing-rooms, with office and stores as before. It is important that the placing of these should allow of easy and direct access, and that the doors open conveniently into a roomy space to avoid collisions or crowding together.

Constructional Notes.

It may be useful to remind you of the following general particulars of construction. A concrete foundation at least 12 in. deep to be provided under footings of walls and over whole floor area, and a backing of concrete not less than 6 in. thick all round outer walls. The main walls 18 in. thick built in cement with internal facing of glazed brick, and, for ornamentation, having a dado of different coloured bricks or of marble, and a suitable flat frieze or coloured courses of bricks under roof. All corners and angles of floors and walls should be rounded. The roofing formed of pavement lights in small rectangular lenses in frames, any required circular or angle shapes being specially cast. The pavement light frames set into rebated stone or granite kerbing which is carried on girders divided up by cross joisting as necessary. The whole roof fixed to arranged falls for throwing off water.

As a guide in ordinary cases, the sizes used by the author may be given as follows: granite kerbing, 8 in. by 6 in.; main steel girders, 8 in. by 4 in., weighing 26 lbs. per foot; cross joisting, 8 in. by 4 in., weighing 19 lbs. per foot; beaded lenses, 4 in. by 3 in. There should be no steps to compartments inside the conven-

ience, excepting to the attendant's office and lavatories, which usually have wood block floors, and are slightly raised above the general level. The rest of the flooring should be enameled tiled with borders. All woodwork should be of teak, and be kept off floor-level by means of stone or glazed brickwork shoes or blocks, so that the washing out with hose may not affect the woodwork.

Staircases.—The placing of the stairways is one of the most important features of a well-planned convenience, and has much to do with the attainment of proper ventilation of the interior. Where possible, two staircases should be provided and used as entrance and exit, especially in the men's portion, where the urinal accommodation is so constantly patronised. Winding steps should be avoided where possible. The stairway to the women's portion should, of course, be placed in the least observed position. To avoid any crossing over carriage-way, it is a good plan to have the stairways on footways with subways leading from them under the carriage-way to the convenience. By constant use the stair treads soon become worn, and it is then advisable to fix some immovable and non-slipping patent coverings, which serve their purpose admirably. A sunk gutter with white glazed channel or gutter, covered at floor level by a movable grating, should be provided at the foot of stairs, to arrest the water which gathers on and runs down the purposely tilted steps.

The railings guarding stair spaces are usually of an ornamental character about 4 ft. 6 in. high with the lower portion more closely arranged to act as a screen. To supplement this, and to prevent mud splashing on persons, it is also necessary to fix solid screens of enamelled iron or glass inside the more exposed portions of the railed-in space. A pleasing and effective screen is also procurable by an arrangement of shrubs in boxes placed near the entrances.

For locking up at night, gates are provided at the top and bottom of stairs. At the top they are hung to open and catch back on the side of the railing, and at the bottom they may take the form of a sliding door or collapsible iron framework of the Bostwick pattern, arranged to shut back into a recess formed in the brickwork. An ornamental grille can be fixed over gates at bottom if necessary to fill in space overhead.

Office.—The attendant's office should be placed so as to command a clear and uninterrupted view of the stairways, as well as of all the doors of compartments. In some conveniences one finds the attendant's office and lavatory are combined in one cubicle in the centre. This may be economy of space, but allows of too little privacy, and is a mistake, as is also the idea of having the attendant's office and storeroom in one, in what may seem an available space under a staircase, being as a rule too limited for the office and not the best position for supervision.

Water-closets.—The water-closet compartments should be wide enough to admit of usage by stout persons, and long enough to give room for doors to open inwards and leave sufficient space in front of seat. The divisions are usually of marble, about 1½ in. thick and 7 ft. high, surmounted by a teak capping, but they could, of course, be of slate at less cost; whereas 4½ in. glazed brickwork partitions take up so much more room.

Urinals.—The urinals are set against walls in straight ranges, or can be full hexagon, half-hexagon or angle-shaped to suit required position. They should be so formed as to allow a person to stand well up into them without risk of splashing back on his legs or feet. Those generally favoured have circular glazed ware backs and bases in one piece with slate shaped treads, and with as few joints as possible. They empty into a gutter having galvanised grating over. The front, jambs, and tops may be of porcelain, stone-ware, slate or marble. They are flushed by a water-spray or sparge from the top falling all round and supplied from automatic siphon action 10-gallon cisterns, which should have reverse-action regulating supply-valve.

Urinets.—Latterly some attention has been given to providing a specially-formed fitting to be used for this purpose at a reduced charge in the women's section, instead of having to pay the full charge for use of water-closet. At Shoreditch the provision seems to be greatly appreciated. The compartments have a spring waterproof curtain as a front screen.

Lavatories.—These are conveniently arranged with the required number of basins, generally in some approved "tip-up" form, set in a marble top, with sufficient elbow-room between each, and having soap and nail-brush trays, small shelf over, and large mirror. Hot and cold water supply to each basin, the hot water being supplied from a geyser heated by gas. It is better to have one large dressing table with large mirror in front than smaller ones in different positions.

Fittings generally.—Of the multitudes of special requisites and fittings supplied by well-known sanitary engineering firms, the author need give no description in this paper, but to anyone interested, the excellent catalogues so readily presented are well worthy of perusal. Every detail has been well studied by these experts, and to entrust the complete work to some of them is to ensure the provision of a convenience in every way creditable to the authority for which it is constructed, and to the firm undertaking the job. The plumbing work in many conveniences in London is a fine object-lesson to those seeking examples of perfect workmanship of that description.

Flat decorations should be used to the greatest possible extent in the nature of glazed coloured brick or tiled dados and friezes. Where possible, painting should be avoided, as it soon becomes badly affected by the damp and peculiarly destructive agents always present in the atmosphere of these places. For this reason, where it is possible, all girder work should be encased or tiled outside to prevent the inevitable unsightly rust-stained appearance and peeling off where painted iron or steel work is exposed. It is quite enough to have to be constantly repainting the underside of the framing of pavement lights, particularly as—so far as the author is aware—no satisfactory cement has yet been introduced that will provide an impervious bedding for the frames of lights on the stone or granite kerbs into which they are set. Many compositions have been tried, but the unequal contraction is very noticeable when rain has to be kept out.

Drainage.—It seems hardly necessary in this paper to particularise on the drainage, as the opportunity is generally taken to make full use of such chance for a model system. It may, however, be useful to remind you that it is advisable to collect all the lavatory wastes and surface gullies into one branch before coming into contact with the water-closet and urinal drains. It is no advantage to have many chambers, but there should be easy means of access through the drains to every fitting, and to avoid short branches to the main drain from the outgo of each water-closet pan, it answers well to place this drain in line directly under the pans. A convenient means of ventilating the chambers is by connexion to base of specially perforated guard-posts on the refuge overhead.

Where there may be possibility of sewer-flooding in case of storm, it is advisable to supplement the precautionary valve arrangements by having some automatic means of warning the attendants that a back-flow from sewer is taking place. In one of the Islington conveniences a warning bell is automatically set ringing during such emergency, and the attendant can immediately manipulate the stop flaps and avert danger, while the drainage is diverted into a large storage tank until the sewer can be depended upon in the ordinary way.

Storage Tanks for Water.—Capacious storage tanks under the roof or under the floor should also be provided where there may be any possibility of failure or even temporary stoppage of the regular water supply.

Lighting.

The necessity of having these places well lighted, makes it essential that all the available area of roof should be formed of prism lights and reflectors, seeing that all sunlight must come by such means, and has so, indirectly, to reach any portion that has been cut under the roadway. The staircases, too, must be thoroughly well lighted at all times. Electric light has proved the greatest boon as an additional means of lighting, but gas must, of course, be used as an alternative, and with incandescent burners a really capital effect is obtained; but there is some attendant heat and the fumes to contend with, and the prevailing difficulty of obtaining complete ventilation by natural means is thereby proportionately increased.

Ventilation.

In the author's opinion, a perfectly ventilated convenience is something which has yet to be attained. Their position underground accounts principally for this, of course, and the condition is not assisted by the ever-varying humours of our climate. A humid outside atmosphere has such an effect inside many of the conveniences in London that they become positively offensive, and no amount of swilling out with scented deodorants can keep down the bad smell.

The usual methods of inducing a constant current are by arranging for wall openings to be left where possible all round the interior just under the roof, which space is continued in the form of a grated duct to communicate with the surface above. Given a proper disposition of the stairways, this arrangement is about the best that has yet been devised. Fair results are in some cases got by ventilating columns with large perforated bases being placed on the roof. Automatic water-driven fans are also largely used, and these certainly displace the air surrounding them and assist in establishing a current. The water is further utilised by connexion to flushing cisterns.

Administration.

On the outside above, the sections are easily made discernible by legible tablets fixed to the railings. Some prefer the plain words "Men only," or "Women only," instead of "Gentlemen only," or "Ladies only," as more frequently seen. Inside of course the provision of plain clear names on the different compartments, and the placing of the scale of charges in a prominent position, is essential. A speaking tube should connect the offices of the men and women attendants, so as to afford communication when necessary. The cleaning and washing devolves on the attendants, and is mostly done by means of a hose attached to the tap which is provided in each portion, the hose being of sufficient length to reach every part of the interior, as well as up the staircases.

There are different systems in vogue of collecting the fees: some favour the penny-in-the-slot lock-up doors, others use tickets and bell-punches, as in Shoreditch, where a special man is employed to generally supervise the attendants and to make a periodical collection of the moneys taken.

The charges vary in different places. In the better-class districts of the Metropolis they are usually: For use of water-closet, 1d.; wash and brush up, 2d.; dressing-room, 6d.; urinal free. In the poorer districts the charge is reduced to 1d. for wash and brush up. In all cases a clean towel is allowed for each person. Where urinettes are provided in women's section, the charge for use is 3d. In most districts the attendants are authorised to allow free use of water-closet to obviously poor persons who express inability to pay, and one of the compartments is specially set aside for this.

The Shoreditch conveniences are open from 6 a.m. till 12 midnight on each week-day, and from 7 a.m. till 11 p.m. on Sundays. Bank holidays as Sundays. The time is divided into two shifts for the attendants, whose wages are for men 27s., and for women 18s. per week of six days. For Sunday and holiday duty the extra men receive 4s. 6d. and the women 3s. per day.

Cost.

The actual cost of the conveniences at Shoreditch was:—

For No. 1 (opposite Shoreditch Church) ..	2,450l.
For No. 2 (Hoxton-street) ..	2,000l.
For No. 3 (New North-road) ..	1,650l.

In each case whole tenders were invited. The cost of these per cubic foot averages about 3s.

The period of repayment of loan allowed by the Local Government Board is thirty years; this makes the annual instalment on the 2,450l. borrowed for No. 1 amount to about 82l., and the maximum amount of interest at 3 per cent. to 73l. 10s.

The administration and other costs are about 47s. per annum, making a total expenditure of 690l. 10s., which includes for the maximum amount of interest; and this data may be taken as fairly proportionate to the cost of the others existing in Shoreditch.

That the provision of these structures will in the true sense of the word be a convenience for the general public is sometimes made a subsidiary factor by their representative

Councillors, the question they mainly consider being whether such a place will be a source of profit over and above the cost of maintenance, administration, and annual charge for repayment and interest where a loan has to be taken up. But even allowing for these, and losing sight of the fact that a valuable property is gradually being redeemed, the receipts from conveniences in an average busy district sometimes prove them to be fairly remunerative institutions; indeed, some of the best-known sanitary engineering firms are disposed to construct and undertake their upkeep and working in certain selected places, and to pay to the respective Local Authorities an annual sum for the privilege, thus ensuring no loss for the rates to bear. The practice is, of course, to be deprecated; and in any case we should try to impress on our employers that these structures are conveniences for the public rather than mere profit-earning institutions.

Illustrations.**THE MONASTERY OF ST. LUKE OF STIRIS, IN PHOCIS.**

THE several illustrations of the ancient churches of this monastery, comprising the isometrical section, cross section, west elevation, and the tympanum of a doorway, are reproduced from the drawings made for Messrs. Schultz and Barnsley's monograph on the subject.

The book is noticed at length in the second article in this issue, to which the reader is referred for further information.

TWO CROSSES, BRESCIA.

THE illustrations of these two crosses were obtained in Brescia. The Byzantine one, shown in obverse and reverse, is said to be in the Brescia Museum—unfortunately, we were not able to identify it and had not time for further inquiries. Whatever the materials and size may be, it is a sufficiently remarkable piece of workmanship to justify its illustration. The mediæval example is in Brescia Cathedral.

THE SANITARY INSPECTORS' ASSOCIATION.

THE autumn conference of the Sanitary Inspectors' Association was held last week at Middlesbrough. A Council meeting was held on Tuesday, August 5, in the Municipal Buildings, but the general business of the conference commenced on the following day, when an official reception was held by Sir J. Crichton-Browne, M.P., F.R.S., the President of the Association. Subsequently the President delivered an address on the subject of "Malaria in Relation to Sanitation." In the course of his address the President said that, assuming few of his hearers would ever come into personal touch with malaria, he would speak to them of a somewhat similar enemy of mankind—*Musca domestica*, or the common house fly. It was the freedom of the fly and the versatility of his tastes that made him a source of danger. In his flight from the galled place on the horse's back or from the offal in the butcher's back yard to any abraded surface on the human skin or mucous membrane he might convey and sow the seeds of septicaemia, and in his incessant migrations from manure heaps to articles of food he must occasionally make very unpleasant and mischievous transplantations. Flitting from person to person, he might directly communicate disease. Fly-blown phylacteries were bad enough, but fly-blown victuals were worse. The evidence already recorded was sufficient to warrant them in believing that the fly might under certain circumstances spread enteric fever, and perhaps other diseases, and that it was an insect that ought to be put under a sanitary embargo. It served no useful purpose, for its scavenger performances, as regards organic refuse, were out of date when compared with modern artificial methods. To sanitary inspectors it should be, wherever multitudinous, a signal that their services were required.

On the proposition of Colonel Sadler, M.P., seconded by Sir Hugh Glizzean Reid, and supported by Mr. T. Pridgin Teale, of Leeds, a hearty vote of thanks was accorded to the President for his address.

A Sanitary Retrospect.

Mr. T. Pridgin Teale, President of the Yorkshire branch, then read a short paper dealing retrospectively with sanitary progress. He mentioned that during the early days of his practice, over forty years ago, sanitary science did not exist, and Robert Rawlinson and Edwin Chadwick were pioneers fighting an uphill battle against the ignorance of architects and builders, and even of the medical profession, ignorance of the very first principles of sanitation and of the manner and the degree in which disease could be produced and intensified by drainage defects. In 1879, in his book, "Dangers to Health," he stated his belief that very few houses were fit to live in, and this opinion had never been challenged, and was an opinion, moreover, which he had never found reason to modify. The change in knowledge, in experience, and in public opinion during the last thirty or forty years was enormous. The retrospect encouraged them as to the future, and made them realise that improvement was taking place in all directions, in the education of public opinion, in the acquisition of power to effect sanitary improvement, and in the recognition of the value and importance of sanitary work. Might they not hope that as a further development of public opinion and appreciation the time was not far distant when two points earnestly hoped for by the sanitary inspector might be granted by the Legislature—security of tenure and a retiring pension.

During the afternoon there was an excursion to Saltaire.

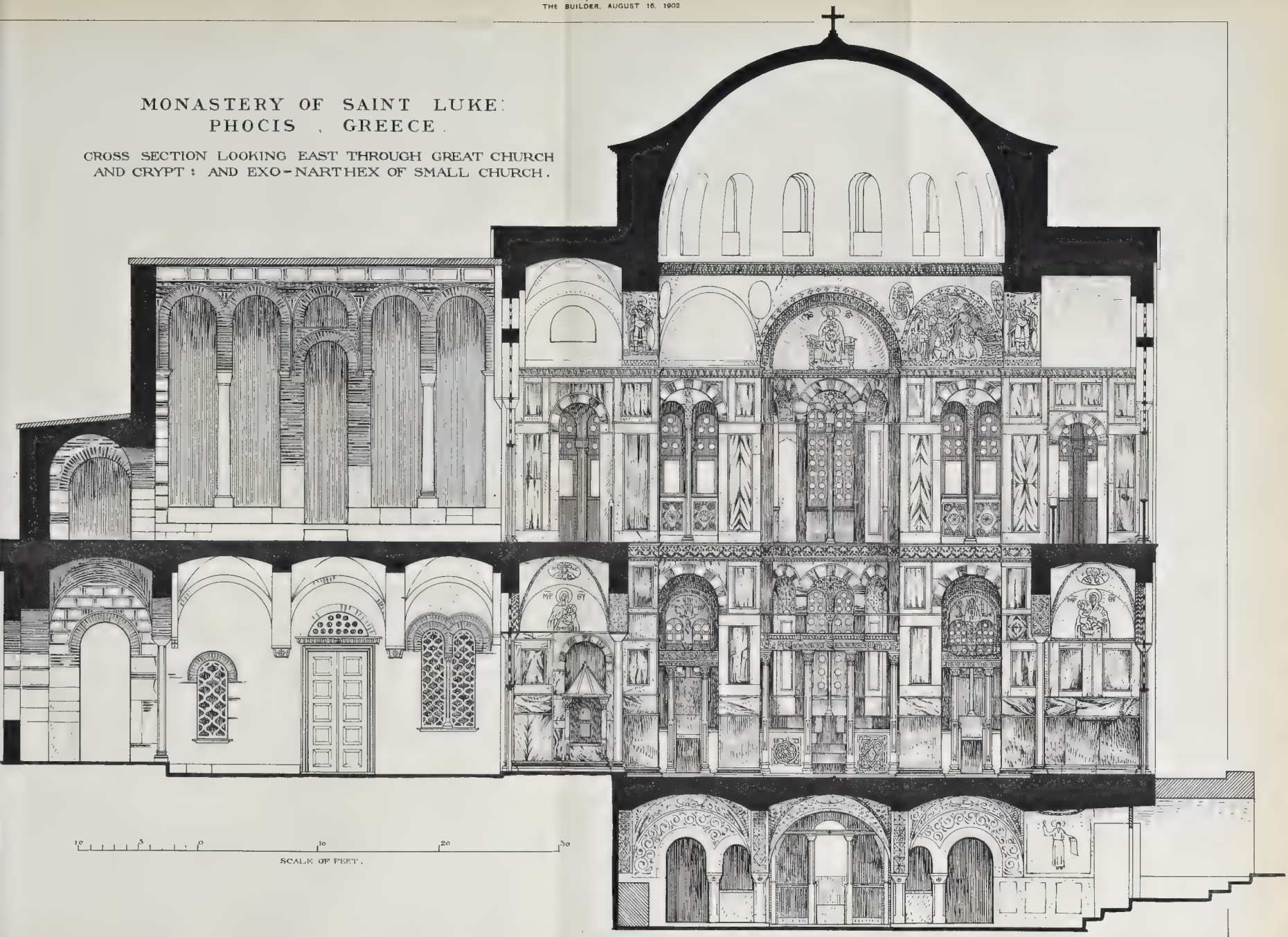
The business was resumed in the Council Chamber, Municipal-buildings, on Thursday morning, Sir James Crichton-Browne presiding.

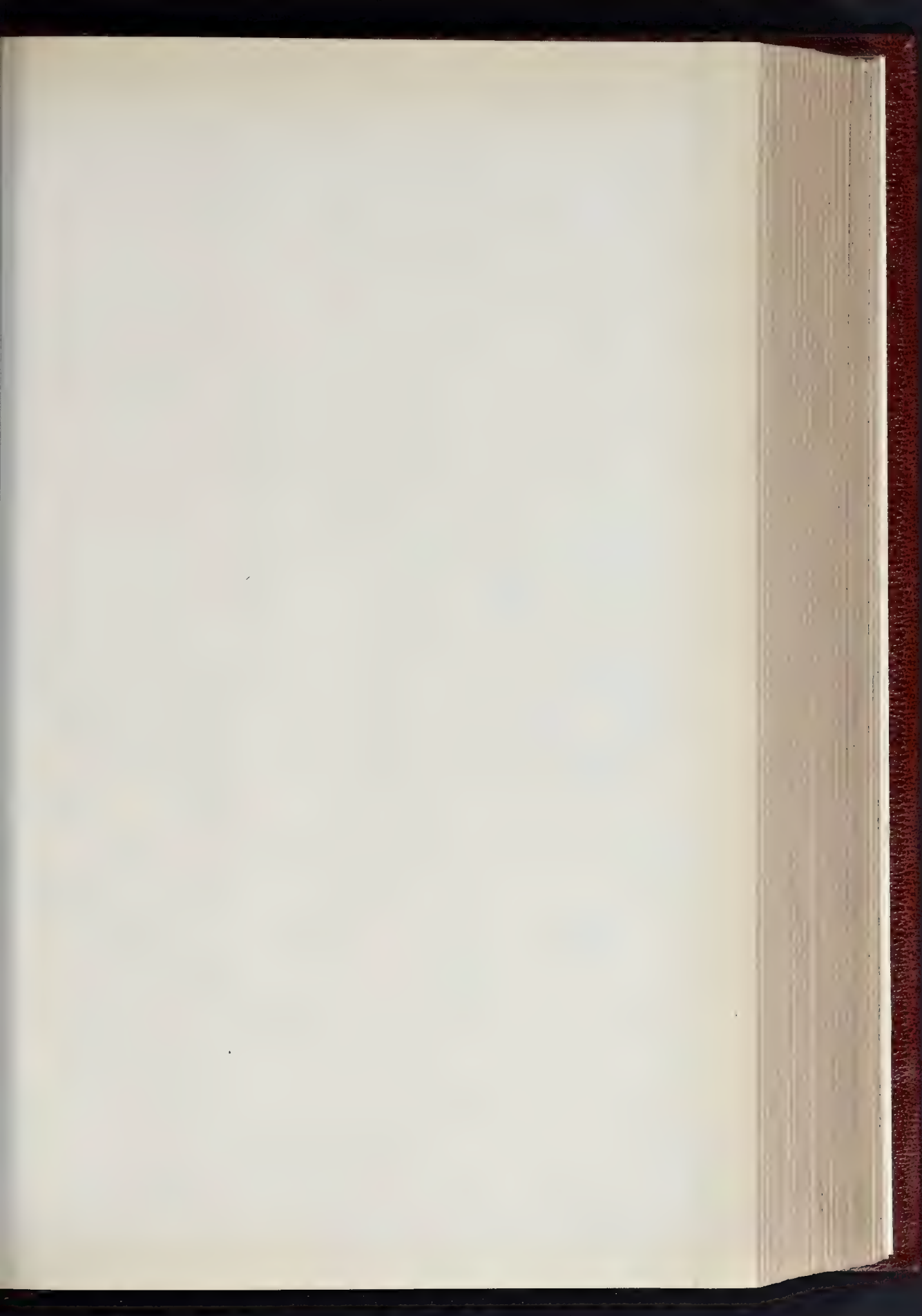
Sanitary Progress in Middlesbrough.

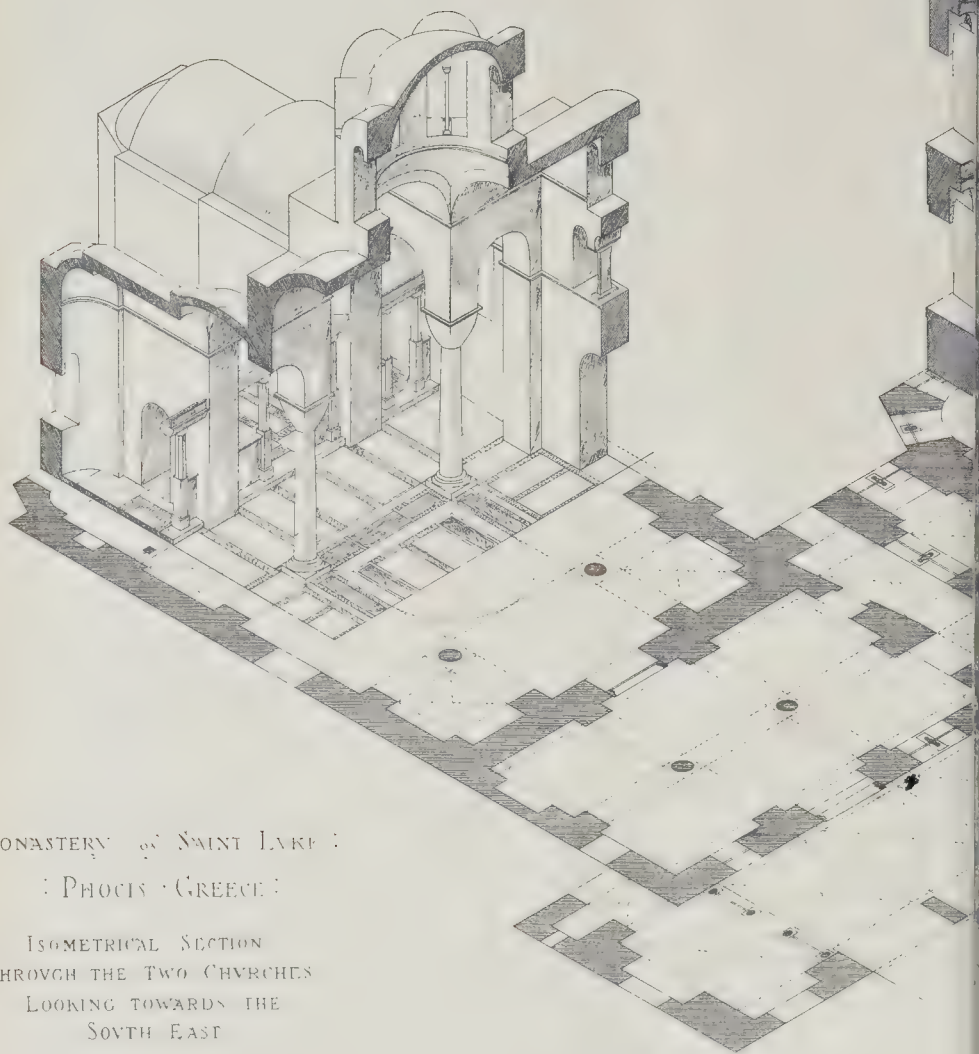
The first paper, "A Quarter of a Century's Sanitary Progress in Middlesbrough," was read by Mr. Geo. H. Anderson, Chief Sanitary Inspector of the County Borough of Middlesbrough. Mr. Anderson prefaced his remarks by stating that he was a native of the town and that he had been employed in sanitary work for thirty years. In the course of his review of the sanitary work of the town, he said that when it was remembered that the first house built in the town was in April, 1830, and that now, only seventy-two years after, their population numbered about 95,000, it would be readily understood that the difficulties encountered by the municipal authority in keeping pace with its extraordinary growth had been as numerous as they had been intricate. In the endeavour to progress with the times the city fathers had made great sacrifices that would probably never receive adequate recognition. As in most towns, the advent of the Public Health Act, 1875, opened the way for real sanitary reforms, and from that time onward steady progress had been made in the direction of improving the conditions under which the working classes lived, and in combating the numerous evils that were peculiar in a measure to densely populated towns. Speaking of the sanitary household arrangements in Middlesbrough, he pointed out that there were 4,000 midden privies, relics of by-gone years; but there had been no new ones added for over twenty years. They never issued a notice to repair one, but used all their powers to have them abolished and ash-pans substituted. Middens were rapidly disappearing quantities. The disposal of night soil had proved a very difficult problem to solve, but as they possessed a fine tidal river, and a wharf of their own barging out to sea was ultimately fixed upon. Of epidemics they had had their share, but by far the most severe visitation of infectious disease experienced was that of small-pox in 1897-8. Few, if any, would imagine that they had sufficient accommodation to cope with such a sudden outbreak; indeed, few provincial towns would have been better prepared than they were. At the beginning they had twenty beds available, but by removing all other cases of infectious disease to their homes, and filling the hospital to its utmost capacity, they were enabled to accommodate about 130. When that was accomplished a large number of patients were necessarily left at home for treatment, a most undesirable state of things, and the Corporation, with a zeal and vigour that would ever redound to their credit grappled with the difficulty in a most determined manner. Such were the efforts made that within a few weeks an army of workmen had provided sufficient wards for the accommo-

MONASTERY OF SAINT LUKE: PHOCIS, GREECE.

CROSS SECTION LOOKING EAST THROUGH GREAT CHURCH
AND CRYPT: AND EXO-NARTHEX OF SMALL CHURCH.



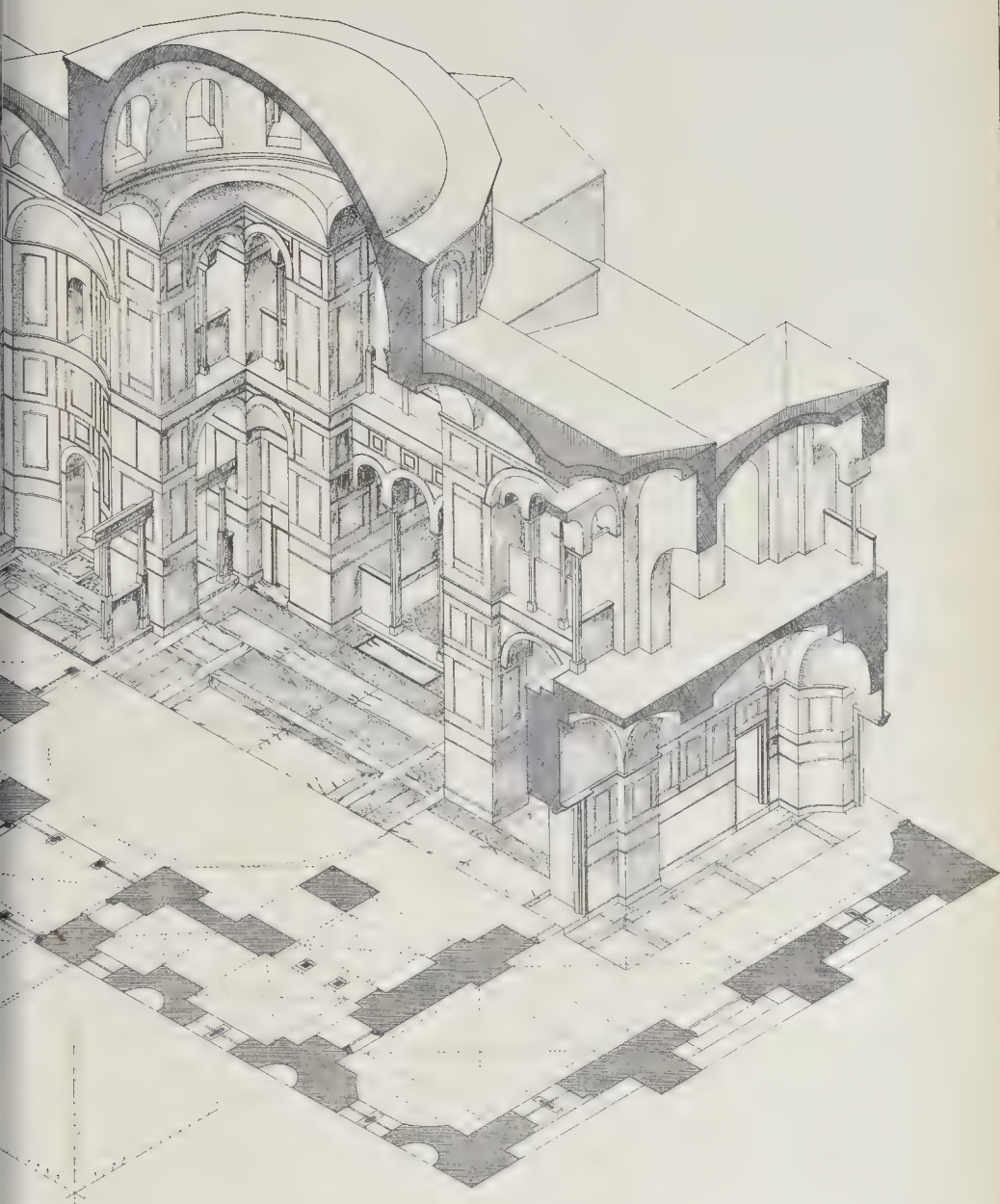




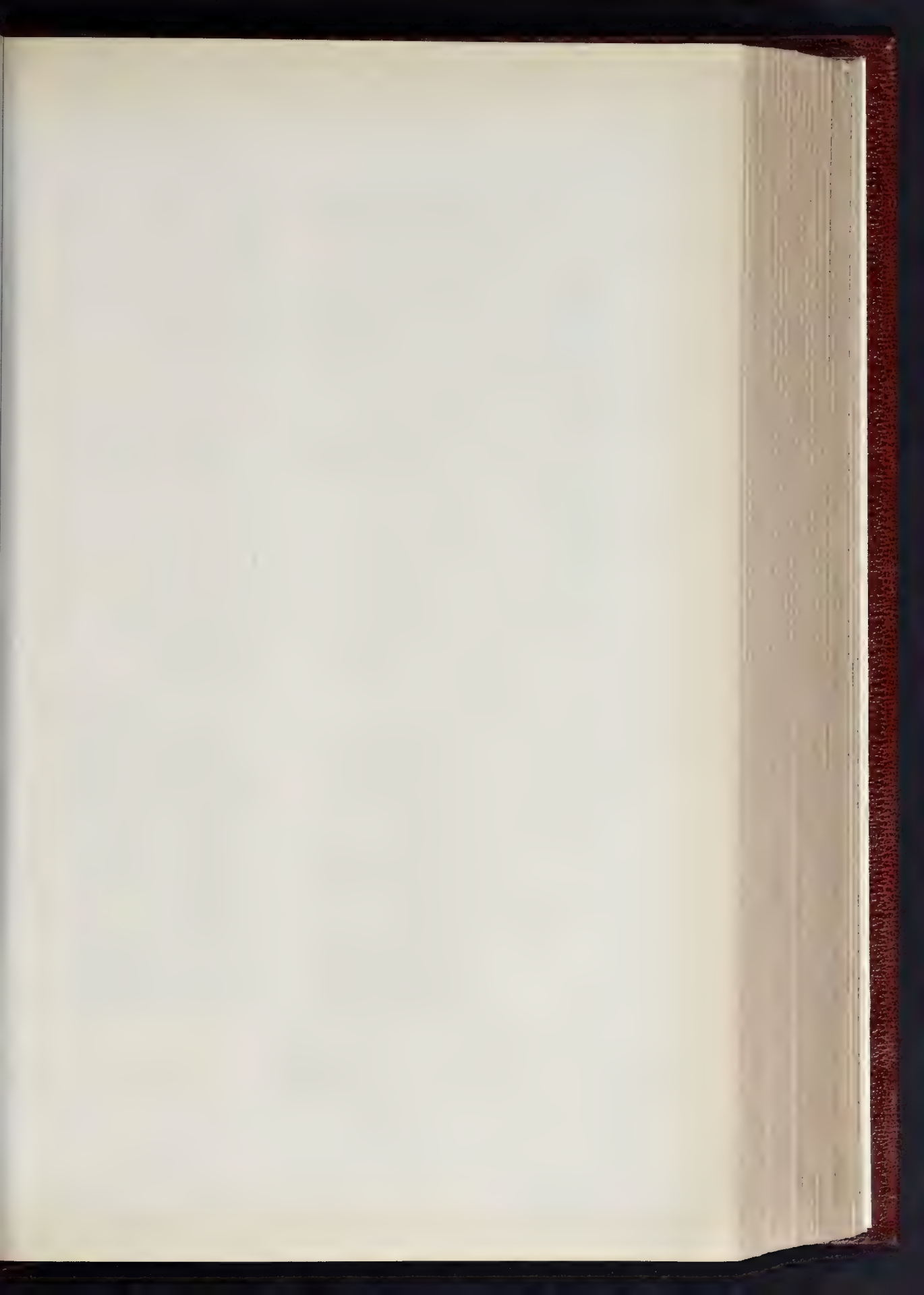
MONASTERY OF SAINT LUKE :

: PHOCIS - GREECE :

ISOMETRICAL SECTION
THROUGH THE TWO CHURCHES
LOOKING TOWARDS THE
SOUTH EAST

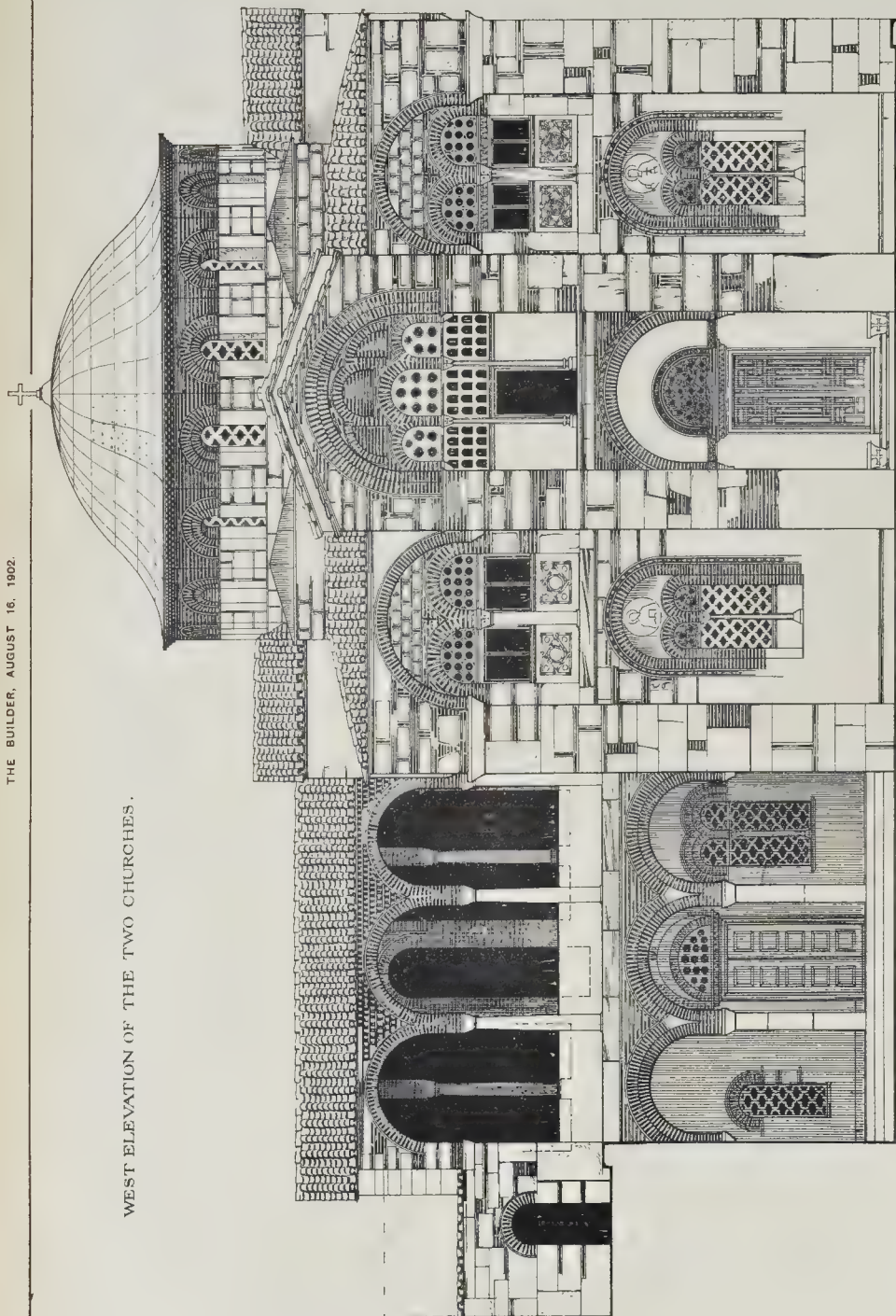


ENGLISH FEET :



THE BUILDER, AUGUST 16, 1902.

WEST ELEVATION OF THE TWO CHURCHES.



10 5 0 10 20 30 40
SCALE OF FEET

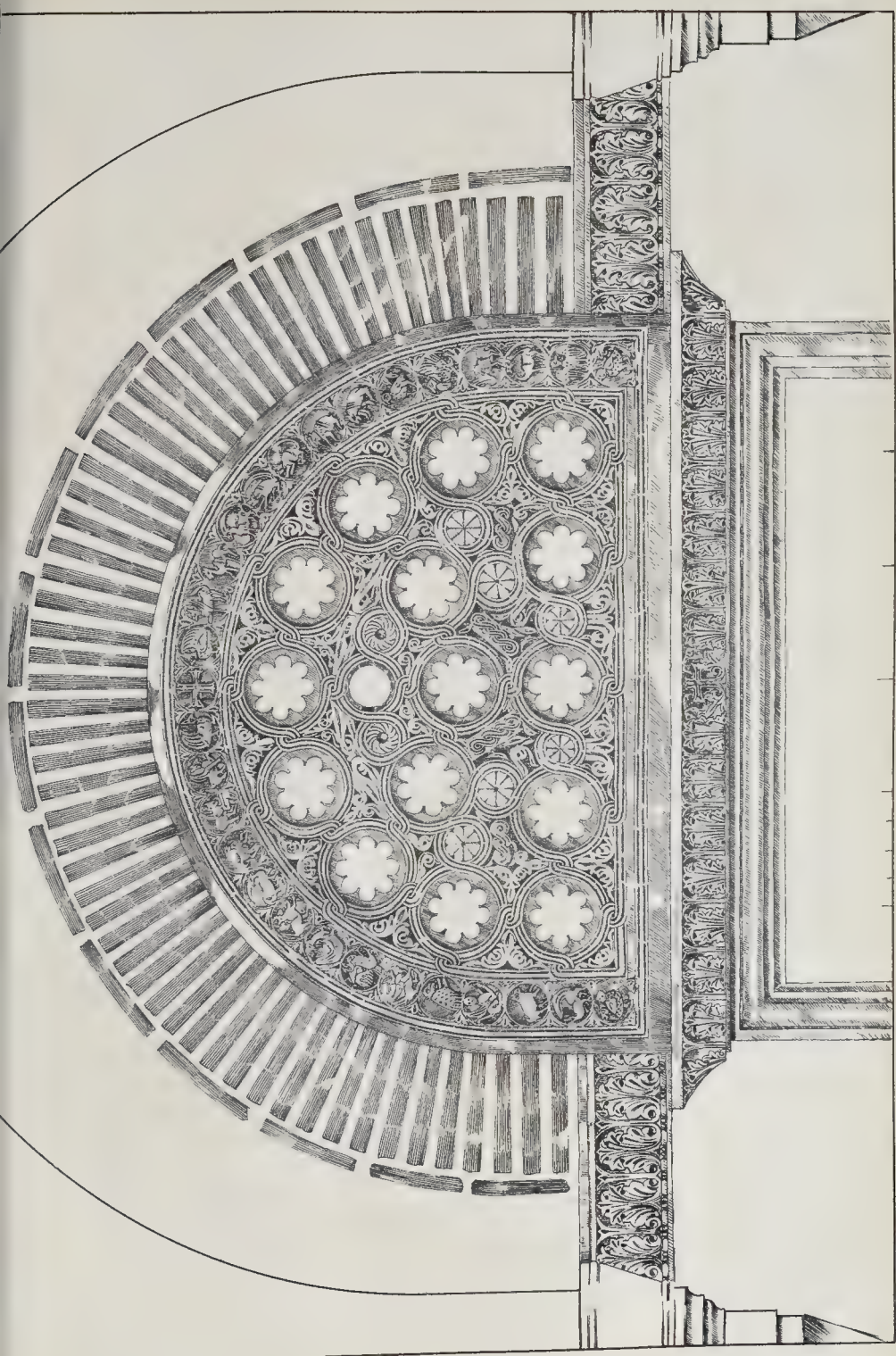


PHOTO LIND SPRAGUE & CO. 485 EAST HARDING STREET PITTSBURGH, PA.

MONASTERY OF ST. LUKE, PHOCIS, GREECE
 TYMPANUM OF WEST DOORWAY OF GREAT CHURCH.





OBVERSE.

IN BRESCIA MUSEUM.



REVERSE.



PHOTOGRAPHED BY PRAGUE & CO. LTD. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

IN BRESCIA CATHEDRAL.

dation of every known case. Not less energetic were the Poor Law Guardians in their endeavours to stamp out the disease. The total number of cases treated was 1,414, and the cost of the epidemic to the town was over £2,000.

Mr. Thornley (Beckingham) moved, and Mr. Humphries (Reigate) seconded, a vote of thanks to Mr. Anderson. Several speakers cordially supported the vote, including the Secretary of the Association, Mr. E. Tidman.

The vote of thanks was then put and carried with acclamation.

A paper by Dr. J. Wright Mason, C.M., Medical Officer of Health to the City and County of Kingston-upon-Hull, and to the Hull and Goole Port Sanitary Authority, was read by Mr. Alfred Sockett, Town Clerk. Dr. Mason's paper dealt with the necessity of taking precautions, with as little inconvenience as possible to trade and commerce, for preventing the introduction into our seaports of infectious diseases, especially those of a more serious character.

The President favoured the view that some assistance should be given to port sanitary authorities.

A paper on "Infectious Diseases" was next read by Dr. Dingle, Medical Officer of Health, Middlesbrough, in which the notification of infectious diseases was recommended, and also various measures with regard to street cleansing. On the latter subject he said the streets of our towns, should be well laid and impervious to pollution, and thoroughly cleansed daily with a copious supply of water, and be well brushed. He was impressed with the thorough washing by a hose-pipe, in contradistinction to the water-cart as usually practised in smaller towns, which the streets in the City of London were subjected to, and it was no doubt in some measure due to this that the City of London had such a favourable death rate.

Mr. Jackling (Maidstone) moved, and Mr. C. W. Evington (Hull) seconded, a vote of thanks to Dr. Dingle.

A paper was next read on "Railways, Tramways, and the Housing Question," by Mr. T. F. Strutt (Westminster), the discussion upon which was postponed until the following morning.

In the afternoon the Mayor and Mayoress gave a party in the Albert Park, to which the members of the Association were invited, and in the evening they were entertained to a banquet in the Town Hall.

The conference resumed on Friday, and subsequently the members made visits and excursions to places in the neighbourhood.

THE LONDON BUILDING ACT.

TRIBUNAL OF APPEAL CASE—IMPORTANT RULING.

THE Tribunal of Appeal under the London Building Act sat at the Surveyors' Institution, Great George-street, Westminster, on Wednesday, the 6th inst., to hear an appeal by Mr. Sheldermine on behalf of the Lancashire and Yorkshire Railway Co. under Section 13 (4) and (5) of the Act against the determination of the London County Council by their resolution, dated July 15, as follows:—"That the Council, in the exercise of its powers under Section 13 of the London Building Act, 1894, do not consent to the erection of office buildings on the site of Nos. 11 and 12, Great College-street, Westminster, at the corner of Little College-street, with the external walls and forecourt fence at less than the prescribed distance of the centres of the roadways of those streets, as shown upon the plan dated May 20, 1902, submitted with the application of Mr. A. Sheldermine on behalf of the Lancashire and Yorkshire Railway Co., as it is considered undesirable to sanction the erection of the building in the position proposed."

The members of the Tribunal sitting were Messrs. J. W. Penfold (chairman), A. A. Hudson, and E. A. Gruning.

Mr. H. F. Dickens, K.C., and Mr. Clavell Salter appeared for the appellants, and Mr. F. F. Daldy (instructed by Mr. Godfrey, of the Solicitors' Department of the London County Council) for the respondents.

Mr. Daldy submitted a preliminary objection to the jurisdiction of the Tribunal. He contended that the Act did not allow any appeal from the refusal of the Council to consent. This point, of course, rested upon the wording of Section 13. The general rule laid down by the Act was that there should be no new building within the prescribed distance

from the centre of the roadway. Power, however, was given to the County Council to allow a departure from the general rule and, if the Council permitted that departure to allow a building to be erected within the distance, then a person who was dissatisfied, such as an adjoining owner or a local authority, might appeal to the Tribunal against that consent and against any departure from the rule being allowed. That, he submitted, was the only appeal that this section allowed. Sub-Section 4, on which the appellants founded their appeal, did not make any provision for an application to the Council for their consent, for a hearing by the Council, or anything of that kind. It was, he suggested, merely a provision that the Council might in any case where they thought it expedient, allow a departure from the general rule. "The Council may, in any case, where they think it expedient, consent to the erection, formation, or extension of any building, structure, forecourt, or place at a distance less than the prescribed distance from the centre of such roadway, and subject to such conditions and terms, if any, as they may think proper to sanction." So far, this sub-section was in terms merely a power given to the Council to allow a departure from the rule.

Then followed what he submitted was a qualification upon that power of the Council, and nothing more: "Provided that the giving of such consent by the Council shall not in any way affect the rights of owners of adjoining lands." The material words were these:—"Any person dissatisfied with the determination of the Council under this sub-section, may appeal to the Tribunal of Appeal." He submitted that the latter part of Sub-Section 4 was merely a limitation upon the former part. Of course, if the sub-section had spoken of an application being made to the Council on the refusal of their consent or anything of that kind in its earlier part, from which they could fairly infer that the "determination" of the Council which was to be appealed from, included a determination to reduce or not to grant a consent, if they had any words of that sort the construction of the section would be very different. He submitted that it was not an unreasonable view of the Act, that the whole of Sub-Section 4 was merely a power of the County Council followed by certain qualifications and restrictions of and upon the exercise of that power, and that the essential words he had quoted could only mean a person dissatisfied with the determination of the Council to allow a departure from the general rule—that was, to consent to the building coming forward.

Mr. Dickens, replying to the objection, remarked that the point raised was very important. He contended that Mr. Daldy had placed far too narrow a construction on the section. His (Mr. Daldy's) point was that the section cut down the powers vested in the Tribunal. The object of that Tribunal was to take out of the ordinary course of law the matters which arose between the County Council or the public authorities and the private owners and those concerned in building as being a much more convenient and satisfactory tribunal than the courts were. "Determination" was a very well-known expression. It meant the adjudication on a matter which had been properly before a tribunal. "Determination" was the result of the resolution which was come to by the body either for or against the application, and must be read subject to what went before. Obviously, under Sub-Section 1 any result of an application came to under that section would be a determination. What was this appeal for? The only appeal could be against the refusal to grant an application which was made to the Council under the circumstances to allow this building to be brought beyond the prescribed distance. When they went into the facts, what the appellants said was that, subject to the question of law, the Council was bound to consent to what they applied for. He submitted that the Tribunal had jurisdiction. The appellants would have to get a tribunal somehow, and if they went under Section 150 against the decision of the District Surveyor, they should go to the Stipendiary, and should have a case stated on the point of law. That Tribunal had exactly the same power of stating a case so far as the convenience of the matter was concerned.

After further arguments, and the members of the Tribunal having consulted in private,

Mr. Hudson said the Tribunal had decided to allow Mr. Daldy's objection. Although it was open to some doubt, he took the view

which the learned counsel had expressed: that there was a general rule preventing the Council from sanctioning anything within the prescribed distance. Then there was an appeal from that in these words: "If any one shall be dissatisfied with the determination of the Council that the prescribed distance shall be greater than 20 ft. from the centre of the roadway, he may appeal to the Tribunal of Appeal against such determination of the Council." Then came Sub-Section 4, and in his view, to put it shortly, the last words of that Sub-Section really had to be read in this way: "Any person dissatisfied with the determination of the Council that the prescribed distance shall be less may appeal to the Tribunal of Appeal." He therefore agreed with Mr. Daldy that under the one power of the Council it might be greater, the "determination" was that the prescribed distance should be greater, and under the fourth sub-section it was a determination that it should be less. Therefore, any person dissatisfied with the determination of the Council that it should be less might appeal to the Tribunal. The Tribunal thought, having taken all the circumstances into consideration, that they ought not to waste the time of both parties, seeing that they were in considerable doubt, and that the balance of their opinion was in favour of Mr. Daldy. They, therefore, allowed the objection.

Mr. Dickens asked if the Tribunal would state a case if applied for within a week. This was assented to, and the hearing was adjourned *sine die*.

Books.

The Bases of Design. By WALTER CRANE. London: Geo. Bell & Sons. 1902.

THIS is a reprint, in a smaller and cheaper form, of the important treatise by Mr. Crane under the above title, the larger edition of which was reviewed at length in our issue of March 5, 1898. The present book contains, we believe, all that was in the original one, only compressed into a smaller page.

Line and Form. By WALTER CRANE. London: Geo. Bell & Sons. 1902.

THIS book, like "The Bases of Design," is a reprint in smaller size of a book first published two years ago, but which we find, for some reason, was not at the time noticed in our columns. Delivered in the first instance in the form of lectures to the students of the Manchester Municipal School of Art, it is really an important treatise on a subject not often systematically dealt with, viz.: the abstract value and significance of line in design, both in regard to the direction or design of the line, and the character of execution of the line itself.

To say that outline is "the Alpha and Omega of Art," as the author does in his opening sentence, is perhaps a little too broad a statement; it might be better put by saying that it is "the Alpha, if not the Omega," leaving the latter portion of the axiom undecided. A portrait in oil-painting is often commended for "losing outline," i.e. for conveying the impression of form rounded away from the eye, which is the impression the features really convey in nature; and where is "outline" in one of Turner's later landscapes? In the sense of "line" pure and simple, in fact, outline can hardly be said to exist in nature, except as the boundary of a certain space of colour. But when we stop short of colour and express our design in black and white, then indeed line assumes supreme importance. It is not the Alpha and Omega of Art, but it is the Alpha and Omega of drawing.

The manner in which the general character of an object may be expressed by its leading lines, and the representation of it built up, as it were, in progressively added lines, is very well shown in the first chapter, though we rather protest against suggestions of the oval and square methods of drawing, in a kind of handwriting, given in the sketches of a horse and man on p. 11, the results of which are rather hideous, and the procedure hardly, to our thinking, educational. A suggestion made on the succeeding page, that if one is inclined to round the forms too much, it would be well to try the "rectangular method" to correct this, is indeed only putting in another way what almost every learner in figure-drawing has probably heard from a good instructor—"Keep



Effect of Different Emphasis in the Treatment of the Same Design.

the lines as straight as you can"; all beginners having a tendency to exaggerate the curves in the bounding outlines of the figure; and that advice, if attended to, seems sufficient for the purpose. The succeeding part of the chapter, on the inherent power of abstract expression in line itself, apart from actual representation of any concrete, is most valuable, as well as the remarks on the different effect of texture in lines. This idea is carried further and applied to actual practice in the succeeding chapter on the language of line in primary forms of decorative design—"question and answer in line," "counterbalance," "linear logic" being among the heads of the treatment. The power of line to suggest movement is well illustrated; and this kind of power is shown as carried further, in the region of composition, in the admirable sketch on p. 263 showing two methods of designing the upper portion of a row of figures supposed to be walking in procession; in the upper sketch their heads are turned in different directions, in the lower sketch they all face the same way following each other; the contrast of effect is remarkable—in the upper sketch the figures look stationary, in the lower one they actually seem to move across the page.

The variety of effect put within the reach of the designer by variation of emphasis is well shown in the illustration on p. 57, reproduced here, in which different effects are got from the same design. "By throwing the emphasis on the leaves, as in No. 1, we should gain one kind of effect or decorative expression. By throwing the emphasis on the fruit, and leaving the leaves in outline, we should get quite a different effect out of the same elements, as in No. 2. While by leaving stems, leaves, and fruit all in outline, and throwing the emphasis upon the ground, we should get, again, a totally distinct kind of effect and expression." This principle, of course, though illustrated in a very simple form here, presents endless possibilities of application. A point to which attention is drawn two or three pages later, and which is of the utmost importance is this (and it grows out of the last-mentioned subject) that if we seek particular qualities in line and form we shall have to subordinate something else to obtain them completely. "A drawing in pure outline of a figure may be a perfect thing in itself. The moment we begin to superadd shading, or lines expressive of relief of any kind, we introduce another element; we are aiming at another kind of truth or beauty; and unless we have also a distinctly ideal aim in this, we shall mar the simplicity of the outline without gaining any compensating advantage, or really adding to the truth and beauty of the drawing."

The later chapters are in the main an application to various branches of drawing, or various kinds of subject, of the broad principles suggested in the two first chapters. Art students will find them full of useful advice. On p. 233 is a diagram showing two equal-sized parallelograms defined by boundary lines, one of them with vertical lines drawn up it at equal distances, the other with horizontal lines drawn across it; this is intended to show the effect of vertical lines in increasing the apparent height of a space, and that of horizontal lines in increasing its apparent width. This is a generally recognised principle; in practical life ladies, for instance, are perfectly aware that a dress with vertical stripes makes them look taller than one with horizontal bands. Yet at the first glance at this page the impression on the

eye of the present writer was that the horizontally-lined space was slightly the higher of the two. Colouring the alternate spaces, so as to give bands of white and colour, came a little nearer the theoretic effect; but we think the real reason is that the spaces chosen are oblong, and the lines being spaced the same, there are fewer lines in the horizontal one than in the vertical one. We made the test with equal square spaces, with vertical and horizontal bands of colour, with a much more decisive optical result.

Picturesque Westminster: a Collection of Sketches. Arranged under the supervision of Mr. WALTER EMDEN.

This is in fact a portfolio of sketches illustrative of Westminster. There are some brief notes in regard to the sites and buildings illustrated, written by Mr. G. P. Warner Terry, but these are admittedly, from the note beneath the preface, rather a compilation than original matter. The real value of the publication therefore lies in the sketches by Mr. Howard Fenton, which are admirable. The originals are evidently pencil sketches in a very artistic style of handling, and they have been reproduced on a smooth and thick paper by a method which almost retains the quality of pencil drawing. Some of the buildings of "picturesque Westminster," as shown here, may be said to owe their picturesqueness more to Mr. Fenton's pencil than to their inherent qualities. But many of the scenes sketched have really picturesque quality, and the artist has made the most of it.

Quantities. Vol. I. Road Making and Sewer Construction. By J. BARTLETT. London: The St. Bride's Press, Ltd.

This book is written mainly for the use of intending surveyors, municipal engineers, and architects—that is to say, it is a students' book, and as such it may be of some use in the process of training for the routine of office work; but we cannot help feeling that at the present day there is a tendency to multiply text books unnecessarily, and to endeavour to acquire by mere book reading the knowledge which only practical experience can adequately convey. Nevertheless, those who are engaged in teaching even such highly technical subjects as the above feel, without doubt, that their lectures are more likely to be beneficial if students are able to provide themselves with printed notes in the form of a text-book. This is what we take Mr. Bartlett's book to be, and doubtless it conforms satisfactorily to that teacher's method of instruction. As a general text-book, without the guidance of an instructor, we do not think the book will be widely useful, although some of the ready reference tables are convenient to have at hand. Rather a large portion of the book, nearly fifty pages, is taken up with specimen forms of tender and specification as issued by the Vestry of Paddington. Although these are not before us for criticism at the present time, we cannot help noticing that they contain ample matter for comment. Doubtless Mr. Bartlett explains to his pupils, for example, that of the seventeen kinds of stone scheduled in the tender for granite, only two or three have any claim at all to that designation. There is also other matter here in which, as object lessons to his pupils, a lecturer would delight.

The typography and paper are excellent, and the general appearance of the volume is as attractive as could be wished.

The Business Encyclopedia and Legal Adviser. By W. M. KNIGHT, Barrister. In six volumes. Vol. II., Con-For. London: The Caxton Publishing Co.

In our notice of the first volume of this ambitious work we pointed out how large and almost unmanageable was its scope. The same impression is conveyed by vol. II. It contains a great deal of useful information, but we still think that it is scarcely possible to make a really satisfactory work out of such endless materials. In the present volume there are articles on "contracts," "dilapidations," and "common employment." We could have wished that the photographs of eminent business men and lawyers had been omitted; they add no value whatever to a work of reference. The date of the year of publication should also have been placed on the title-page, so that readers might know the time down to which information is carried.

Correspondence.

OSCILLATION IN SPINNING MILLS.

SIR,—Referring to the letter in your issue of this date over the signature "W," the case in point is evidently that of a weaving, and not a spinning mill.

The oscillation is due to the reciprocating motion with which each loom is fitted, and which, following each "pick" of the shuttle, pushes the weft home up to the previously woven cloth.

The oscillation of the structure will vary more or less according to the greater or less number of synchronisms of these reciprocating motions.

It can be reduced by putting some of the looms at right angles to others, but this causes complications in the driving, and defective lighting, as the light should come in across the cloth.

Story weaving mills ought to be specially designed to resist horizontal reciprocating thrusts.

A. HENTHORN STOTT, JUN.

STAIN FOR WOOD.

SIR,—Can any of your readers inform me if there is any wood-stain in the market that will not wear patchy, and will maintain a uniform colour, as when first applied? I understand that Peter Bratch's "carbolium" will answer this description, but cannot find out if it is still in the market.

H. W. R.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

7.—PORTLAND CEMENT: ITS COMPOSITION AND MANUFACTURE.

TRADE DEFINITION.—The Cement Trade Section of the London Chamber of Commerce defines Portland cement as "a mixture of two or more suitable materials, intimately and artificially mixed in the requisite proportions, and afterwards properly calcined and ground, to which nothing has been added during or after calcination, excepting that an addition not exceeding 2 per cent. of gypsum is permissible for the purpose of regulating the setting."

The suitable raw materials are carbonate of lime and clay.

Chemical Composition.—The following analysis, published by Stanger & Blount, may be regarded as representative of the average composition of Portland Cement of good quality:—

	Portland Cement.
Silica, soluble in acid	2.23
Insoluble residue (sand and clay)	0.70
Alumina	8.36
Ferric oxide	4.34
Lime	59.46
Magnesia	1.04
Sulphuric anhydride	1.37
Carbonic anhydride	1.77
Water	1.81
Alkalies and loss	.83

100.00

In 1897 Messrs. S. P. & W. B. Newberry communicated to the Society of Chemical Industry the results of a long experimental

investigation into the constitution of Portland cement, from which they conclude that:—

1. The essential constituents of Portland cement are tri-calcium silicate with varying proportions of di-calcium aluminate. This composition may therefore be expressed by the formula $X(3\text{CaO} \cdot \text{SiO}_2) + Y(2\text{CaO} \cdot \text{Al}_2\text{O}_3)$. From this formula it may be calculated that the correct proportion of lime, by weight, in Portland cement is 2.8 times the silica plus 1.1 times the alumina.

2. Iron oxide combines with lime at a high heat, and acts like alumina in promoting the combination of silica and lime. For practical purposes, however, the presence of iron oxide in a clay need not be considered in calculating the proportion of lime required.

3. Alkalies, so far as indicated by the behaviour of soda, are of no value in promoting the combination of lime and silica, and probably play no part in the formation of cement.

4. Magnesia, though possessing marked hydraulic properties when ignited alone, yields no hydraulic products when heated with silica, alumina, or clay, and probably plays no part in the formation of cement. It is incapable of replacing lime in cement mixtures, the composition of which should be calculated on the basis of the lime only, without regard to the magnesia present.

Manufacture of Portland Cement.—Portland cement is produced by calcining a mixture of carbonate of lime and clay. Both the native chalk or limestone and the clay used by different cement makers vary considerably in composition, but by analysing the two raw materials it is possible to so proportion them in the mixture prepared for calcination that the finished cements obtained from the different mixtures shall closely resemble each other in chemical composition and physical properties.

When the mixture of clay and carbonate of lime is heated, the carbonate of lime is gradually converted into quicklime, which attacks the clay, and forms calcium silicate and calcium aluminate. If the raw mixture contain too much clay, the resultant cement is deficient in strength, and if it contain too much carbonate of lime, the resultant cement will contain quicklime, which may cause disruption of the cement after it has set.

When water is added to Portland cement, hydrated silicates of lime and alumina are formed and set into a hard mass, which is practically unaffected by further contact with water. The cement when mixed with water stiffens in a few minutes, and becomes moderately hard within twenty-four hours, but it continues to harden and gain in strength for several weeks, or even for months.

The different methods of cement manufacture now in vogue are classified by Mr. H. H. Humphreys (*vide the Builder*, December 28, 1901) as follows:—

1. Wet process.
2. Semi-dry or Gorcham process.
3. Dry process.
4. Rotary process.

The Wet Process consists in mixing clay and chalk together in definite proportions with an excess of water in a wash mill. In the mill the clay and chalk are reduced to a very fine state of division, and the mixture is technically known as "slurry" or "slip." From the wash mill the slurry passes into settling tanks, and is allowed to settle for several days or even weeks. The supernatant liquid is then drawn off. When the slurry has been partially dried it is cut out in blocks and placed between layers of coke in kilns, the kilns being charged with alternate layers of the coke and slurry.

Great care has to be taken to have the chalk and clay in the correct proportions, and to maintain a suitable temperature within the kilns. Too high a temperature results in the production of "overburnt" cement, which contains a considerable proportion of inert matter, and also of matter which is apt to undergo chemical change and expansion many months after the cement has been used for building and has set. Too low a temperature results in the presence of caustic lime in the cement, which is also very objectionable, for reasons to be discussed in the next chapter when referring to the "aeration" of cement.

The cement is withdrawn from the kilns as "clinker," which has to be broken to small fragments in crushing machines and then reduced to an extremely fine powder in grinding mills. The finished cement should be

exposed to the atmosphere in a storeroom for some time before being employed for building.

The Gorcham or Semi-dry Process.—In this process only about one-fourth the volume of water employed in the wet process is used with the mixture in the wash mill, but the slurry produced undergoes a further mixing operation by being passed between horizontal millstones or edge-runners. The calcination of the slurry and grinding of the finished cement is performed as in the wet process. The advantage of this process is said to be that much less heat is required to develop power to work the millstones than is required to remove the excessive quantity of water from slurry prepared by the wet process.

The Dry Process.—The dry process is used where hard limestones or shales (hardened clays) have to be used in place of those chalks and clays which are readily disintegrated by water. The raw materials are mixed in the necessary proportions and are then crushed, ground to powder, mixed with water, and passed between a pair of wet stones. The mixture is then dried, placed in kilns, and calcined as in the wet process.

The Rotary Process.—This process has been in use in the United States for about five years, and has recently been adopted at the Woudham Cement Works, near Grays, in Essex. The process consists essentially in calcining the slurry in a slightly inclined revolving cylinder instead of in a kiln, the feed being at the end most distant from the burner, which is supplied with injected coal dust as fuel.

The slurry slowly travels down the inclined cylinder and as it approaches the burner becomes calcined into clinker. The clinker passes from the calcining cylinder to a second inclined cylinder where it heats the air passing to the coal-dust burner. After leaving the second cylinder the clinker passes between crushing rolls which are sprayed with water and which reduce the coarser lumps before the material passes to a third cylinder. In the third cylinder the clinker is further cooled and pulverised, and it then drops into trucks and is removed to the grinding mills.

The advantages of the rotary process over other processes are:—(1) The cement is manufactured at less cost; (2) the handling of the material from the crushers of the raw substances to the stock boxes containing the finished cement is mechanical and continuous; (3) the production of cement is continuous; (4) coal slack may be used instead of coke; and (5) an artificially-matured cement is produced, and subsequent prolonged aeration is unnecessary.

The Composition of Slurry and Gauged Cement.—The following analyses which appeared in the *Engineer* show the composition of (1) slurry ready to be calcined into cement, (2) finished cement before being mixed with water, and (3) set cement seven days after the cement has been treated with water:—

	Slurry.	Portland Cement.	Gauged Cement seven days old.
Sand (insoluble)	1.24	0.08	1.16
Silica (soluble in acid)	11.77	20.45	18.77
Ferric oxide	2.13	4.37	3.08
Alumina	4.15	8.05	7.04
Magnesia	—	1.18	1.52
Lime	2.87	1.18	1.52
Calcium sulphate	—	62.13	54.80
Calcium carbonate	69.97	—	2.13
Water and volatile matter	5.29	—	1.73
	97.72	101.07	99.16

The composition of Portland cement does not exactly correspond with that of the slurry after deduction of the carbon dioxide and water. The ash of the coke or other fuel used for calcination of the slurry may materially affect the composition, because from 7 to 10 cwt. of coke are used to calcine a ton of slurry.

Analyses of some Typical Raw Materials.—The raw materials, clay and chalk or limestone, which are employed for the manufacture of Portland cement, vary greatly in their composition, although by careful blending in the proper proportions, they may be made to yield cements of practically identical composition and properties. The following analyses of the Medway cement-producing materials

published by Mr. D. B. Butler and the late Mr. Henry Faija, may be regarded as representing the average composition of the clays and chalks most largely used in that important centre of the cement industry:—

	Medway Chalks.	
	White.	Grey.
Insoluble siliceous matter	1.50	3.95
Soluble silica	1.0	2.0
Alumina and oxide of iron .....	.80	.75
Carbonate of lime	97.32	94.37
Potash .....	.22	.18
Soda .....	.16	.13
Magnesia	trace	trace
Sulphuric acid	trace	trace
	100.10	99.58

Medway Mud.		Medway Blue Gault Clay.	
Water	4.30	Organic matter	1.30
Organic matter	7.49	Sand	9.64
Silica	54.80	Combined silica	34.06
Alumina	14.40	Alumina	13.89
Oxide of iron	8.10	Oxide of iron	5.76
Carbonate of lime	4.64	Lime	15.25
Carbonate of magnesia	3.20	Magnesia	2.02
Sulphuric acid	1.69	Sulphuric acid	1.64
Alkalies .....	.75	Carbonic acid	14.20
	99.97	Potash .....	.18
		Soda .....	.26
			99.50

Raw Materials used in Foreign Countries.—Referring to the character of the natural carbonates of lime used in different countries for cement manufacture, Mr. S. B. Newberry, a recognised cement authority in the United States, says that "In England a comparatively soft chalk is generally used; in Germany chalk, limestone, and 'mergel' (a soft limestone containing clay) are the most common materials. In the United States most of the Portland cement produced is made in the Lehigh Valley region from an unlimited deposit of slate-like limestone containing rather more clay than is required for a correct mixture. To this a small amount of pure limestone, usually 10 to 20 per cent., is added. The grinding of the raw material is comparatively coarse, since the bulk of it is already of nearly correct composition. In New York, Ohio, and Michigan, marl, a soft fresh-water deposit similar to chalk, is generally employed. Pure limestone is used at three or four small factories only."

OBITUARY.

MR. GEORGE TRUEFIT, F.R.I.B.A., who passed away at his residence at Worthing, last Monday, at the age of seventy-eight. Up to the last ten years he was in practice at 5, Bloomsbury-square, London. Mr. Truefitt was a pupil, at the age of fifteen, of the elder Cottingham. He was articled for five years, and then had an appointment at once with the late Sir Sancton Wood, and afterwards with Eginton, of Worcester. He then went with his friend, Calvert Vaux, on a walking tour through France and Germany, taking between 400 and 500 sketches. On his return, although very young, he competed for the Army and Navy Club in Pall Mall, a most successful competition for him, as his design brought him one of the best of friends and clients in Mr. (afterwards Sir) William Cunliffe Brooks, M.P., for whom he worked till he died. Mr. Truefitt had erected buildings in 25 different counties; he had put up 15 churches and chapels, including St. George's, Tufnell Park; St. George's, Worthing; St. John's, Bromley, Kent; Davyholme Church, Cheshire; Blakemere, Herefordshire, &c.; and restored 7 churches. He has erected 8 rectory-houses; 7 schools; 13 banks in London, Manchester, Altricham, Blackburn; 7 large halls and church-rooms; 170 houses and mansions, including a large house at Antibes, in the south of France; 20 various buildings; 44 cottages and lodges. Amongst his works he laid out large sums of money in the forest of Glen Tanu, Aberdeenshire, for Sir William Brooks, in architectural buildings, and he was engaged in extensive restorations and additions to Aboyne Castle (also in Aberdeenshire), the residence of the Marquis of Huntly. He had also been architect to the Tufnell estate for over twenty years. Mr. Truefitt was a hard worker, he himself having made the whole of his designs, drawings, working drawings, specifications, and perspectives. Competitions have therefore been easy with him, as they never cost him anything but his own time, and he reckoned that of all the work he had done, about three-fourths of it had been the result of competitions. He told the late Editor of this journal, Mr. Godwin, however, that his period of success dated from the publication of one of his designs in the *Builder*, which led to an important commission from some one who had seen it and been struck by it. Mr. Truefitt was always very fond of sketching, both in ink and water-colour, and this was his greatest amusement up to the last.

GENERAL BUILDING NEWS.

CHURCH, ADAMS-DOWN, CARDIFF.—The cornerstone of the new parish church of All Saints, Adams-down, Cardiff, was laid recently by Lord Tredegar. The church, which has a schoolroom underneath, will cost about £3,500. It is intended to accommodate about 300 worshippers. The architects are Messrs. Seddon & Carter, and the builders Messrs. Evans Bros.

BAPTISTRY, ST. MARY'S CATHEDRAL, NEW-CASTLE-ON-TYNE.—On the 10th inst. at St. Mary's Roman Catholic Cathedral, the new baptistry, containing a white marble monument which has been erected to perpetuate the memory of Catholic soldiers who have fallen in the South African war, was opened. The monument is composed of white marble and is oblong in shape. It is adorned with figures emblematic chiefly of the sorrows of warfare, while at either ends of it are figures, in full dress uniforms, representing privates in the Northumberland Fusiliers and the Durham Light Infantry, below which are carved in relief the arms of the respective regiments. The monument is 13 ft. high, 9 ft. long, and 4 ft. 6 in. wide. Iron gates form the approach of the baptistry, which is lighted with electricity. The floor is of mosaic sets, and contains a tablet. The baptistry has cost £1,400. The cost of the monument was £1,000. The architects are Messrs. Dunn & Hanson, and the sculptor of the monument, Mr. Robt. Beal, of Newcastle.

ST. ETHELWOLD'S CHURCH, SHOTTON.—On the 7th inst. the Bishop of St. Asaph consecrated the new church of Ethelwold, Shotton-in-Hawarden. The new church has been built of Staffordshire sandstone, with a clearstory, western gallery, and an apse, and is capable of holding 600 persons. There are three sets of windows in the east end, one erected to commemorate the independence of Great Britain, and the other two are memorials to the late Miss Davison. The south aisle is to the memory of the late Mrs. Gladstone. In the gallery are three stained windows to the memory of the late Mr. Gladstone. The gallery is approached by a flight of steps from the porch. The floors of nave, aisles, and choir are laid with wood blocks, the chancel with small black and dove-coloured tiles. The step and floor in the sacrum are laid with marble. All the painted glass is by Mr. Edward Frampton, of London. The pulpit and font are carried out in stone, the latter being Helsby stone. The nave and aisles are seated with chairs, the chancel having oak choir fronts and prayer desks. The altar table is of oak, and has been carved by Mr. Frank Hurlbutt. The reredos above is of wood, carved, painted, and decorated. The church is lighted throughout by suspended oil lamps by Messrs. Singers of Frome. Messrs. J. King & Co., Liverpool, are responsible for the heating. The whole of the structural work has been carried out by Messrs. J. Ward & Son, of Uttoxeter, from the design of Messrs. Douglas & Minshull, of Chester.

THE COTTANCIN SYSTEM.—The trustees of the St. Sidwell's Wesleyan Church, at Exeter, have decided to employ the Cottancin system of fireproof reinforced brick and reinforced cement construction for the erection of their church. The architects are Messrs. Commis & Coles, of Exeter, and the design, octagonal on plan, with lofty octagonal dome and cupola, and with a gallery unsupported by any pillars, forms an interesting subject for the application of this system of construction.

SEAMEN'S HOSPITAL, CARDIFF.—A new hospital is being erected at Cardiff on a site close to the present hospital ship. The foundations have been constructed with piers of concrete carried 2 ft. into the gravel. These piers vary in dimension according to the work they have to do, but are generally 4 ft. wide and from 4 ft. to 8 ft. or 10 ft. long. They also vary a good deal in their distance apart, from 6 ft. to 9 ft. or 10 ft. They contain of cement concrete for 4 ft. in height from their base to concrete above. A cement concrete lintel 4 ft. thick runs along the tops of the piers and forms the footing for the walls. In some parts of the building a slab of concrete takes the place of the lintels. Owing to the very soft nature of the clay, great difficulty was experienced in getting the shafts for the piers sunk, as the clay worked up from the bottom of the hole below the timbering. The superstructure will consist of the hospital wards, the administrative block, doctor's house, operating theatre, laundry, &c. The entrance to the hospital will be in Ferry-road. From the entrance porch a corridor will run straight to the wards. On the right of this corridor on entering will be a waiting-room for out-patients and consulting-room, dispensary, &c., and a small accident ward for receiving and examining cases before sending them on to the wards. Also on the right of the corridor will be the main stairs with a bed-lift in the well of the stairs. On the left of the corridor will be the kitchen, staff-room, stores, &c., and at the end of the corridor the wards and their adjuncts. The wards will be on three floors, a main ward containing sixteen beds, and a small ward with two beds on each floor—fifty-four beds in all. At the entrance to the wards will be the duty-room, with lifts, pantry, &c., and at the further end of the main ward a dayroom, facing south, with lavatories, bathrooms, sick-rooms, and emergency stairs. There will also be a recreation-room on the first floor in the front of the building. The wards and corridors will be

heated by low-pressure hot water. The floors of the wards will be of marble tiling. The operating theatre and Röntgen-ray room will be connected to the administrative block by a covered way. There will also be a small mortuary, viewing-room, and post-mortem-room. The doctor's house will be at the western side of the site, and will be connected by a covered way with the administrative block. A small infectious ward is to be provided, which will have no internal communication with the rest of the building. The buildings are designed in red brick, with red stone, Bath-stone, and terra-cotta dressings. The architect for the building is Mr. E. W. M. Cobb, Cardiff; the contractors are Messrs. W. Thomas & Co., Cardiff; and the clerk of works is Mr. John Evans, Cardiff.

HOSPITAL, PONTYPOOL.—The memorial-stone has just been laid of the Pontypool and District Hospital. Mr. Robert Williams, of London, prepared the plans, and the contract was let to Messrs. Bailey Bros. of Pontnewynydd. The contract price for the building is £3,841.

SCHOOL, WOODSIDE, ABERDEEN.—New school buildings are being erected at Aberdeen School Board at Woodside, from the plans of Mr. J. A. O. Allan, the Architect and Master of Works to the Board. The total frontage of the school is 252 ft. to Clifton-road. The new building will be two stories in height. The front of the school is being built of hammer-blocked and square-snecked ashlar grey granite, with picked dressings, and the back is pointed rubble. The total cost of the school will be about £18,000, inclusive of the heating and ventilating arrangements. For the last seven months there have been in course of erection a new wing to the south of the present school, and a detached building in the playground for the school adaptation of the cookery and manual instruction department. It has been found necessary to proceed with the work in sections because the present school has still to be utilised until the new block, or a considerable portion of it, is ready for occupation. The new school will have accommodation for over 1,500 children. When fully completed the school will be grouped round a central hall on the ground floor, 40 ft. in length by 42 ft. in breadth. This hall will rise to the first floor, with galleries all round on that floor, and the whole will be lit from the roof. At each end of this hall there will be two staircases leading up to the first floor. The ground floor of the new south wing, at present being erected, will be wholly devoted to the infants' department, with seven rooms, giving a total accommodation of 400 places. This department is to be provided with a front and back entrance, cloakrooms, store, and a wing for the staff. Along the centre of the infants' wing of the building there will be a corridor, 12 ft. 6 in. wide leading at the north end, into the central hall. The boys' and girls' front entrances will also lead directly into this hall, and the back entrances will be similarly situated. At each end cloakroom accommodation has been provided, and additional cloakrooms will be available with the new wing. The plan of the upper floor of the south wing makes provision for eight classrooms for the junior classes, with a central corridor similar to that on the ground floor, and teachers' accommodation. It is expected that this new south wing and the detached building for the cookery and manual instruction department will be ready for occupation early next summer, when the school classes can be transferred to the new building, leaving the old building free for demolition, with the exception of the four classrooms at the back, these, with some alteration, to be utilised. The ground floor of the new wing to the north of the central hall will contain five classrooms, a corridor similar to that in the south wing, a teachers' accommodation, and a head-master's room. On the first floor in this wing there will also be five classrooms, a library, a music-room, cloakrooms, and teachers' rooms. In the separate building now in course of erection the cookery-room is provided on the ground floor. It measures 20 ft. square. Off this cookery-room, which is entered from the girls' playground, there is a scullery. At the other end of the building there is the entrance from the boys' playground to the manual instruction classroom, which will occupy the first floor, and will be reached by a stair. This room will be 35 ft. long by 25 ft. wide, and will be fitted up with benches and all other necessary apparatus for instruction in woodwork. The height of the classrooms throughout will be 14 ft. A janitor's lodge is to be erected at the south end of the site near Clifton-road. Playsheds and other accommodation are to be provided separate for each department of boys, girls, and infants. The floors of the ground floor, hall, and corridors will be of white wood blocks on concrete, and the dadoes of all the corridors, staircases, &c., will be lined with glazed tiles. The lighting of the school throughout will be by electricity supplied from the Corporation mains. The contractors for the various departments of the work are as follows:—Mason work, Mr. George Hall; carpenter work, Messrs. Henthorn & Keith; slater work, Messrs. Morton & Stewart; plaster work, Messrs. J. Scott & Son; plumber work, Messrs. Thom & Strachan; painter and glazier work, Messrs. Murray & Mitchell; steel work, Messrs. William Mackinnon & Co.; and iron and blacksmith work, Messrs. J. Abernethy & Co., Aberdeen Foundry.

WORKMEN'S DWELLINGS, DEVONPORT.—The memorial stone of the new workmen's dwellings in Ordnam-street area, Devonport, was laid on the 6th inst. The Ordnam-street area cost about £10,500, and the new buildings will cost £17,500. The site is just over an acre in extent, and there will be three blocks of buildings, contained in all will be sixty-three separate dwellings of two and three rooms each. The builder is Mr. A. N. Coles, and the architect is Mr. J. F. Burns, Borough Surveyor.

ASYLUM, TALGARH, BRECONSHIRE.—A new asylum has been erected at Talgarh, Breconshire and Radnorshire. The asylum, the contract price for building which was about £20,000, is designed to accommodate 350 patients, but the administrative blocks provide for possible additions to bring the total up to 500. There are six blocks of buildings for the patients, viz., one for epileptics (males) and another for females, one for general acute cases (male) and another for females, and one male and one female infirmary blocks. The blocks are connected by a continuous corridor. The exterior work is native stone-walling, with ashlar stone dressings, but all the interior of the walls and woodwork is painted. The patients are housed from the main building, the pavilion hospital for male and female patients; and also a mortuary, a chapel for religious services, and the medical superintendent's residence. The architects of the asylum are Messrs. Giles, Gough, & Trollope, of London. The clerk of the works is Mr. W. T. Creed, and the builder was Mr. W. Williams.

CORONATION MEMORIAL, STAMFORD.—The design for the Coronation Memorial, Stamford, by Mr. J. C. Traylen, A.R.I.B.A., which has been selected, is of free Classic treatment. The lower part is circular in shape, and stands upon a spreading base, which may be used as a seat, approached by steps. The upper part is octagonal, having deeply recessed arches and a bronze panel on the four cardinal sides, divided by attached shafts. From these panels are caps of which spreading foliage springs, and fills the spandrels up to the cornice. A truncated termination is carried up above the cornice, upon which is fitted a wrought crown of iron, bronzed. The crocketed ribs and the centre termination of it will form attachments for the electric light. The total height from the base to the top of the arch will be 20 ft. The materials of its composition will be granite, marble, bronze, and iron. The intention is to show that King Edward VII. was crowned on a certain date, and that at that time peace was concluded in South Africa, and a bronze panel on the south side towards Ironmonger-street on the south side to show that the arms of the King, highly emblazoned in colour and gold by enamel, on copper, or vitreous mosaic work. On the east and west cardinal panels, respectively, the arms of Edward IV. and William Browne are introduced in stone-work, with bronze panels setting forth their connexion with the town. These panels are connected all round with cornucopia garlands. The north panel is a memorial to the Stamford Volunteers.

SANITARY AND ENGINEERING NEWS.

THE PYRMONT BRIDGE, SYDNEY.—Previous to 1857 communication between the two Sydney shores was maintained by means of ferry and row boats, but in that year a wooden bridge, constructed by private enterprise, at a cost of £75,000, was opened, & toll being levied on each passenger, vehicle, or animal crossing. There was a swing span in the centre to enable masted vessels to pass through. In 1884 the bridge was purchased for £40,000, by the State Government, and the tolls abolished. This year a wooden bridge, of a rapid expansion of passenger and vehicular traffic that a new bridge became indispensable, and, after various preliminaries, competitive designs were invited from various parts of the world, that obtaining the first premium being estimated to involve a cost of £95,700. Ultimately it was arranged that the new bridge should be constructed from designs prepared by Mr. Percy Allan, M.Inst.C.E., one of the engineers in the State Department of Public Works, and an Australian by birth, a commencement being made with the actual work in September, 1899, and the structure formally opened on June 28, 1902, by Sir Harry Watson, the State Governor, assisted by the Hon. E. W. O'Sullivan, State Minister of Public Works. The total length of the Pyrmont Bridge and its approaches is 1,758 ft., the bridging occupying 1,200 ft., of which 223 ft. represents the length of the swing span. The heaviest work was in connection with the sinking of the caisson forming the main support of the bridge swing. This huge chamber, having a diameter of 42 ft., was commenced on August 2, 1900, and a few weeks later was completed sufficiently to permit of its being grounded, by means of girders and wedges, in the position it was intended to permanently occupy. Then it was gradually worked down a depth of 45 ft. below the low water mark, at which point the cutting edge touched rock on a level. The necessary damming having been completed, the water was pumped out and excavations carried on in the "dry" until a "blow" occurred, when the work had to be continued with the surface of the rock under water.

The caisson, when the work of sinking had been completed, was filled with a solid mass of stone and concrete, representing a dead weight of over 8,000 tons. Electricity supplies the motive power or working the bridge-swing; its slewing, the lifting of the ends, the operating of the gates closing the traffic, and the lighting of the roadway being controlled by a man stationed in a conning-tower in the centre of the bridge. Both the slewing and its motions are carried on a platform inside the drum, the former working through a train of gears, a vertical shaft, on the lower end of which is cast a steel pinion meshing, with a steel rack secured to the top of a pivot pier, while the end lift is effected by means of cones on horizontal shafts worked by a 35 horse-power motor gearing on to a longitudinal shaft running the whole length of the bridge span. The materials used in the latter were iron and stone, Australian hardwood being largely employed in the construction of the other spans, twelve in number, each having a length of 82 ft.; while the roadway, which is 4 ft. wider than that of the Tower Bridge, London, is asphalted.

FOREIGN.

FRANCE.—The Prix de Rome in Architecture has been awarded to M. Léon Prost, pupil of M. Marcel Lambert.—A group of artists have founded a society which will organise at the Grand Palais, in the months of October and November, an exhibition to be called "Salon d'Automne."—A luxurious casino is to be established in the forest of Pierrefonds, at a cost of about a million francs.—M. Reynaud has been elected President of the Société des Architectes de la Bouches du Rhône.—The architects of the Department of the Gard have constituted themselves a society, under the presidency of M. Seuilhaac, architect, of Nîmes.—The jury in the competition for a museum at Nîmes have awarded the first premium to M. Raphaël, of that city; the second to M. Peysson, of Lyons, and the third to M. Arnaud, of Nîmes, and M. Muller, of Marseille.—The jury in the competition for a Savings Bank building at Wassy have awarded the first premium to M. Robert, of Clamart.—The Commission des Monuments Historiques will take a hand shortly the restoration of the ancient church of Locronau, one of the oldest monuments of Finisère.—The Municipality of Paris has decided on the construction of a theatre on the Place de l'Égalité, at a cost of a million francs.—The Government have despatched M. Emile Bertone, the architect, to Berlin to make a study of the fragments from Palmyra which are in the Asiatic museum there.—M. Ernest Dubois, the sculptor, is at work on the monument to Bossuet for the cathedral of Meaux. The monument includes a statue of Bossuet on a pedestal, which is flanked by two groups of historic figures—Turenne and Mlle. de la Vallière on the right, and the Dauphin of France and Henrietta of England on the left.

MISCELLANEOUS.

BOOK SALES IN LONDON.—Amongst the books, prints, and other works of art that were included in the closing sales by auction for the current season the following were disposed of: *Virgii Aeneid*, by J. M. Smith, 1884, 36s.; *A Description of the Works of Art* forming this collection, 1884, 36s.; *Dr. J. L. Proper's History of Miniature Art*, 1887, 22s.; *J. M. Whistler, "Etchings and Dry-Points"*, sixteen plates, 49s.; *F. Seymour Haden, "Etudes à l'Eau Forte"*, 1866, twenty-five plates, 77s.; *J. J. Boydell, "History of the River Thames"*, 1794-96, with seventy-six fine engravings and numerous portraits, views, &c. inserted, 31s. 10s.; *W. H. Pyne, "History of the Royal Residences of Windsor, Carlton House, St. James's Palace, &c."*, 1819, 17s. 5s.; *John Hutchins, "History and Antiquities of the County of Dorset"*, 1801-70, with a large number of extra views and other illustrations, 23s. 5s.; *J. M. W. Turner, "England and Wales"*, 1837, 27s.; *J. Smith, "Catalogue Raisonné of the Works of the most eminent Dutch, Flemish, and French Painters"*, 1820-42, in nine volumes, 15s.; *M. Drayton's "Poly-Olbion"*, 1613-22, 44s. 10s.; *The Roadster's Album*, 1845, a very rare work, with coloured plates of old coaching-roads, &c., 49s.; *Benjamin John Smith, "A Map of Virginia"*, 1612, 20s.; *Beverly's "Virginia"*, 1705, 10s. 2s. 6d.; *A Brief Description of the Province of Carolina*, 1666, 42s.; *John Lederer, "Discoveries in Virginia and Carolina"*, 1672, 120s.; *Lescarbot, "Nova Francia"*, 1609, 27s.; *G. Thomas, "Account of Pennsylvania"*, 1680, 100s.; *Whitbourne's "New-England"*, 1659, 33s.; and *"Nova Britannia Virginia"*, 1609, 35s.

THE CHRIST HOSPITAL SITE, LONDON.—At a meeting of the Court of Aldermen held on Tuesday last week it was resolved that the seal of the Court should be affixed to two indentures whereby the Mayor, commonalty, and citizens of London, as Governors of Christ Hospital, convey to themselves as Governors of St. Bartholomew's Hospital in consideration of the sum of £23,845, the freehold of certain premises in Giltspur-street, Little Britain, Ball-court, a small part of the passage-way Green Dragon-court, and that portion of Christ Hospital, including the leasehold, but not the free-

hold, of such portion as was held by Christ Hospital upon lease from the Corporation which was adjacent to St. Bartholomew's Hospital, and was comprised in the notice to treat served by the Governors under the St. Bartholomew's Hospital Act, 1901; and (b) in consideration of the sum of £8,871, some land containing 1,376 sq. ft. which was not cited in that notice, being part of the passage-way in Ball-court. The demolition of the school buildings has already been begun.

THE KING'S SANATORIUM FOR TUBERCULOSIS.—The Ad Hoc Committee appointed by King Edward VII. have, with the King's approval, made their award in respect of the three prizes, for which 180 essays, with plans, were sent in. They adjudged the first prize to Dr. Arthur Latham, of London, with whom is associated as architect Mr. William West, both of London; the second to Dr. F. J. Wethered, with Messrs. Law & Allen as architects, all of London; and the third prize to Dr. E. C. Morland, with Mr. G. Morland as architect, both of Croydon. Honourable mention is made of four essays—by Dr. P. S. Hichens, of Northampton, with Mr. R. W. Schultz, of London, architect; Dr. Turban, of Davos, with Herr J. Gros, of Zurich, architect; Dr. Jane Walker, of London, with Messrs. Smith & Brewer, of London, architects; and Dr. R. P. Wills, of Bath, with Mr. W. H. Morland, architect. The Committee consisted of Sir W. Broadbent, Sir R. Douglas Powell, Sir Felix Semon, Sir Herman Weber, and Dr. Theodore Williams.

A TRACTOR FOR FIRE-APPLIANCES.—The Chief Officer of the Metropolitan Fire Brigade has designed an improved tractor for the transit of fire-brigade appliances, and for general use with vehicles that have a pivoted front-carriage, by removal of the front-carriage and bolting the tractor in position, with its driving-axle in place of the axle of the former. The frame of the tractor will carry a motor upon its light steel girders. Brackets on the rear end carry the axle of the two driving-wheels as well as springs for a frame to which the turning-plate is fixed. The rear-most end is adapted for the transport of a fire-escape.

LONDON UNDERGROUND RAILWAYS AND PARLIAMENT.—The Select Committee of the House of Commons, of which Mr. Lewis McIver is the chairman, have found as proved the preamble of the Brompton and Piccadilly-circus Bill. They have postponed until next October the consideration of the Bills promoted by the Piccadilly, City, and North-East London and the London United Electric Railways Companies. In the course of the evidence heard by the Committee it was stated that a sealed undertaking has been made by the Underground Electric Railways Company (or TrACTION Company) to contract to build the Brompton and Piccadilly-circus, the Great Northern and Strand, the Baker-street and Waterloo, and the Charing Cross, Euston, and Hammersmith railways, and Parliament is asked to give capital powers in respect of those four projects of 3,844,000l. debenture stock and 11,536,000l. ordinary stock. Mr. Edgar Speyer, senior partner in the firms of Messrs. Speyer Bros. of London, and Messrs. Speyer & Co. of Frankfurt and New York, expressed to the Committee the readiness of himself and his associates to undertake to furnish the money for the construction and equipment of those four tube railways. The Committee have inserted a clause in the first-named Bill which declares that the powers of the Company under the Act shall cease and determine if they, within twelve months from the passing of the Act, shall have failed, through any cause within their own control, to have substantially begun the construction of the line.

PUBLIC IMPROVEMENTS, NOTTINGHAM.—The Town Council having applied to the Local Government Board for sanction to borrow 11,400l. for purposes of street improvement and 3,500l. for the reconstruction and improvement of the bridge in Wilford-street, Nottingham, known as the Navigation Bridge, Mr. A. A. G. Malet, M.Inst.C.E., the inspector appointed by the Board, held an inquiry on the 6th inst. into the subject. The Corporation was represented by the Town Clerk (Sir Samuel G. Johnson), Mr. A. Brown (City Engineer), Mr. T. W. Gordon (assistant city engineer), Mr. J. E. Bryan, and others. The works included the improvement and widening of Sneinton Hermitage, Colwick-road, Meadow-lane, Trent-lane, estimated cost 3,840l., together with the carrying out of small improvements in setting back new buildings to improved street lines in Dale-street (Sneinton), Fairfax-street (Basford), Byard-lane, Windmill-lane, Hounds-gate, Nottingham-road (Basford), London-road and Leen-side, Thurgarton-street, Cinderhill-road, Bradford-street (Butwell), Carlton-hill, and Bluedale-hill, the cost in this instance being estimated at 5,500l. The reconstruction and improvement of the bridge in Wilford-street was explained to have been rendered necessary by the increase in the traffic, the old one being considered unsafe for the heavier weights now carried, and also by reason of the electric tramway developments. After hearing the evidence and inspecting the various plans, the inspector proceeded to view the respective sites. There was no opposition.

SCOTTISH BUILDING TRADES FEDERATION.—The quarterly meeting of the Executive of the Scottish Building Trades Federation was held on the 7th inst. in the Station Hotel, Stirling, Mr. Robert

Lamb, Edinburgh, President, in the chair. Members were present from various parts of the country. The report, which was submitted by the Secretary, Mr. James L. Selkirk, Glasgow, referred to the principal matters which were engaging the attention of the Executive and to the progress that was being made. In particular, the question of more complete organisation in the several districts was fully considered, and an earnest appeal made for hearty co-operation. The state of the finances called for special attention, and a scheme was submitted for placing these on a more satisfactory footing. Discussions took place on the various subjects treated of in the report, and resolutions were adopted bearing on future work. The annual meeting was fixed to be held in Edinburgh in October next.

THE DANGERS OF HOUSE DEMOLITION.—An inquest was held by Dr. G. D. Thomas, at Holborn Coroner's Court on the 11th inst., concerning the death of Henry William Parker, aged forty, a labourer, who was killed by the sudden fall of the first floor at 217, Tottenham Court-road, the centre house of three old houses which were being demolished. Mr. C. F. Hayward, District Surveyor of Holborn, explained that he had no control over the demolition of old premises, which were generally pulled down in a very careless manner. The jury, in returning a verdict of accidental death, called attention to the danger in such cases of loading floors with rubbish, and expressed the opinion that these demolitions should be under the jurisdiction of the District or Borough Surveyor.

CO-OPERATIVE BUILDING.—A meeting of the Hull City Council was held on the 7th inst. The City Improvements Committee recommended that the tender of Mr. T. Goates for the erection of eleven workmen's dwellings, amounting to 2,771l., be accepted. The lowest tender on the list was that sent in by the Hull General Builders, Ltd., amounting to 2,750l. 16s. 0d., and Mr. T. G. Hall moved that this be accepted. He said that opposition to the Hull General Builders, Ltd., arose from the fact that it was a co-operative society. Mr. McLaren seconded Mr. Hall's amendment. Alderman Massey supported the Committee, pointing out that the tender sent in by this co-operative society of artisans was not a complete one, and that the sureties were not submitted. Young firms had reputations to earn, and they had confidence to establish. He had no desire to injure these united working men. He wished them success, and had no doubt they would attain it. Mr. Hall reminded the Council that the names of two substantial sureties were submitted. The Town Clerk: Yes, on the following day. On a division the amendment was carried, and the contract given to the co-operative firm.

FARADAY HOUSE.—The Faraday House Journal announces that this important electrical training establishment will open its autumn session on September 15, and the entrance examination will be held on Monday, September 8, at 11 a.m. According to the Journal, an important alteration has been made in the arrangement of the first year's work. In future fresh courses of instruction will be begun at the commencement of each term—viz., in January, after Easter, and in September—instead of twice a year only—viz., in February and September—as has been the case hitherto. This arrangement came into operation this year, and the result has fully justified the action of the Board in making this departure, the number of students at present on the books of the institution being higher than it has ever been since its foundation. The alteration has necessitated considerable additions to the accommodation. The building at the back of Faraday House has therefore been taken, and two large light drawing offices, a carpenter's workshop, and a new common-room fitted up. In the front building alterations have been made on the fourth floor, and a new lecture-room and common-room fitted.

LEGAL.

REMOVING CONTRACTORS' MATERIALS IN WESTMINSTER.

THE case of the Postmaster-General v. the Mayor, &c., of the City of Westminster came before Mr. Justice Joyce in the Chancery Division on the 11th inst. on a motion by the plaintiff for an interim injunction restraining the defendants until trial or further order from wrongfully removing and disturbing any materials, tools, machinery, or apparatus placed or to be placed by the plaintiff, his contractors, servants, or agents in or upon any streets and public roads within the City of Westminster for the purpose of executing any work authorised by the Telegraph Acts, and from impounding any such materials, &c., so wrongfully removed or disturbed, and from making or exacting any charge for or in respect of delivering, restoring, or replacing any such materials or apparatus, or from otherwise interfering with or obstructing the plaintiff in the execution of works authorised by the Telegraph Acts and the exercise of any of the powers conferred on him for the purposes of the said Acts.

It appeared that a dispute arose between the Postmaster-General and the Corporation of the

City of Westminster as to the right of the former in executing works authorised by the Telegraph Acts to deposit materials and plant required for the works in the public streets. Last month the officials of the Corporation removed certain plant and materials stacked by the Post-office contractors in the roadway of the Broadway, Westminster, to the City yard, and the Corporation declined to give them up until the expenses incurred in their removal had been paid. Hence the present proceedings for an interim injunction.

The Solicitor-General and Mr. Cassaly appeared in support of the motion; and Mr. W. F. Hamilton, K.C., and Mr. Morton Smith for the Corporation.

Mr. Hamilton stated that there was a very serious question to be determined at the trial as to whether the post-office authorities had the right in carrying out authorised works to use the public streets for the storage of materials during the construction of the works. The Corporation had seized the plant and materials under powers conferred upon them by Michael Angelo Taylor's Act. The Corporation did not wish to obstruct the Postmaster-General in the execution of the necessary works.

Mr. Justice Joyce suggested that the Corporation should, without prejudice to their rights, return the goods in question.

Mr. Hamilton agreed to do this.

In these circumstances his Lordship directed that the motion should stand till the trial, the plaintiffs to have leave to bring it on again on a two days' notice.

IMPORTANT TRADE UNION APPEAL.

In the Court of Appeal, composed of the Master of the Rolls and Lords Justices Stirling and Cozens-Hardy, on the 7th inst., the arguments in the case of *Read v. the Friendly Society of Operative Stonemasons* and others were concluded on the appeal of the defendants (other than R. E. Saunders) from a judgment of a Divisional Court of King's Bench composed of the Lord Chief Justice of England, Mr. Justice Darling and Mr. Justice Channell ordering a new trial of the action tried before Judge Eardley Wilmot, the County Court judge of Ipswich, in which he gave judgment for the defendants. There was also a cross-appeal by plaintiff asking that judgment might be entered for him.

The action was brought by the plaintiff *Read* against the defendants for damages for wrongfully and maliciously inducing Messrs. Wigg & Wright, of Ipswich, to whom the plaintiff had been bound apprentice for three years as a stonemason, to break the contract of apprenticeship. The deed of apprenticeship was entered into on June 1, 1900, at which date the plaintiff was 25 years of age, and by the deed the plaintiff covenanted to serve his employers for three years at 15s. a week, and they (the employers) covenanted to teach him the trade. Messrs. Wigg & Wright and the men in their employ were members of the defendant Society. Certain rules had been drawn up between masters and men, and these rules Messrs. Wigg & Wright had agreed to and signed. Rule 6 for Ipswich and district was as follows:—"Apprentices.—That boys entering the trade shall not work more than three months without being legally bound apprentices, and in no case to be more than sixteen years of age, except masons' sons and stepsons. Employers to have one apprentice to every four masons on an average." At a lodge meeting of the defendant Society on August 13, 1900, it was resolved that if the plaintiff started work for Messrs. Wigg & Wright as a mason, one of their employes was to report the fact in two hours. Owing to the action of the defendant Society from August 3, 1900, to May 20, 1901, Messrs. Wigg & Wright did not employ the plaintiff as a stonemason or teach him the trade; but he continued to do labourer's work. On May 20, 1901, the Secretary of the defendant Society wrote to Messrs. Wigg & Wright that they regretted that the firm had put themselves into a difficult position, but the members of the Society considered the firm's action a direct infringement of the rule, and if the man started working at the trade they were bound to protest against the firm for introducing an individual not of the trade, and in accordance with their general rule the Society had empowered their members working for the firm to take prompt action in the matter. The defendants, in their answer to interrogatories, admitted that "prompt action" meant that the masons in Messrs. Wigg & Wright's employ should give two hours' notice and leave their employ if they thought fit. The County Court Judge held that the facts fell short of giving any ground for action against the defendants, who seemed to have acted bona fide in the best interests of the Society and not from any improper motive, and though the defendants' interpretation of the rule might not be correct, they had not acted improperly in their method of enforcing it. The Divisional Court on the plaintiff's appeal from the learned County Court Judge's decision, held that the contract alleged by the defendants was one which, if proved, might, by reason of its being in restraint of trade or otherwise illegal, be incapable of being enforced, and in that case to seek to hold Messrs. Wigg & Wright to it could not be held a sufficient justification. Whether there was a contract

between Messrs. Wigg & Wright and the defendants did not sufficiently appear. For these reasons the Divisional Court held that there must be a new trial. Hence the present appeal of the defendants and the cross appeal of the plaintiff.

Mr. Arthur Cohen, K.C., and Mr. Chester Jones appeared for the appellants (the defendants); and Mr. Frederick Low, K.C., and Mr. Henlé for the plaintiffs.

Mr. Cohen contended that the defendants were perfectly justified in giving the notice to the employers of the plaintiff and that they were not liable for an action for malicious conspiracy. It appeared to him that the action ought to have been brought against Messrs. Wigg & Wright, by whom the contract was broken. In this case it could not be said that there had been "procuring" at all on the part of the defendants. The defendants simply said that Messrs. Wigg & Wright, having subscribed to the rules, had violated them, and they called upon Messrs. Wigg & Wright not to employ the plaintiff as a mason apprentice. On general principles, therefore, it would seem unjust to hold that the plaintiff was entitled to recover from the defendants damages which were really the consequence of misconduct on the part of Messrs. Wigg & Wright. It would be to introduce a dangerous and mischievous fiction if it were said in this case that the defendants had been maliciously procuring anything. There had been no agreement on the part of the defendants to do an unlawful act at all. The resolution of the Society to give warning to Messrs. Wigg & Wright was a perfectly legal act. They simply asked Messrs. Wigg & Wright to do what they were bound to do—namely, not to violate the rules of the Society. What was done by the defendants was done, not out of spite or ill-will, but was done bona fide and in exercise and protection of their rights. To support an action for conspiracy it must be shown that the defendants had been agreed or combination to do an unlawful act.

Mr. Chester Jones having followed on the same side.

Mr. Low, for the respondent, said that the action was of great importance, both from the point of view of the rights of Trade Unions, and the more important question as to the freedom of persons in the position of the plaintiff to enter into contracts with regard to their own labour. It had been suggested that the proper remedy for the plaintiff was to sue his employers. If that was to be considered an answer to that class of action, it would dispose altogether of actions for procuring breaches of contract. It was a violation of a legal right to interfere with contractual relations. In this case it was absolutely clear that a violation of a legal right had been committed, and that the contractual relations between the plaintiff and Messrs. Wigg & Wright had been interfered with. He submitted that the whole discussion turned upon the question of justification, and the evidence called in the County Court, and the correspondence which had taken place, showed conclusively that there had been unlawful interference by the defendants with the plaintiff's rights. The plaintiff, then, twenty-five years of age, wished to discontinue his position of a labourer to qualify himself as a mason, and to follow the trade his father had followed. The plaintiff went to a firm who would teach him that trade and enable him to earn higher wages, and he was engaged by them as an apprentice. Had that contract been carried out the plaintiff now would be in the position of being a fully qualified stonemason. The Society, however, interfered. It gave notice to the employers that unless they refused to perform their contract with the plaintiff it would call out the persons in their employ who were members of the Society. Messrs. Wigg & Wright were then faced with two alternatives. One was not to comply with the request of the Society, and the other was to stop teaching the plaintiff his trade or be practically ruined by having their labour taken from them by the Society. The breach of contract was solely brought about by the Society under the threat of a strike. It seemed to him (counsel) that what was left out of sight altogether in the arguments for the appellants was that the inducing or the procuring of a breach of contract was *prima facie* an unlawful act. There was nothing to show in the present case that the plaintiff had any knowledge whatever of the existence of the rules of the Society. He submitted that these rules could not exclude a man twenty-five years of age from learning the trade of a mason. The construction put on the rules by the defendant was that no person over sixteen years of age should learn the business. That was a rule, he submitted, that no court could recognise as giving the foundation of any legal right. The Society practically said that no matter how a man might get on, or what incentive he had to improve himself, if he was over sixteen years of age he must not be apprenticed to learn the trade, but must remain a labourer. It was clear upon the face of the rules produced that they did not apply to the plaintiff. If the argument by counsel for the appellants was right that the provision in the rules meant that no person should learn the trade if he was over sixteen years of age, then such a provision their lordships would be entitled to ignore as being an unreasonable and absurd restriction on trade.

Mr. Henlé having followed on the same side, and Mr. Cohen having replied on the whole case, the Master of the Rolls said that the Court would reserve judgment.

DISPUTE OVER EARLY BUILDING OPERATIONS.

In the Court of Appeal composed of Lords Justices Vaughan Williams and Mathew, on the 12th inst., the case of *Browning & Heselline v. Harrod's Stores, Ltd.* and others came on for hearing on the appeal of the defendants from a decision of Mr. Justice Buckley on the 7th inst. granting an injunction restraining the defendants and their contractors from working a steam crane in such a way as to be a nuisance to the plaintiffs. The injunction restrained the working before 7 o'clock in the morning.

Mr. Buckmaster, K.C. and Mr. Mangham appeared for the appellants; and Mr. Astbury, K.C. and Mr. Bischoff for the plaintiffs in the action.

It appeared that the plaintiffs occupy premises in Harrod's Road, Brompton road, and the defendants Harrod's Stores, Ltd., are enlarging their premises, the workmen on which commenced their work at 6.30 a.m. The plaintiffs allege that from 5.30 a.m. when the engineer of a steam crane employed by the defendants' contractors sited his engine, lighted his furnace, and got up steam, and when the main commenced work, they could obtain no sleep; and they applied for an injunction, which the learned Judge in the court below granted, restraining the nuisance complained of until 7 a.m. Harrod's Stores, Ltd., appealed, and urged that as the rule of the trades-union prevented them from altering the hours of work, they would suffer considerable loss by having to work 300 men each for half-an-hour every day for work which they did not perform, and that the injunction was therefore, and for other reasons, unreasonable.

In the result their lordships discharged the injunction with costs, and remarked that they were far from saying that if there was a nuisance created by the steam crane for half an hour, the plaintiffs would be bound to submit to it. In their judgment, however, there was no evidence that a nuisance existed. Persons conducting building operations were bound to use all reasonable means to prevent a nuisance, but it could not be said that half-past six was an unreasonable hour to commence work in the summer months. The plaintiffs had no vested right to say they should not be disturbed in their sleep before seven in the morning.

The appeal was accordingly allowed.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

7,512.—AN ANTI-FREEZING DEVICE FOR HOUSE TAPS: *I. Osgood*.—The inventor devices an auxiliary valve for the taps or faucets of house-service pipes through which water can be drained and air can be admitted when one closes the stop-cock at the main, which also has a drainage outlet. A perforated screw fastens the washer of the valve-plug, which is recessed for a ball-valve that the pressure of the water normally forces on to its seat in the plug. The ball drops with the cutting off of the supply, and air passes into the pipe through a port, and the recess. For the ball-valve may be substituted either a cylindrical or a hollow valve.

7,551.—CLEANSING OF SEWERS AND DRAINS: *F. Gunn and N. M. Gunn*.—A dish-dish metallic plate having pointed ends, and fitted at one end with a flap that will open in only one direction, is to be drawn through the drain or sewer. Cross-bars strengthen the plate, which may also be provided with wheels on its under side.

7,556.—FITTINGS FOR PUMP-PISTONS: *E. Hovatta and R. S. Lloyd*.—The invention, which relates more especially to the packing of the pump buckets and pistons of deep well, petroleum, and similar pumps is intended to obviate its frequent renewal or adjustment. The customary cup-leather packing is supplemented with a packing of hemp gasket, together with loose rings, of which the conical facings are laid against the packing, and which, as they are free to move slightly, will compress the packing as the liquid pressure is successively exerted upon them, whilst friction is reduced with rollers or balls inserted behind the rings.

7,561.—MANUFACTURE OF SLABS AND TILES: *M. Storp*.—The setting of plaster of Paris, to be pressed in a mould is retarded by mixing with it a portion one-fifth by weight, of magnesium chloride; the moulded goods may then be rendered weather-proof with a coating of some celluloid solution or varnish, or by soaking them in paraffin.

7,598.—A CUTTER FOR USE IN BORING MACHINES: *W. Taylor and W. Doherty*.—An expandable cutter consists of two wedge-shaped parts clamped one another with screws through slots in the screw that enables one to expand the parts, so to bore differently-sized holes engages with a thread on one of the parts, and is held lengthwise with a screw on the other part. A groove and a dove-tailed projection on the two parts respectively retain the parts in sliding contact together.

7,606.—IMPROVEMENTS IN LIFT-VALVES: *H. Lippold*.—A ring, whereon a conical seating is fashioned, is screwed into a diaphragm, and the seating fits into an annular recess of the valve. In another from the relative positions of the recess and the seating are reversed. A ring and a screwed sleeve normally retain between them the nut inside which the spindle screws, and the joints are covered with a cap that is screwed on to the casing. The renewal of the seal or valve can be effected by turning the nut and the sleeve until the lower end of the latter becomes seated upon the diaphragm, then the cap and other portions are unscrewed, so that one obtains access into the interior of the valve whilst the current of water is arrested.

7,625.—A METHOD OF HARDENING RESINS: *Elektricitäts A.G. vorm. Schuckerl & Co.*—For the hardening of colophony and other soft resins used in making lacquers, the inventors cause air or oxygen, under pressure, to be forced through molten resin mixed, it may be, with linseed or Chinese wood oil, and with lead, manganese, or other salts of resin acids or oleic acid, litharge, metallic oxides, or salts, or some such oxidising or drying agents.

7,636.—IMPROVEMENTS IN GRATES: *F. Ashby and W. P. Bonwick (Flaming Firebrick Co.)*.—To promote the burning of coke, anthracite, and other fuel, interlocking sections or slips of firebrick are used to line the sides and back of the grate, their adjoining faces are fashioned with compound recesses so as to form ducts when the sections are laid and joined together with holes and dowels. Confer also No. 7,682 of 1897.

7,659.—MOULDING ARTICLES OF CONCRETE, CEMENT, &c.: *A. Musker*.—Water is pumped out of a reservoir into a cylinder, the water being released when the pressure becomes abnormal by means of a relief-valve and a subsidiary relief-valve on the pump or on the pipes. The ram of the press works through the table that carries the moulds or slab frames and forces the material in the mould against a head, when it is lifted by water pumped into the cylinder. The arms of counterbalance levers carry tamping or ramming mechanism that can be lifted or depressed with handles. When the tamper is depressed the stamps are thrown into gear by a spring that works a clutch, which is lifted the stamps are thrown out of gear by the clutch, which is worked by a lever that is set in engagement with a pin upon the rammer.

7,692.—ADJUSTMENTS OF CALLIPERS AND SIMILAR GAUGES: *G. H. Bulrick*.—A square-set end piece is provided for each bar of a pair of true bars which slide upon one another through yokes between the table that carries the moulds or slab frames and forces the material in the mould against a head, when it is lifted by water pumped into the cylinder. The arms of counterbalance levers carry tamping or ramming mechanism that can be lifted or depressed with handles. When the tamper is depressed the stamps are thrown into gear by a spring that works a clutch, which is lifted the stamps are thrown out of gear by the clutch, which is worked by a lever that is set in engagement with a pin upon the rammer.

7,705.—A LIFTING-JACK: *R. B. Alliton*.—A screwed and detachable bush is placed so that it shall not turn in the standard, the socketed head of the working screw takes the stem of the lifting-head, and balls are inserted between the latter and the top of the standard, whilst the sliding can be prevented by the clamping of one of the yokes on both the bars. A fine adjustment can be procured by means of a screw between the yokes, and the bars are graduated. In the case of profile and contour gauges, a square for a shoulder is formed with the reversal, sideways, of one of the bars; and in the case of drawing-compasses the end pieces are set with points, whereby a beam compass is supplied.

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7,723.—APPLIANCES FOR GAS-BURNERS: *F. Abraham*.—For heating the air-supply, the inventor contrives that it shall partly flow down between concentric chimneys or between the chimney and the globe, and partly be admitted through apertures under the control of a hit-and-miss valve; the heated air is thence conveyed in part through apertures into the mixing-tube of the burner and in part through other openings in the conical valve, also a space between the hit-and-miss valve, into a space between the chimney and the head of the burner. A disc hit-and-miss valve may supplant the conical valve.

7,734.—CONSTRUCTION OF FOUNDATIONS, &c.: *W. O. Roy*.—For making foundations, boundary-stones, landmarks, and so on, and also for fencing, an hour-glass shaped hole is made in the ground by raking a row-bar, and the space thus made is filled with cement.

7,762.—A FENCE FOR SAW-BENCHES: *N. Talbot*.—A set of rollers are mounted on the bench so that they may be adjusted at different heights with a carrying-bar which moves in slots cut in the frame to which it is clamped with a nut, the carrying-bar is extended to carry a roller which will prevent the bench from being bent outwards as it is passed between the saw and the fence, the spindles that carry the rollers carry a lower series of rollers besides.

7,784.—FASTENINGS, &c., FOR WINDOWS, CASEMENTS, AND FANLIGHTS: *J. B. Le Maître*.—A sliding sash may be retained at any desired height without balance-weights or cords by means of worm gearing, whereof the worm is worked with an endless cord or a handle) is set to gear with a worm-wheel upon a spindle that carries a worm-screw and is in gear with a rack in a recess in one of the sash-stiles. A round-nosed sliding bolt that sustains the other side of the sash can be locked with a key or handle, and a spring presses it to engage with the rack. The sash carries friction rollers which bear against metallic guiding-plates on the frame. The contrivance is applicable for the outwardly projected racks or stays of casements and fanlights.

7,789.—APPLIANCES FOR USE WITH SCAFFOLDING: *T. Stubbs*.—Planks are carried upon a bracket consisting of a horizontal arm to which is pivoted a supporting arm, and the two arms are fastened to the pole with chains, screwed hooks, nuts, and quadrantal clips. An eye for a safety cord or bar is fashioned at the upper end of an upright which is bolted on to the horizontal arm. The pole can be placed out of the way against the wall.

7,814-5.—PROCESS OF MOULDING TILES: *R. Loss*.—The pug-mill feeds the sheet of clay to the moulding rollers, which are grooved to take the clay, have cross-ribs that cut it into lengths, and are recessed for fashioning hanging-nibs or hooks, or curved for producing pantiles. Material for the ribs and hooks is provided by making the middle of the clay sheet thicker than its sides. (7,815) The pug-mill propels a strip of clay, of which the middle is thickened, on to a set of moulding trays or boxes mounted upon an endless band. The roller, having side and cross-ribs and recesses, moulds the clay into roofing tiles, &c. The band has studs between which the moulds are put, and the sharp ends of the latter impinge against the cutting-ribs on the roller. The moulds are held up by a roller under the band beneath the roller first mentioned.

7,820.—CONSTRUCTION OF SCAFFOLDING: *F. M. David*.—A band or a double socket joins two standards or poles cross-wise. In the angles between the poles are laid planks or ledgers. For lowering the scaffolding, one draws the bases of the poles together, and the bases are forced apart for locking the poles in the socket-pieces. A barrel consists of a plank having loose clips that will grip the plank and press against the socket pieces to which they can be secured.

7,851.—AN AUTOMATIC FIRE-ALARM: *A. F. Linden*.—A clip retains a match in contact with a combustible string. The ignition of the match by heat from the stove or fire or other object to which it is attached consumes the string, and so liberates the escapement of a bell-hammer that is driven by clockwork, the alarm being sounded by the hammer upon a bell.

7,901, 7,904, and 7,908.—FASTENERS AND OTHER APPLIANCES FOR WINDOWS: *E. F. Knight*.—For a sliding sash is devised a spring balance consisting of a broad spiral spring loosely working within a toothed barrel and having its ends hooked backwards into engagement with cams that project from the barrel and a fixed axle. The barrel gears with a rack upon the sash, the lowering of which winds up the spring. As the spring is unwound the barrel freely slides over the outer end of the spring in one direction but is stopped by the other end of the spring. One of the cams to engage with one hooked end of the spring. (7,904) Allowance for warping and shrinkage of the woodwork is effected by pivoting the box which holds the spring-balance on to a bolt passed through the lug of a face-plate on the frame, a spring which presses the toothed wheel to engage with a rack on the sash is carried on a bolt. Beneath is a shaft having a cranked arm or pawl for engagement with the teeth of the wheel, whereby the sash can be locked in any position desired, the shaft being worked with a push-rod that is screwed into a block which is pivoted on to a crank on the shaft. Due provision is made for the swivelling motion of the box and for preventing the rotation of the crank of the shaft. (7,908) A wooden rack cut across the grain, with its fibres reaching from the back of the rack to the front of the teeth, is strengthened with two wooden strips glued or cemented lengthwise in grooves cut in the back of the rack, which otherwise may be made of raw hide, ebonite, &c. The solid end of the rack constitutes a stop to prevent it from running out of gear with the pinion of the spring-balance apparatus.

TRADE UNION CONGRESS.—The next Trade Union Congress will be held at the Holborn Town Hall, London—the first time for twenty-one years that the labour parliament has migrated to the metropolis, the last occasion having been in 1881. The chairman will be Mr. W. Steadman, L.C.C., and the Congress will assemble on Monday, September 1. A large number of resolutions are down for discussion by the delegates—among which the amendment and extension of the Workmen's Compensation Act occupies a prominent place. Attention is also directed to the Factory Acts, the Farmers' Association asking for the inclusion of their trade under the Act, in view of the scarcity of room in our workshops and the often insanitary condition of the same. Various resolutions deal with the wages of Government labourers.

SOME RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

July 23.—By FAREBROTHER, ELLIS, & CO. (at Barrow-in-Furness).	
Broughton-in-Furness, &c., Lancs.—Part of the Duddon Hall Estate, comprising farms, lands, &c., about 1,265 a. 7, (in numerous lots)	£17,522
July 31. By G. E. SWORDER & SONS (at Bishops Cleeve).	
Harlow, Essex.—Campion's Estate, 41 a. 3 r. 13 p. f.	2,500
Enclosures of grass land and other ground, 11 a. 1 r. 36 p. f.	510
Various enclosures, 26 a. 1 r. 3 p. f.	1,330
Four freehold cottages.	335
A freehold building estate, 29 a. 3 r. 18 p. f.	1,200
Back-st., a freehold malting and o. a. 27. 20 p. f.	600
Y. r. 704.	900
Matching, Essex.—Househam Tye Farm, 23 a. 3 r. 12 p. f. and c.	1,735
Various enclosures of land, 93 a. 0 r. 22 p. f. and c.	410
Four cottages, Blacksmith's shop, &c. f.	155
Matching Green, Essex.—Enclosure of land, 6 a. 0 r. 10 p. f.	280
White Roothing, Essex.—Waterloo Farm, 26 a. 0 r. 0 p. f. and c.	135
Raven's Farm enclosures, 13 a. 2 r. 13 p. f.	770
Potteen's Farm, 66 a. 1 r. 25 p. f.	770
Takeley, Essex.—Parker's Farm, 42 a. 2 r. 27 p. f.	770
By DEW & SON (at Llangefni).	
Llandyfydro, Anglesea.—Melin Esobog Farm, 81 a. 1 r. 28 p. f.	3,200
Llanbabo, Anglesea.—Glan-y-Gors Farm, 169 a. 3 r. 13 p. f.	4,000
By BIDWELL & SONS (at Ely).	
Southery, &c., Norfolk.—High Land, Causeway End and Ragmoor Farms, 20 a. 1 r. 20 p. f.	6,550
Horse Fen Farm, 120 a. 0 r. 10 p. f.	3,250
Hilgay Farm, 95 a. 2 r. 31 p. f.	1,200
Methwold, Norfolk.—Freehold fen land, 16 a.	180
Aldreth, Cambs.—Enclosures of land, 26 a. 0 r.	320
Bradfield Farm, 3 a. 1 r. 13 p. f.	275
Haddenham Fen, Cambs.—Bradfield Farm, 70 a. 1 r. 33 p. f. and c.	1,200
Various enclosures, 92 a. 0 r. 13 p. f. and c.	1,570
Sutton Fen, Cambs.—Enclosures of land, 7 acres f.	120
Haddenham, Cambs.—Staple Leys Farm, 71 a. 1 r. 24 p. f.	1,150
Padnal, Cambs.—Coppold fen land, 17 a. 2 r. 1 p. f.	160
Manea, Cambs.—Enclosures of land, 11 a. 1 r. 10 p. f.	330
Udley, Suffolk.—Two freehold holdings, 10 a. 1 r. 0 p.	600
Peter House Farm, 239 a. 3 r. 13 p. f.	1,800
Mildenhall, Suffolk.—Freehold fen land, 32 a. 2 r. 17 p. f.	310
Lakenheath, Suffolk.—Freehold fen land, 77 a. 3 r. 24 p.	905
August 1.—By G. B. HILLIARD & SON (at Chelmsford).	
Chelmsford, Essex.—New London-rd., two freehold building plots.	460
Sandon, Essex.—Deal Trees Farm, 69 a. 0 r. 26 p. f.	890
Little Waltham, Essex.—A land tax of 17l. 4s.	420
By H. F. RUSSELL & SON (at Leominster).	
Middleton-on-the-Hill, Hereford.—The Pole Farm, 13 a. 1 r. 33 p. f.	570
By CHINNICK, GALSORTHY, & CHINNICK (at Swansea).	
Swansea, Glamorgan.—Oxford-st., &c., f.g.t.'s, 1,212 sq. sd., reversions varying from 30 to 91 yrs. (in one lot)	47,100
August 2.—By FRANKLIN & JONES (at Oxford).	
Westcott Barton, &c., Oxon.—Horsehay Farm, 102 a. 1 r. 17 p. f.	1,550
By F. W. BACK (at Norwich).	
East Dereham, Norfolk.—Calley Moor Farm, 27 a. 2 r. 17 p. f.	620
Four enclosures, 24 a. 0 r. 15 p. f.	480
The Allotment, 7 a. 2 r. 0 p. f.	115
August 4.—By J. H. HARMAN (at Clacton-on-Sea).	
Weeley, Essex.—Highbitch Farm, 47 a. 0 r. 31 p. f.	975
Kempston's (building land), 18 a. 0 r. 29 p. f.	500
Y. r. 111.	500
August 5.—By FOX & VERGETTE (at Market Harborough).	
Foxton, Leicester.—A freehold pasture farm, 125 a. 1 r. 10 p. f.	5,114
August 6.—By RICHARD AUSTIN & SON.	
Sutton Scotney, Hants.—Freehold house, water corn mill, and 21 a. 3 r. 21 p.	725
August 7.—By FAREBROTHER, ELLIS, & CO.	
Lambeth.—York-rd., &c., Engineering Works, warehouses, and timber yard; also the Somerset Temperance Hotel, area 16,000 sq. ft. 231 yrs., g.r. 109l., y.r. 1,005l. 12s.	7,000
By A. & A. FIELD.	
King's Cross.—12, Albion-st., u.l. 42 yrs., g.r. 6l., y.r. 306l.	370
Norwood.—3, Pilgrim Hill, f. y.r. 32l.	410
Notting Hill.—41, Crescent-st., f. w.r. 31l. 4s.	480
By KING & CHASEMORE.	
Horsham, Sussex.—The Carfax, the Crown Hotel, 1, p.	4,600
Dymchurch, Kent.—Dymchurch pasture land, 54 a. 2 r. 6 p. f.	2,050
By MONEY & JOHNSTON.	
Norwood.—107, Belvedere-rd., u.l. 66 yrs., g.r. 14l., y.r. 506l.	400

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Strathcona and South African Memorial	The Committee	Not Stated	No date

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Alterations to Shop, Albion-street	Halifax Corporation	J. Lord, Civil Engineer, Town Hall, Halifax	Aug. 19
Additions to Schools, Osborne-street	Hull School Board	Broderick & Co., Architects, Lowgate, Hull	do.
House, Nelson-street, Lees, Yorks	Selkirk Town Council	T. W. Bottomley, Architect, 16, Prince-street, Haworth, Yorks	do.
Shop, Shed, &c., Anlaby Mills, Armley, Leeds	Bishop Stortford U.D.C.	T. S. Nelson, Architect, 15, Park-row, Leeds	do.
Granite, &c. (900 tons)	South Mims R.D.C.	T. Swathriges Council Offices, Bishop Stortford	do.
Freestery, Mountain Ash, Wales	Amble U.D.C.	T. R. Bates, Architect, 26, Westgate-chambers, Newport	do.
Street Works, Woodbine-street	Ashford (Kent) School Board	G. D. Byfield, 16, High-street, Barnet	do.
Tram Paving at Schools, Victoria-road	Bishop Stortford U.D.C.	W. Gibson, Surveyor, 31, Queen-street, Amble	do.
Gravel, &c.	Bexhill (Sussex) U.D.C.	Jeffery & Lacey, Architects, North-street, Ashford	do.
Hall, &c., Highton Park-road		T. Swathriges, North-street, Bishop Stortford	do.
Alterations to Farm Buildings, Fintree, N.B.	Glasgow Lunacy District Board	G. Ball, Civil Engineer, Town Hall, Bexhill	Aug. 20
Asylum Extension, Lenzie	West Hartlepool Corporation	S. Stronach, Junr., 20, Belmont-street, Aberdeen	do.
Drainage Works	Hfracombe U.D.C.	H. F. Fredericks, Borough Engineer, Burn-rd., West Hartlepool	do.
Water-works, Chulcomb	Manchester Corporation	O. M. Frouse, Civil Engineer, Town Hall, Hfracombe	do.
Pumping Station	Manchester Guardians	City Surveyor, Town Hall, Manchester	do.
Painting Walls at Workhouse, Crumppall	Wrexham Town Council	A. J. Murgatroyd, Architect, 23, Strutt-street, Manchester	do.
Road Works, Wrexham-road, Centre, Broughton	Tynemouth R.D.C.	A. Woolley, Surveyor, 2 Temple-row, Wrexham	do.
Sewers, &c., Backworth	Meiborough School Board	S. H. Haining, 21, Ellison-place, Newcastle	do.
School	Denbighshire County Council	H. L. Tacon, Architect, 11, Westgate, Rotherham	do.
Additions to Police Station, Miners	East Riding County Council	R. L. Williams, County Surveyor, Denbigh	do.
Police Station, Market Weighton, Yorks	Launce County Council	A. Beaumont, Civil Engineer, County Hall, Beverley	do.
Police Station, &c., Thornton	Dartford U.D.C.	J. L. Hittler, Architect, Preston	do.
Concrete Works, &c., at Electricity Works	Lichfield (Staffs) R.D.C.	J. C. Hayward, Sessions House, Dartford	do.
Road Materials (900 tons)	London County Council	R. J. Knapman, Surveyor, Lichfield	Aug. 21
*Purchase and Removal of Corporation Stands	Bristol Corporation	Valuer, London County Council, Spring-gardens, S.W.	do.
Culverts, Aonbank Electricity Works	Central Finsbury Radical Club	H. F. Proctor, Civil Engineer, Temple Bank, Bristol	do.
*Additions to Refreshment Bar and Beer Cellars	Southwam Town Council	The Secretary, 326, City-road, E.C.	do.
Sewers, &c., Cromwell Wood	Swindon School Board	F. Masse, Civil Engineer, Letley House, Wakefield	Aug. 22
Schools, Eudist-street	Woodford U.D.C.	Bishop & Fritchett, Architects, Swindon	do.
Kerling, &c., Sunset-avenue	Pontypridd U.D.C.	W. Farrington, Surveyor, Woodford Green, Essex	do.
Offices, &c.	Linlithgow School Board	R. P. Wilson, Engineer, 66, Victoria-street, S.W.	do.
Schools	Dukinfield Corporation	W. T. Scott, Architect, Linlithgow	do.
Sewerage Works, &c., Crescent-road	Rushden Water Board	R. E. Middleton, Civil Engineer, 17, Victoria-street, S.W.	Aug. 23
Reservoir, near Earl's Barton, Northants	New Ross (Ireland) Guardians	P. A. Pope, Board Room, New Ross	do.
Additions to Workhouse	Colchester Town Council	Bishop & Fritchett, Architects, Alderbury	do.
Pump Works, Bakkerne Hill	The Company	J. Jewell & Co., Architects, Alderbury	do.
Cottage Hospital, Rhunney, Mon.	Knaresborough Corporation	Vigers & Co., 4, Frederick's-place, Old Jewry, E.C.	Aug. 25
*New Roads, Mawell Hill	Swindon Corporation	E. W. Dixon, Civil Engineer, 14, Albert-street, Harrogate	do.
Cas Iron Pipe Trench, High Bridge	Grimby School Board	Bishop & Fritchett, Architects, Harrogate	do.
Additions to schools, Victoria-road	Dunstable Town Council	W. J. Fennell, Architect, 2, Wellington-place, Belfast	do.
Concrete Works at Alderman Dobson's School	Honiton Town Council	H. C. Scapellato, Architect, Court Chambers, Grimsby	Aug. 23
Granite, &c.	Metropolitan Asylums Board	G. Smock, Borough Surveyor, Town Hall, Dunstable	Aug. 27
Reservoir, &c.	Committees	Beeley & Co., Engineers, 11, Victoria-street, S.W.	do.
*Additional Fire Hydrants, &c., Hospital, nr. Dartford	Committees	Waller & Son, Architects, 17, College Green, Gloucester	do.
Nurses' Home at Infirmary, Gloucester	Committees	C. E. Oliver, Architect, Pilgrim-street, Newcastle	Aug. 30
Offices, Pilgrim-street, Newcastle-on-Tyne	Committees	J. H. Bizard, Architect, Lansdowne House, Southampton	do.
*Tar-paving Grounds, &c., Shirley Board School	Committees	Start & Rowell, Architects, Colchester	do.
New schools and alterations, Parkstone	Ramsey School Board	Borough Engineer, Lambeth Town Hall, Kennington Green, S.E.	do.
*Two Underground Conduits	Lambeth Borough Council	Borough Engineer, Town Hall, West Ham, E.	Sep. 1
*Construction of Tramway Route	Walsall School Board	F. E. T. Lawrence, Architect, 22, Buckingham-street, W.C.	Sep. 1
School	Renfild School Board	J. Graham, Engineer, Bank-street, Carlisle	do.
*Additions, &c., to Schools, Bush Hill Park	Wigan U.D.C.	Johnstone Bros., Architects, 39, Lower-street, Carlisle	do.
Water supply, Thorncliffe	Leiston U.D.C.	Mr. Whitworth, Jackson's-avenue, Gledhow	do.
Mortuary, &c., near Folkestone	Miss Bonstead	J. D. Kennedy, Borough Surveyor, Retford	do.
Alterations to premises, The Crescent, Carlisle	Retford Corporation	J. D. Kennedy, Borough Surveyor, Retford	do.
Flouring, &c., at Town Hall	Messrs. Crowe & Co., Ltd.	J. D. Kennedy, Borough Surveyor, Retford	do.
Warehouse, Leeds		J. D. Kennedy, Borough Surveyor, Retford	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Assistant Sanitary Inspector	Willenden U.D.C.	100/-	Aug. 25
*Appointments on Unestablished Staff of Archt's Dep.	London County Council	3/- to 4/- per week	Aug. 27

Those marked with an asterisk (*) are advertised in this Number.

Competition, p. iv.

Contracts, pp. iv, vi, viii, x, & xiii.

Public Appointments, xviii, & xix.

By RUMBALL & DICKSON.

Stroud Green—82, Upper Tillington Pk., Oct. 74

yrs. 6, 11, 15, 21, 26, 31, 36, 41, 46, 51, 56, 61, 66, 71, 76, 81, 86, 91, 96, 101, 106, 111, 116, 121, 126, 131, 136, 141, 146, 151, 156, 161, 166, 171, 176, 181, 186, 191, 196, 201, 206, 211, 216, 221, 226, 231, 236, 241, 246, 251, 256, 261, 266, 271, 276, 281, 286, 291, 296, 301, 306, 311, 316, 321, 326, 331, 336, 341, 346, 351, 356, 361, 366, 371, 376, 381, 386, 391, 396, 401, 406, 411, 416, 421, 426, 431, 436, 441, 446, 451, 456, 461, 466, 471, 476, 481, 486, 491, 496, 501, 506, 511, 516, 521, 526, 531, 536, 541, 546, 551, 556, 561, 566, 571, 576, 581, 586, 591, 596, 601, 606, 611, 616, 621, 626, 631, 636, 641, 646, 651, 656, 661, 666, 671, 676, 681, 686, 691, 696, 701, 706, 711, 716, 721, 726, 731, 736, 741, 746, 751, 756, 761, 766, 771, 776, 781, 786, 791, 796, 801, 806, 811, 816, 821, 826, 831, 836, 841, 846, 851, 856, 861, 866, 871, 876, 881, 886, 891, 896, 901, 906, 911, 916, 921, 926, 931, 936, 941, 946, 951, 956, 961, 966, 971, 976, 981, 986, 991, 996, 1001, 1006, 1011, 1016, 1021, 1026, 1031, 1036, 1041, 1046, 1051, 1056, 1061, 1066, 1071, 1076, 1081, 1086, 1091, 1096, 1101, 1106, 1111, 1116, 1121, 1126, 1131, 1136, 1141, 1146, 1151, 1156, 1161, 1166, 1171, 1176, 1181, 1186, 1191, 1196, 1201, 1206, 1211, 1216, 1221, 1226, 1231, 1236, 1241, 1246, 1251, 1256, 1261, 1266, 1271, 1276, 1281, 1286, 1291, 1296, 1301, 1306, 1311, 1316, 1321, 1326, 1331, 1336, 1341, 1346, 1351, 1356, 1361, 1366, 1371, 1376, 1381, 1386, 1391, 1396, 1401, 1406, 1411, 1416, 1421, 1426, 1431, 1436, 1441, 1446, 1451, 1456, 1461, 1466, 1471, 1476, 1481, 1486, 1491, 1496, 1501, 1506, 1511, 1516, 1521, 1526, 1531, 1536, 1541, 1546, 1551, 1556, 1561, 1566, 1571, 1576, 1581, 1586, 1591, 1596, 1601, 1606, 1611, 1616, 1621, 1626, 1631, 1636, 1641, 1646, 1651, 1656, 1661, 1666, 1671, 1676, 1681, 1686, 1691, 1696, 1701, 1706, 1711, 1716, 1721, 1726, 1731, 1736, 1741, 1746, 1751, 1756, 1761, 1766, 1771, 1776, 1781, 1786, 1791, 1796, 1801, 1806, 1811, 1816, 1821, 1826, 1831, 1836, 1841, 1846, 1851, 1856, 1861, 1866, 1871, 1876, 1881, 1886, 1891, 1896, 1901, 1906, 1911, 1916, 1921, 1926, 1931, 1936, 1941, 1946, 1951, 1956, 1961, 1966, 1971, 1976, 1981, 1986, 1991, 1996, 2001, 2006, 2011, 2016, 2021, 2026, 2031, 2036, 2041, 2046, 2051, 2056, 2061, 2066, 2071, 2076, 2081, 2086, 2091, 2096, 2101, 2106, 2111, 2116, 2121, 2126, 2131, 2136, 2141, 2146, 2151, 2156, 2161, 2166, 2171, 2176, 2181, 2186, 2191, 2196, 2201, 2206, 2211, 2216, 2221, 2226, 2231, 2236, 2241, 2246, 2251, 2256, 2261, 2266, 2271, 2276, 2281, 2286, 2291, 2296, 2301, 2306, 2311, 2316, 2321, 2326, 2331, 2336, 2341, 2346, 2351, 2356, 2361, 2366, 2371, 2376, 2381, 2386, 2391, 2396, 2401, 2406, 2411, 2416, 2421, 2426, 2431, 2436, 2441, 2446, 2451, 2456, 2461, 2466, 2471, 2476, 2481, 2486, 2491, 2496, 2501, 2506, 2511, 2516, 2521, 2526, 2531, 2536, 2541, 2546, 2551, 2556, 2561, 2566, 2571, 2576, 2581, 2586, 2591, 2596, 2601, 2606, 2611, 2616, 2621, 2626, 2631, 2636, 2641, 2646, 2651, 2656, 2661, 2666, 2671, 2676, 2681, 2686, 2691, 2696, 2701, 2706, 2711, 2716, 2721, 2726, 2731, 2736, 2741, 2746, 2751, 2756, 2761, 2766, 2771, 2776, 2781, 2786, 2791, 2796, 2801, 2806, 2811, 2816, 2821, 2826, 2831, 2836, 2841, 2846, 2851, 2856, 2861, 2866, 2871, 2876, 2881, 2886, 2891, 2896, 2901, 2906, 2911, 2916, 2921, 2926, 2931, 2936, 2941, 2946, 2951, 2956, 2961, 2966, 2971, 2976, 2981, 2986, 2991, 2996, 3001, 3006, 3011, 3016, 3021, 3026, 3031, 3036, 3041, 3046, 3051, 3056, 3061, 3066, 3071, 3076, 3081, 3086, 3091, 3096, 3101, 3106, 3111, 3116, 3121, 3126, 3131, 3136, 3141, 3146, 3151, 3156, 3161, 3166, 3171, 3176, 3181, 3186, 3191, 3196, 3201, 3206, 3211, 3216, 3221, 3226, 3231, 3236, 3241, 3246, 3251, 3256, 3261, 3266, 3271, 3276, 3281, 3286, 3291, 3296, 3301, 3306, 3311, 3316, 3321, 3326, 3331, 3336, 3341, 3346, 3351, 3356, 3361, 3366, 3371, 3376, 3381, 3386, 3391, 3396, 3401, 3406, 3411, 3416, 3421, 3426, 3431, 3436, 3441, 3446, 3451, 3456, 3461, 3466, 3471, 3476, 3481, 3486, 3491, 3496, 3501, 3506, 3511, 3516, 3521, 3526, 3531, 3536, 3541, 3546, 3551, 3556, 3561, 3566, 3571, 3576, 3581, 3586, 3591, 3596, 3601, 3606, 3611, 3616, 3621, 3626, 3631, 3636, 3641, 3646, 3651, 3656, 3661, 3666, 3671, 3676, 3681, 3686, 3691, 3696, 3701, 3706, 3711, 3716, 3721, 3726, 3731, 3736, 3741, 3746, 3751, 3756, 3761, 3766, 3771, 3776, 3781, 3786, 3791, 3796, 3801, 3806, 3811, 3816, 3821, 3826, 3831, 3836, 3841, 3846, 3851, 3856, 3861, 3866, 3871, 3876, 3881, 3886, 3891, 3896, 3901, 3906, 3911, 3916, 3921, 3926, 3931, 3936, 3941, 3946, 3951, 3956, 3961, 3966, 3971, 3976, 3981, 3986, 3991, 3996, 4001, 4006, 4011, 4016, 4021, 4026, 4031, 4036, 4041, 4046, 4051, 4056, 4061, 4066, 4071, 4076, 4081, 4086, 4091, 4096, 4101, 4106, 4111, 4116, 4121, 4126, 4131, 4136, 4141, 4146, 4151, 4156, 4161, 4166, 4171, 4176, 4181, 4186, 4191, 4196, 4201, 4206, 4211, 4216, 4221, 4226, 4231, 4236, 4241, 4246, 4251, 4256, 4261, 4266, 4271, 4276, 4281, 4286, 4291, 4296, 4301, 4306, 4311, 4316, 4321, 4326, 4331, 4336, 4341, 4346, 4351, 4356, 4361, 4366, 4371, 4376, 4381, 4386, 4391, 4396, 4401, 4406, 4411, 4416, 4421, 4426, 4431, 4436, 4441, 4446, 4451, 4456, 4461, 4466, 4471, 4476, 4481, 4486, 4491, 4496, 4501, 4506, 4511, 4516, 4521, 4526, 4531, 4536, 4541, 4546, 4551, 4556, 4561, 4566, 4571, 4576, 4581, 4586, 4591, 4596, 4601, 4606, 4611, 4616, 4621, 4626, 4631, 4636, 4641, 4646, 4651, 4656, 4661, 4666, 4671, 4676, 4681, 4686, 4691, 4696, 4701, 4706, 4711, 4716, 4721, 4726, 4731, 4736, 4741, 4746, 4751, 4756, 4761, 4766, 4771, 4776, 4781, 4786, 4791, 4796, 4801, 4806, 4811, 4816, 4821, 4826, 4831, 4836, 4841, 4846, 4851, 4856, 4861, 4866, 4871, 4876, 4881, 4886, 4891, 4896, 4901, 4906, 4911, 4916, 4921, 4926, 4931, 4936, 4941, 4946, 4951, 4956, 4961, 4966, 4971, 4976, 4981, 4986, 4991, 4996, 5001, 5006, 5011, 5016, 5021, 5026, 5031, 5036, 5041, 5046, 5051, 5056, 5061, 5066, 5071, 5076, 5081, 5086, 5091, 5096, 5101, 5106, 5111, 5116, 5121, 5126, 5131, 5136, 5141, 5146, 5151, 5156, 5161, 5166, 5171, 5176, 5181, 5186, 5191, 5196, 5201, 5206, 5211, 5216, 5221, 5226, 5231, 5236, 5241, 5246, 5251, 5256, 5261, 5266, 5271, 5276, 5281, 5286, 5291, 5296, 5301, 5306, 5311, 5316, 5321, 5326, 5331, 5336, 5341, 5346, 5351, 5356, 5361, 5366, 5371, 5376, 5381, 5386, 5391, 5396, 5401, 5406, 5411, 5416, 5421, 5426, 5431, 5436, 5441, 5446, 5451, 5456, 5461, 5466, 5471, 5476, 5481, 5486, 5491, 5496, 5501, 5506, 5511, 5516, 5521, 5526, 5531, 5536, 5541, 5546, 5551, 5556, 5561, 5566, 5571, 5576, 5581, 5586, 5591, 5596, 5601, 5606, 5611, 5616, 5621, 5626, 5631, 5636, 5641, 5646, 5651, 5656, 5661, 5666, 5671, 5676, 5681, 5686, 5691, 5696, 5701, 5706, 5711, 5716, 5721, 5726, 5731, 5736, 5741, 5746, 5751, 5756, 5761, 5766, 5771, 5776, 5781, 5786, 5791, 5796, 5801, 5806, 5811, 5816, 5821, 5826, 5831, 5836, 5841, 5846, 5851, 5856, 5861, 5866, 5871, 5876, 5881, 5886, 5891, 5896, 5901, 5906, 5911, 5916, 5921, 5926, 5931, 5936, 5941, 5946, 5951, 5956, 5961, 5966, 5971, 5976, 5981, 5986, 5991, 5996, 6001, 6006, 6011, 6016, 6021, 6026, 6031, 6036, 6041, 6046, 6051, 6056, 6061, 6066, 6071, 6076, 6081, 6086, 6091, 6096, 6101, 6106, 6111, 6116, 6121, 6126, 6131, 6136, 6141, 6146, 6151, 6156, 6161, 6166, 6171, 6176, 6181, 6186, 6191, 6196, 6201, 6206, 6211, 6216, 6221, 6226, 6231, 6236, 6241, 6246, 6251, 6256, 6261, 6266, 6271, 6276, 6281, 6286, 6291, 6296, 6301, 6306, 6311, 6316, 6321, 6326, 6331, 6336, 6341, 6346, 6351, 6356, 6361, 6366, 6371, 6376, 6381, 6386, 6391, 6396, 6401, 6406, 6411, 6416, 6421, 6426, 6431, 6436, 6441, 6446, 6451, 6456, 6461, 6466, 6471, 6476, 6481, 6486, 6491, 6496, 6501, 6506, 6511, 6516, 6521, 6526, 6531, 6536, 6541, 6546, 6551, 6556, 6561, 6566, 6571, 6576, 6581, 6586, 6591, 6596, 6601, 6606, 6611, 6616, 6621, 6626, 6631, 6636, 6641, 6646, 6651, 6656, 6661, 6666, 6671, 6676, 6681, 6686, 6691, 6696, 6701, 6706, 6711, 6716, 6721, 6726, 6731, 6736, 6741, 6746, 6751, 6756, 6761, 6766, 6771, 6776, 6781, 6786, 6791, 6796, 6801, 6806, 6811, 6816, 6821, 6826, 6831, 6836, 6841, 6846, 6851, 6856, 6861, 6866, 6871, 6876, 6881, 6886, 6891, 6896, 6901, 6906, 6911, 6916, 6921, 6926, 6931, 6936, 6941, 6946, 6951, 6956, 6961, 6966, 6971, 6976, 6981, 6986, 6991, 6996, 7001, 7006, 7011, 7016, 7021, 7026, 7031, 7036, 7041, 7046, 7051, 7056, 7061, 7066, 7071, 7076, 7081, 7086, 7091, 7096, 7101, 710

PRICES CURRENT (Continued).

BRICKS, &c.
The cement and lime is exclusive of the ordinary charge for sacks.

Stone Fire—... 6s. 6d. per yard, delivered.
Portland Fire-clay in sacks, 25s. 6d. per ton at rly. dep.

STONE.

	s. d.
aster in blocks ... 11	per ft. cube, deld. rly. depot
Eight Down Bath ... 8	"
in blocks ... 6	"
ashill ... 10	"
Portland in blocks ... 10	"
ley Dale in blocks ... 2	"
Corsehill ... 5	"
Reburn Red Freestone ... 3	"
Manfield ... 2	"
and York in blocks ... 10	"
6 in. sawn both sides	"
landings, to sizes	s. d.
(under 40 ft. sup.)	2 8
at rly. depot.	"
6 in. Rubbed Ditto ... 3	0
3 in. sawn both sides	"
slabs (random sizes)	3 10
2 in. self-faced Ditto	0 9 1/2
ton Wood (Hard Bed) in blocks	2 3
deld. rly. depot.	"
6 in. sawn both sides	"
landings	2 7
deld. rly. depot.	"
3 in. do.	2 1 1/2

SLATES.

	s. d.
best blue Bangor ... 12	0
best seconds ... 11	10
8 best ... 6	17 6
best blue Portland	"
doc ... 11	7 6
best blue Portsmouth	6 5
best Eureka	"
fading green ... 13	10
8 ... 7	10
to permanent green	10 10
8 ... 6	0

TILES.

	s. d.
plain red roofing tiles ... 41	6
per 1,000, at rly. depot.	"
Hip and valley tiles ... 3	7
per doz.	"
Erosey tiles ... 48	6
per 1,000	"
Hip and valley tiles ... 4	0
per doz.	"
Ruabon Red, brown or	"
orindled Do. (Edwards)	6
per 1,000	"
or ornamental Do. ... 50	0
per doz.	"
Valley tiles ... 3	0
per doz.	"
Red or Mottled Staf.	"
Do. (Peakes) ... 50	0
per 1,000	"
Hip tiles ... 3	8
per doz.	"
Valley tiles ... 3	8
per doz.	"

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard.
1st: best 3 in. by 11 in. and 4 in.	s. d.
by 9 in. and 11 in.	14 10
2nd: best 3 in. by 9 in.	13 10
3rd: best 2 1/2 in. by 7 in. and 8 in.	10 10
and 3 in. by 7 in. and 8 in.	10 10
4th: best 2 1/2 in. by 6 in. and 3 in. by 6 in.	10 10
5th: seconds	10 10
6th: seconds	10 10
7th: 2 in. by 4 in. and 2 in. by 5 in.	8 0
8th: Sawn Boards—	"
9th: 2 in. by 12 in.	0 10
more than battens,	"
10th: 1 0 0	"
At per load of 50 ft.	"
11th: Best middling Danzig	4 10
12th: Memel (average specification)	4 5
13th: all timber (8 in. to 10 in.)	3 12
14th: Swedish balks	2 15
15th: pine timber (30 ft.)	3 0
16th: JOINERS' WOOD.	"
17th: 1st: First yellow deals,	22 0
18th: by 12 in.	22 0
19th: by 9 in.	20 0
20th: battens, 2 1/2 in. and 3 in. by 7 in.	16 10
21st: 2nd yellow deals, 3 in. by 11 in.	18 0
22nd: 3 in. by 11 in.	18 0
23rd: battens, 2 1/2 in. and 3 in. by 7 in.	13 0
24th: 2nd yellow deals, 3 in. by 11 in.	13 0
25th: 3 in. by 11 in.	13 0
26th: 3 in. by 9 in.	12 0
27th: 3 in. by 9 in.	12 0
28th: 3 in. by 9 in.	12 0
29th: 3 in. by 9 in.	12 0
30th: 3 in. by 9 in.	12 0
31th: 3 in. by 9 in.	12 0
32th: 3 in. by 9 in.	12 0
33th: 3 in. by 9 in.	12 0
34th: 3 in. by 9 in.	12 0
35th: 3 in. by 9 in.	12 0
36th: 3 in. by 9 in.	12 0
37th: 3 in. by 9 in.	12 0
38th: 3 in. by 9 in.	12 0
39th: 3 in. by 9 in.	12 0
40th: 3 in. by 9 in.	12 0
41th: 3 in. by 9 in.	12 0
42th: 3 in. by 9 in.	12 0
43th: 3 in. by 9 in.	12 0
44th: 3 in. by 9 in.	12 0
45th: 3 in. by 9 in.	12 0
46th: 3 in. by 9 in.	12 0
47th: 3 in. by 9 in.	12 0
48th: 3 in. by 9 in.	12 0
49th: 3 in. by 9 in.	12 0
50th: 3 in. by 9 in.	12 0

PRICES CURRENT (Continued).

WOOD.

	At per standard.
White Sea and Petersburg—	"
Battens ... 13	0
Second white deals 3 in. by 11 in.	13 0
" " 3 in. by 9 in.	12 0
" " 3 in. by 9 in.	12 0
Pitch-pine: 1st: deals ... 10	0
Under 2 in. thick extra ... 10	0
Yellow Pine—First, regular sizes ... 10	0
Broads (2 in. and up) ... 2	0
Oddments ... 2	0
Seconds, regular sizes ... 24	0
Yellow Pine Oddments ... 24	0
Kauri Pine—Planks, per ft. cube ... 0	3
Danzig and Stettin Oak Logs—	"
Large, per ft. cube ... 0	6
Small ... 0	3
Wainscot Oak Logs, per ft. cube ... 0	3
Dry Wainscot Oak, per ft. sup. as ... 0	5
2 in. do. ... 0	7 1/2
Dry Mahogany—do. ... 0	7
Honduras, Tabasco, per ft. sup. ... 0	9
Select, Figury, per ft. sup. as ... 0	1
Dry Walnut, American, per ft. sup. ... 0	10
Teak, per load ... 16	0
American Whitewood Planks—	"
Per ft. cube ... 0	3
Prepared Flooring—	"
1 in. by 7 in. yellow, planed and ... 0	13
shot ... 0	16
2 in. by 7 in. yellow, planed and ... 0	13
matched ... 0	16
1 1/2 in. by 7 in. yellow, planed and ... 0	13
matched ... 0	16
2 in. by 7 in. white, planed and ... 0	13
shot ... 0	16
1 1/2 in. by 7 in. white, planed and ... 0	13
matched ... 0	16
2 1/2 in. by 7 in. white, planed and ... 0	13
matched ... 0	16
6 in. at 6d. per square less than 7 in.	"

JOISTS, GIRDERS, &c.

	In London, or delivered
Railway Vans, per ton.	"
Roller Steel Joists, ordinary sections	6 5
Compound Girders ... 8	5
Angles, Tees and Channels, ordinary sections ... 7	17
Flat Plates ... 8	5
Cast Iron Columns and Stanchions, including ordinary patterns ... 7	2

METALS.

	Per ton, in London.
IRON—	"
Common Bars ... 7	15
Staffordshire Crown Bars, good merchant quality ... 8	5
Staffordshire "Marked Bars" ... 10	10
Mild Steel Bars ... 9	0
Hoop Iron, basis price ... 9	0
" galvanised ... 10	0
" (* and upwards, according to size and gauge.	"
Sheet Iron, Black—	"
Ordinary sizes to 20 g. ... 10	0
" 20 g. and 24 g. ... 12	0
" 24 g. and 28 g. ... 12	0
Sheet Iron, Galvanised, flat, ordinary quality—	"
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g. ... 12	15
" 22 g. and 24 g. ... 13	5
" 26 g. ... 14	5
Sheet Iron, Galvanised, flat, best quality—	"
Ordinary sizes to 20 g. ... 16	0
" 22 g. and 24 g. ... 16	10
" 26 g. ... 18	0
Galvanised Corrugated Sheets—	"
Ordinary sizes, 6 ft. 10 ft. to 24 g. ... 12	15
" 22 g. and 24 g. ... 13	5
" 26 g. ... 14	5
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. ... 12	15
" 22 g. and 24 g. ... 13	0
" 26 g. ... 14	5
Cut nails, 3 in. to 6 in. ... 9	15
(Under 3 in. usual trade extras.)	"

LEAD, &c.

	Per ton in London.
LEAD—Sheet, English, 3 lbs. & up. ... 13	7
Pipe in coils ... 14	7
Soil Pipe ... 16	17
ZINC—Sheet—	"
Vicille Montagne ... 24	0
Silesian ... 23	15
COPPER—	"
Strong Sheet ... 0	10
Thin ... 0	11
Copper nails ... 0	11
BRASS—	"
Strong Sheet ... 0	10
Thin ... 0	10 1/2
TIN—English Ingots ... 0	1
SOLDER—Plumbers' ... 0	7
Tinmen's ... 0	9
Blowpipe ... 0	10

PRICES CURRENT (Continued).

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds ... 24d.	per ft. delivered.
" fourths ... 24d.	"
21 oz. thirds ... 34d.	"
" fourths ... 34d.	"
26 oz. thirds ... 44d.	"
" fourths ... 44d.	"
32 oz. thirds ... 54d.	"
" fourths ... 54d.	"
Fluted sheet, 15 oz. ... 3d.	"
" 21 oz. ... 4d.	"
" 26 oz. ... 5d.	"
" 32 oz. ... 6d.	"
" 15 in. ... 24d.	"
" 18 in. ... 24d.	"
" 21 in. ... 24d.	"
" 24 in. ... 24d.	"

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes or barrels ... 0	2
" " in drums ... 0	3
Bolled " in pipes or barrels ... 0	2
" " in drums ... 0	3
Turpentine, in barrels ... 0	2
" " in drums ... 0	3
Genuine Ground English White Lead ... 1	0
Red Lead, Dry ... 30	0
Best Linseed Oil Putty ... 0	8
Stockholm Tar ... 1	12

VARNISHES, &c.

	Per gallon.
Fine Pale Oak Varnish ... 0	5
Pale Copal Oak ... 0	10
Superfine Pale Elastic Oak ... 0	12
Fine Extra Hard Church Oil ... 0	12
Superfine Hard-drying Oak, for Seats of Churches ... 0	14
Fine Elastic Carriage ... 0	12
Superfine Pale Elastic Carriage ... 0	16
Fine Pale Maple ... 0	16
Finest Pale Durable Copal ... 0	18
Superfine Pale Copal Body ... 1	0
Extra Pale French Oil ... 1	0
Eggshell Flattening Varnish ... 0	18
White Copal Enamel ... 1	4
Extra Pale Paper ... 0	12
Best Japan Gold Size ... 0	10
Best Black Japan ... 0	16
Oak and Mahogany Stain ... 0	9
Brunswick Black ... 0	8
Berlin Black ... 0	16
Knottling ... 0	10
French and Brush Polish ... 0	10

TO CORRESPONDENTS.

A. & W. R. & W. (Amounts should have been stated).
NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.
We cannot undertake to return rejected communications.
Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.
All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.
We are compelled to decline pointing out books and giving addresses.
Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.
All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100, unless in some exceptional cases and for special reasons.]
* Denotes accepted. † Denotes provisionally accepted.

BRISTOL.—For new bottling stores and additions to the Bristol United Breweries premises at St. Paul's Brewery, Bristol. Mr. Thomas Scammell, architect and surveyor, 1, St. Stephen-street, Bristol.
John Perkins ... £5,310 0
R. Wilkins & Sons ... £2,084 0
W. Cowlin & Sons ... £1,173 0
Jones & Hill ... £1,157 0
G. Humphries ... £1,994 13
C. A. Hayes ... £1,133 0
F. Chown ... £1,938 0
[All of Bristol.]

BALENG.—For road and sewer on Baling Park Estate, South Ealing. Messrs. Thos. Dinwiddie & Sons, surveyors:—
Neave* ... £999

HENDON.—For road and sewers on Hale Grove Estate, Mill Hill, Hendon. Messrs. Thos. Dinwiddie & Sons, surveyors:—
Dickson ... £1,102
Halsey ... £1,097
Killingback ... £1,030
Ballard ... £957
Adams ... 939
Neave* ... 934
[See also next page.]

HULL.—For taking down part of, and rebuilding, Empress inn, Alfred Gelder-street, for the Corporation.
Mr. J. H. Hirst, architect, Town Hall, Hull:—
F. Southern £9,328 Hockney & Liggins £1,994
M. Harper 2,587 Hull Joiners, Ltd.* 1,916
T. Goates 2,126
(All of Hull.)

KETTLESTONE.—For work at Kettlestone Rectory, Norfolk. Mr. Herbert J. Green, architect, 31, Castle Meadow, Norwich:—
Bardell Bros. 0 0 W. I. Lerner,
J. Needs 593 8 4 East Dereham* £516 7 3

LEWES.—For the erection of board-room and offices, West-street, for the Guardians. Mr. Hy. Card, architect, 10, North-street, Lewes:—
E. Hammond £3,799 Noakes & Son £2,893
W. Wells 3,000
Peerless Dennis & Co., Eastbourne* 2,968

LONDON.—For the erection of a bridge (and approaches) over the Great Eastern Railway Co.'s lines, Hackney Wick N.E., for the Trustees of the late Viscount Eversley. Messrs. Wigg, Oliver, & Hudson, architects, 80, Leman-street, E. Quantities by Messrs. C. Stanger & Son:—
Perry & Co. £11,866 Patrick & Son £11,628
Chasen & Newman 11,321 Wilkinson Bros. 11,431

LONDON.—For the erection of workshops, Great Hermitage-street, Wapping, for Mr. A. W. Birt. Mr. John Parrish, architect and surveyor, 347, Richmond-villas, Hoe-street, Walthamstow:—
A. Edwards, Cambridge Heath* £1,700

LONDON.—For the erection of boundary wall, Red Mead-lane, Wapping, for Mr. A. W. Birt. Mr. John Parrish, architect and surveyor, Richmond-villas, Hoe-street, Walthamstow:—
A. Edwards* £195

LONDON.—For the erection of back addition, 71, Green-street, Bethnal Green, for Mr. F. Soufield. Mr. John Parrish, architect and surveyor, Richmond-villas, Hoe-street, Walthamstow:—
A. Edwards* £335

LONDON.—For the erection of workshops, Brooksbury-walk, Homerton, for Mr. W. H. Bond. Mr. John Parrish, architect and surveyor, Richmond-villas, Hoe-street, Walthamstow:—
S. Sharpin, Buckhurst Hill* £642

LONDON.—For the construction of cold storage, Brooksbury-walk, Homerton, for Mr. W. H. Bond. Mr. John Parrish, architect and surveyor, Richmond-villas, Hoe-street, Walthamstow:—
Mr. S. Sharpin* £505

LONDON.—For alterations to St. Cyprian's Hall, Brockley-road, S.E., for musical and other entertainments, for the Trustees. Mr. John Jas. Downes, architect, 199, Lewisham High-road, S.E.:—
H. Thomas £1,266 0 0 S. R. Best £674 15 0
T. Sayers 920 0 0 R. Soper 644 15 0
W. J. Howie 225 10 6 W. C. Colling 644 15 0
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M. Champion 726 0 0 ley-road* 607 10 0

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Nightingale 1,975 Bulled 1,793
Parsons & Townsend 1,941 Loden 1,766
Holliday & Greenwood 1,888 Burges 1,559

OSWESTRY.—For additions to market buildings, Bailey-street, for the Town Council. Mr. G. W. Lacey, C.E., Guildhall, Oswestry. Quantities by Borough Engineer and Surveyor:—
H. Price £1,300 0 J. Higgins £1,249 10
W. Felton 1,226 0 W. H. Thomas,
Oswestry* 1,099 0

PLYMOUTH.—For Hyde Park-road School, for Plymouth School Board. Mr. Henry J. Sael, architect, Plymouth:—
J. Paynter £18,699 S. Roberts £17,321
J. Partridge 18,650 Allen & Tozer 17,233
A. Andrews 18,600 J. P. Berry 17,213
T. May 18,275 G. B. Turpin 16,997
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Fearn Bros. 17,938 A. N. Coles 15,920
W. E. Blake 17,331 W. J. Jinkins 15,359
(All of Plymouth.)

VENTNOR (I.W.).—For the erection of boundary fences and entrance gates at the Underhill Isolation Hospital. Mr. George Boughton, architect, Ryde, I.W.:—
E. A. Vincent, Ventnor* £167 14
For sinking an artesian well, 225 ft. deep, and providing pumping gear and windwheel:—
Duke & Ockenden, Littlehampton* £262 10

CORRECTION.—In our issue for August 2, page 115, we gave a list of tenders for alterations and additions at "Freemasons' Tavern," Wood-green. The work is being carried out at the Fishmongers' Arms. The mistake was not ours; we printed the information as it was sent to us.

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The Builder.

VOL. LXXXIII.—No. 3107.

AUGUST 23, 1902.

ILLUSTRATIONS.

House Front, Avenue Rapp, Paris	M. Lavirotte, Architect.
Proposed Lady Chapel, St. Patrick's Cathedral, New York	Design by Mr. W. D. Carie, F.R.I.B.A.
The Bootham School, York	Messrs. Thorp & Rowntree, Architects.
Nurses' Home, Sheffield Union	Mr. E. W. Mountford, F.R.I.B.A., Architect.
Proposed Catholic Church, Camberley	Mr. C. H. B. Quennell, Architect.

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Some Notes on the Classic Orders.

MR. SPIERS'S useful selection of drawings of the orders* is taken from Normand, Mauch, and other authorities, the object being to give a selection of the most important examples for students who may not be able to procure copies of the larger collections which form the standard illustrative works on the subject. To the second and third editions of the work some plates were added beyond those issued in the first edition. The present (fourth) edition includes all these, and the whole of the plates have been produced again from the original engravings and drawings, and the figures rewritten in some cases where they were not quite legible. A new plate has been added showing the Ionic order of the portico of the Triangular Forum of Pompeii, which is of value as giving a type of treatment differing from that of the most accepted Classic types; and suggestive, one may add, of the possibility of further variations on an old theme. Another new plate added is that of the richly decorated Composite order of the Thermæ of Diocletian. The description of the plates has been revised throughout, and is now preceded by an introductory Note on the Origin and Development of the Classic Orders.

This last is the most important addition to the new issue. As Mr. Spiers observes in the preface, the discoveries of the last fifteen or twenty years have thrown much additional light on the history of the orders, though there are still many points which require, and may possibly in future receive, further elucidation.

Mr. Spiers, like most students of architectural history nowadays, accepts the theory of the entirely timber origin of the Greek Doric order, in which we go with him as

far as the entablature is concerned, but we feel much doubt as to accepting the timber origin of the column, so far at all events as proportion and design are concerned. The well-known note of Pausanias, to the effect that he found one of the columns in the opisthodomus of the temple of Hera, at Olympia, to be of oak, seems to have had more built upon it than it will quite bear. It has been assumed from this that the columns were all originally of oak, and replaced from time to time, as they decayed, by stone columns. If Pausanias had mentioned what the oak column was like, and whether it differed from the other column in design, there would have been something more to go upon; but this mere blank statement as to the material leaves various interpretations open. It might have been a temporary column put up to replace a stone one which had decayed. If, as Dr. Dörpfeld assumes, the original timber temple of Hera was of the eleventh century B.C., it is hardly likely that one of its original wooden columns would be standing in the second century A.D. That the original use of wooden columns in early temples necessitated the provision of stone bases for them to stand on, and that when stone columns were substituted the stone base was no longer required, is an ingenious, and perhaps not improbable, manner of accounting for the absence of the base in the Doric order. But the theory certainly supports the idea that the original wooden column was only in the nature of a post of comparatively thin dimensions, and hence required a stone template as a base to it, to distribute the pressure. Had it been of the proportions of the early Doric stone column, with a broad butt-end at the base, it might have rested equally well on the upper course of the stylobate. At all events, the fact that the design of the earliest stone Doric column as known to us is so distinctly lithic in character, coupled with the fact that in the main the earliest examples are the thickest in proportion, withdraws it, to our mind, from any possibility of being a development from a wooden origin. Granted that wooden columns preceded stone ones, they did not

give the origin of the æsthetic form of the latter. We must look for that elsewhere.

The analysis of the origin of the entablature forms in the Doric order, as given by Mr. Spiers, is what we think will be generally accepted now as correct, or at least highly probable; only we are rather surprised that in describing the original elements of the entablature he should have described the soffit of the corner of the cornice as "inclined upward so as to be parallel with the slope of the roof," without any observation on the important fact that in the Parthenon and other examples it is *not* parallel, but flatter than the roof-slope, and also that the slope or cant of the soffit occurs just the same at the ends of the buildings, at right angles to the section of the roof. It may be argued, of course, that this slope of the soffit originally represented the lower side of the rafter, and had been modified in process of time, in the stone building, after the timber originally had passed out of memory; though that does not get over the important fact of the sloping of the soffit in the cornices across the ends of the building, where it never could have had any such meaning. These two facts were cited by Mr. Garbett, in his well-known treatise, as a reason for not accepting the timber origin of the entablature, and his argument is very strongly put and is worth attention, though we confess that we think the arguments on the other side are stronger. But at all events the fact that the soffit and the roof slope are not parallel in the latest and most complete examples should have been noticed, as it is an important point.

We regret also that the author did not take the opportunity of a new edition to do what we suggested in noticing the first edition, viz., to add an authentic representation of the Parthenon order, unquestionably the finest of all. The materials for it are all to hand in Mr. Penrose's book, and only require putting together. The existing published illustrations of the Parthenon order are all inaccurate in certain points; and the addition of an accurate delineation of it would have added a special value to Mr. Spiers's book, and it could easily have been done.

* "The Orders of Architecture—Greek, Roman, and Italian." By R. Phené Spiers, F.S.A., F.R.I.B.A. Fourth Edition, revised and enlarged. London: E. T. Batsford. 1902.

In the remarks on the Ionic capital the two essentially distinct classes of scroll capital—what the author calls the Cyprian form (fig. 1), in which the volutes spring vertically from the centre of the shaft, and

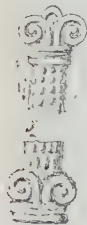


Fig. 1.

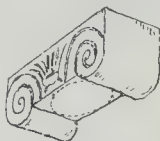


Fig. 2.

the Greek form, in which they are the terminations of a line across the top of the shaft, are duly distinguished. The Cyprian form, as Mr. Spiers observes, suggests metal work; on the other or Classical form he makes this comment:—

"The oblong shape of the abacus of the archaic capital at Ephesus is constructive in the sense that in its origin it was conceived as a bracket-capital to lessen the bearing of the architrave, and the assumption that, in the first stage, it consisted of an oblong piece of timber placed on the top of a post is borne out, firstly, by it being still the ordinary system of support employed in the huts of Asia Minor; and secondly, by the early cap found at Delos [fig. 2], and now in the Museum at Athens. The desire here has evidently been to decorate the original crude form, and the spiral starts in the centre of the capital like the Cyprian examples; but in the large proportion of the archaic capitals in the Museum at Athens, many of them found in the Acropolis show the upper fillet of the volute running horizontally under the abacus. The capital at Ephesus already referred to, and an example at Delphi, show the fully-developed archaic form. In the Delos capital the sides are sunk and moulded, forming what is known as the cushion, which is decorated in various ways."

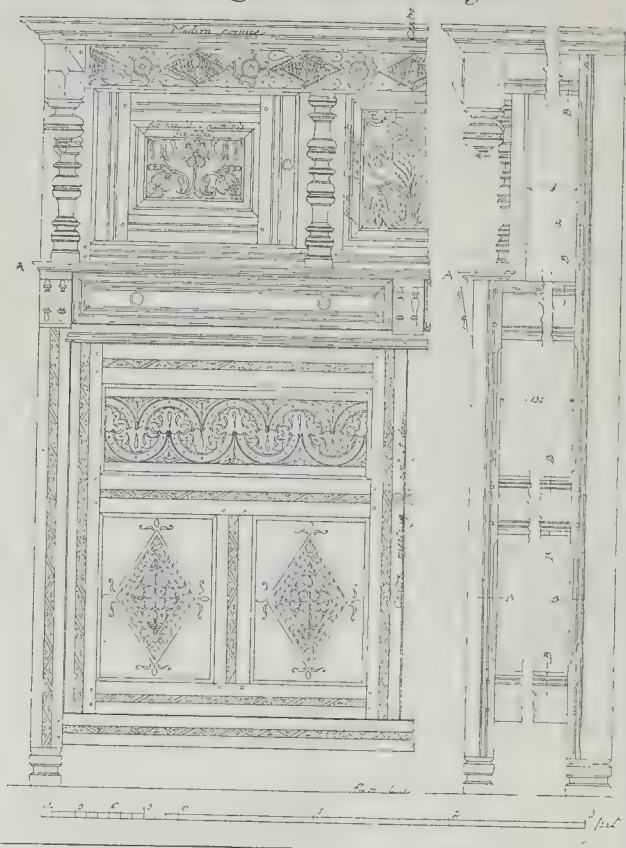
The author then goes on to mention the later development of the Ionic capital, first with an outer angle volute at an angle of 45 deg., next, in the Roman form, with all the angles so treated; the only really convenient way to treat it when the Ionic column is used as a peripteral colonnade. But, while agreeing with the author's short sketch of the development of the Ionic capital, we might add that essentially this is a capital to be used between *antæ* and not in a peripteral colonnade; it is a capital that only faces one way, or rather it has only two opposite faces, instead of facing four ways like the Doric and Corinthian capitals; the other two aspects show only *ends*, not faces. This fact entirely agrees with the nature of its origin as assumed by Mr. Spiers, and it is worth note that the use of the Ionic order by the Athenians in the Propylæa, where it is mixed with the Doric order, shows that this was at that time their idea, as the Ionic columns are only introduced in the centre portion of the portico, being stopped, as it were, by Doric columns at each angle, although in the rather later Erechtheion portico the Ionic column is used without this restriction. Still, the point is an important one, and should always be borne in mind in any æsthetic estimate of the Ionic order. We may add that the undeveloped form shown in fig. 2 has a good deal of capability of

further modern treatment, on the same general lines.

Into the vexed question of the origin of the Corinthian capital Mr. Spiers does not go, beyond a suggestion, partly founded on a passage in Pliny, that it had a metallic origin, which is not unlikely. It is a question, however, which it is not of much use to "vex" any more, as we are never likely to have any further data to go upon. Mr. Spiers draws attention to the fact that the Corinthian order, unlike the Doric and Ionic, shows no trace of early structural development; it comes to us once almost complete; for though the Lysicrates capital has not the completeness and perfection of the best Roman examples, the general idea is complete. Its defect lies in the want of harmony of character between the lowest fringe of leaves and the upper portion; but in every other respect, though less grandiose than the best Roman examples, it excels them in its peculiar grace and flow of line, and shows a finer artistic feeling.

We welcome Mr. Spiers's fourth edition, which will be a boon to young students especially. But when there is a fifth edition, as we have little doubt there will be sooner or later, we hope the Parthenon order will be included, more especially with the view of correcting the inaccuracies of Normand and Mauch.

OLD OAK CABINET — *Louisa*



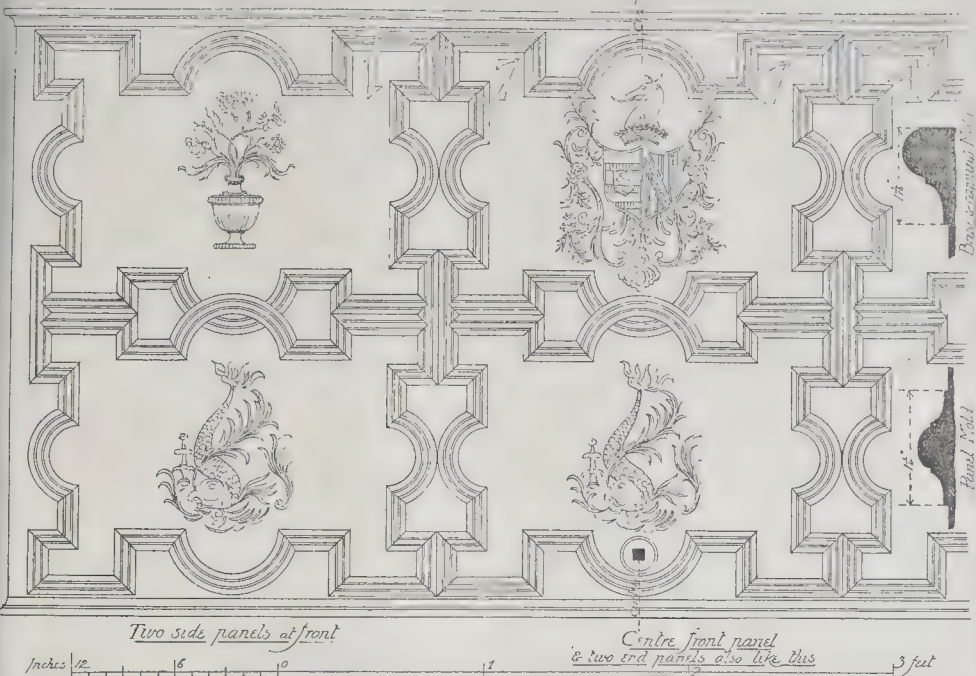
OLD ENGLISH OAK FURNITURE.

EVERY one likes to possess a genuine piece of English carved oak furniture of the seventeenth or eighteenth centuries. There is a solidity and mass about it which give it a kind of monumental character; it is so much more solid and weighty than even the most honestly made modern furniture; which, besides, is seldom in oak. Then the design and ornament are essentially English in character, the unsophisticated production of the native joiner, with his somewhat crude but usually effective forms of moulding and carved enrichment.

That the style of work is somewhat crude can hardly be denied; and however we may like the original work of this type for its own sake, we do not know that it is quite a kind of work to be set up as a model for imitation in the present day, as Mr. Hurrell, who has produced a fine folio volume of measured drawings of English oak furniture,* seems to imply in his preface. He lays it down that the internal woodwork and plaster-work of an old English mansion of the seventeenth and eighteenth centuries "are probably unsurpassed by the contemporaneous work of any other country"; and

* "Measured Drawings of Old Oak English Furniture; also of Some Remains of Architectural Woodwork, Plaster-work, &c." By J. Weymouth Hurrell. London: B. T. Batsford. 1902.

OLD LEAD CISTERN at No. 18 Rutland St. DUBLIN.



having produced a number of very careful and accurate measured drawings of English woodwork of this period, he suggests that the book will be a valuable one to the architect, designer, and craftsman, "whose business it is to produce similar work in modern times." But is that their business? That is just the question.

The author does not perhaps mean that we should produce imitations of this work, but that we should take it as a standard for suggestion and for emulation. But is it really good enough for that, except in the valuable quality of solidity and stability of appearance? From the purely artistic point of view, and putting aside national and historic association, is this kind of honest, sturdy, but in general somewhat clumsy, work to be compared, for instance, with the best French work of the Louis Seize period? Character there is about it always, no doubt, but it is character of a rather *bourgeois* kind. As we turn over the pages of Mr. Hurrell's excellent drawings, we must see that the decorative resources of the English joiner were somewhat limited; they represent a very few ideas, treated with a certain amount of variety, but also with a good deal of repetition of devices which are for the most part naïve enough. Mouldings are often effective in themselves, but ill-balanced in proportion to the whole design, and often by no means well profiled, like the cornice of the cabinet shown on plate 9; certainly not a very refined piece of work. Among the best of the simpler forms of decoration is that gained by panelling the fronts of drawings with rather heavy mouldings, as in the example just named and in plate 8,

which is better. This is a simple but effective and suitable method of giving richness of effect. Among rather more elaborate methods a favourite one is an ornament formed by reversed half-circles interlocking or interrupting each other, as in the middle portion of the "Old Oak Cabinet, Lancashire," of which we give a reduced reproduction. This serves also to illustrate another rather favourite detail, that of the little features like miniature balusters, which decorate the sloping blocks just below "A" on the elevation and section. This feature, in slightly varying form, meets us again and again in the illustrations. These decorative additions seem to have been turned circular, then cut in half and the halves glued on. They have absolutely no meaning as ornament, and no beauty; they are simply a trick of the trade, which very likely the author would be the first to condemn if it were modern work. There is an interesting naïveté about the floral carving in the upper panels of this cabinet, and it is effective in its place, but surely it cannot be really said to be very good or refined design. We were about to add that the profile of the cornice is better than in many of the other works, when we perceived the memorandum that it is modern. It is probably better than the original cornice, though it must be admitted that it is rather too small in scale for the rest of the work.

We are not detracting in the least from the value of Mr. Hurrell's book; these old pieces of carved work are of the greatest interest, and as the number now existing is limited and we cannot all possess examples of them, it is very useful to have such a set of careful and evidently accurate drawings

of a number of the most characteristic examples. But we hardly think that this kind of work can be regarded as art in the true sense. It represents the industry and enthusiasm of artisans, anxious to do their best to decorate the work they had in hand; but it can hardly be classed as the work of artists, nor can it be held up as offering models for imitation, though many suggestions can be taken from it, to be worked out in a more finished and refined manner.

In addition to the oak-work, the author has included examples of plaster and other work of the same period; among others a drawing of a lead cistern from a house in Rutland-square, Dublin, of which we give a reduced reproduction, and which is perhaps finer in character than anything else in the book.

NOTES.

ALTHOUGH alarmist statements made at intervals concerning the safety of the Metropolitan cathedral must be considerably discounted, it is undoubtedly the fact that engineering operations of a subterranean character are responsible for injury to the foundations, and we are glad to think that no future work of the kind is likely to be permitted in its vicinity without the most careful scrutiny. So far as the present condition of St. Paul's is concerned, it appears from the recent Report of two well-known engineers appointed to investigate the matter that the fears entertained by the authorities were by no means unreasonable. The foundations are found to have been impaired by undermining in the neighbourhood of the building, and remedial

nal service therein on the night of Sunday, March 20, 1881. The building has since been occupied by a firm of agricultural implement makers. The new chapel and schools, distant but 50 yards southwards in the main road, were opened on September 26, 1888, having been built for them after designs by Mr. James Weir on the site of the old Turkish Baths and two houses, Nos. 190-2, adjoining, at a cost of nearly 2,000*l.*, the ground included. The site of the old chapel belongs to the trustees of Brown's Estate.

At a time when a good many people, some of them architects and artists, are in temporary occupation of sea-side lodgings, one is wrought to contemplate, with a kind of awe, those peculiar forms of art, in the shape of chimney ornaments and engravings, which are only found in lodging-houses, and perhaps only to perfection in seaside resorts. It is difficult to imagine whence are collected these æsthetic horrors, which one sees nowhere else, and which would appear to be made especially for lodging-house consumption. The extraordinary bric-à-brac which usually crowds the chimney-piece is probably English—the cheap productions of some obscure firms who cater for this particular market. The engravings and "chromos" which decorate the walls, however,—such as Daniel in the den of lions; the forlorn sentimental lady elegantly dabbling away a tear with the corner of her handkerchief as she watches her lover's ship sail away; the straw-hatted youths hand-milking shepherdesses across the stepping-stones; &c. &c.,—all these have mostly the appearance of having been "made in Germany"; where are their depôts in England one does not know. As there is an "Art for Schools Association," to provide schools with pictorial and other decorations which, though cheap, should be inoffensive to the taste, could not something be done for this still more benighted section of our fellow creatures? Might we not have an "Art for Lodging-houses Association"? We commend the idea to the consideration of those who have a charitable desire to elevate the æsthetic perceptions of the lower middle classes.

THE ARCHITECTURAL ASSOCIATION SUMMER VISITS:

IV.—FOOT'S CRAY AND SIDCUP.

THE fourth summer visit of the Architectural Association took place on Saturday, the 16th inst., to Foot's Cray, Kent. Owing, no doubt, to the holidays, only about sixteen members attended.

The first place visited was the church, which is picturesquely situated in the south-west corner of the park belonging to Foot's Cray Place. It lies off the main London road, but originally the pilgrim path from London to Canterbury passed the church. The building, like many another Kentish church, is quite small and of various dates, but the work is chiefly fourteenth century. It consists simply of nave and chancel, with a chapel and vestries on the north side, and has a good, plain, open-timber roof. At the west end the principals and tie-beams supporting the wood and tile steeple are particularly interesting, and are quite the most noticeable feature in the church; it is to be hoped that the new beam which it is proposed to add, in order to increase the support, will not be made to look too ancient, to match the existing timbers. Another most interesting thing in the church is the font, a very fine specimen of Norman work.

The Rev. Charles Birch, the rector, welcomed

the members and kindly read them a short paper on the history of the church. Hasted, in his "History of Kent," 1758, says of this church that "it stands at the back of the village; it is a small, mean building, seemingly of high antiquity." In 1851 the north chapel or chantry was restored as a memorial to Lord Bexley, and in 1862, just after the present incumbent was appointed, the two west end galleries, one above the other, were removed, together with the old three-decker and the high pews; the church was re-seated, and the vestries and organ chamber built, while the nave was lengthened westward, the architect being Mr. E. C. Hakewill. In 1898, under the direction of Mr. White of Harley-street, the oak choir stalls were added, the carving being done by Miss Hilliam of the Technical School, Reading. Last year the steeple was rebuilt as a memorial to Queen Victoria, the architects being Messrs. Drake & Boucher, of Rochester.

The old communion rails, dated 1638, have been made into gates for the churchyard and the pulpit, the stairs up to the latter being the old roof steps. According to Hasted, under an altar tomb lie buried Sir Simon de Vaughan and his wife; he lived in the reign of Edward III. The registers of the church date from 1537, but a record of the rectors exists back to 1489.

In the churchyard, on the south side of the chancel, is an old iron ledger with sunk lettering, dated 1656, and there is also a fine granite cross, beautifully placed beneath four large lime trees, to the memory of Sir John Pender.

An old whipping-post used to exist at the south gate of the churchyard, and there exist many records of its having been used for both men and women. In 1637 Joan Cork, a beggar woman, was "whipped at ye whipping stock." Leaving the church, the members, under the guidance of Mr. D. T. Corke, the agent to the estate, walked through the park to Foot's Cray-place, now the residence of Mr. S. J. Waring, which was built in the middle of the eighteenth century for the Herance family; it came into the possession of the late Lord Bexley and now forms part of the Vansittart estates. The house, which was erected in 1750, is a copy of a villa near Florence by Palladio. The gardens and park slope gently southwards to the river Cray; on the west is a fine avenue of Spanish chestnuts leading from the farm buildings to the church, and on the east are two more avenues, but of elm trees, extending to the river. The house is severely symmetrical—square on plan, with projecting bays on each side, open on the north, and forming the entrance portico. It has a central hall, octagonal on plan, about 30 ft. diameter, surmounted by a dome. A gallery runs round internally at the first floor level, with centre corridors branching off each four ways; yet, inside, the plan is very convenient. Internally, few alterations have been made. The old library—a fine room, occupying the whole of the south front—has been made into a drawing-room; the hall has been improved with niches and a fireplace; and on the first floor bathrooms and lavatory accommodation have been skilfully provided in the roof space over each projecting bay, so that the outside remains unaltered. Mr. Frank Atkinson was the architect responsible for the alterations. He also designed the new lodge and entrance-gate piers on the north side of the park, which are careful examples of modern Classic work. The old walled kitchen garden has been laid out in a formal manner by Mr. T. Mawson, who has also arranged the fine bowling-alley against the south wall of the same; the garden also contains some old Italian wrought-iron gates, and the balls on the caps of the gate piers were brought from Cyprus by the late Sir J. Pender. In our issue of September 28, 1901, there appeared a design by Mr. Mawson for laying out in a formal manner the whole of the gardens immediately south of the house, and if these terraces are carried out they will add greatly to the appearance of the gardens.

The members were most hospitably entertained by Mr. Waring, who has saved a most interesting house and property from the spoiling hands of the jerry builder.

The party then visited the parish church at Sidcup, lately completed from designs by Mr. G. H. Fellowes Prynne. The original church, consisting of nave and chancel, was in 1844 known as East Chislehurst Church. In 1875 the cloisters, which surrounded three sides of the church, and the galleries at the west end, were removed and the ground floor was re-

seated; then in 1882 Mr. R. J. Withers was consulted, and he prepared plans for the rebuilding of the whole church, but only the chancel, vestries, and south chapel were carried out.

In 1897 the idea of completing the church on these lines was abandoned, and Mr. G. H. Fellowes Prynne was asked to design a new nave. He prepared plans for a new nave and aisles, and a tower for six bells, keeping the existing chancel. The nave has six bays, being 30 ft. wide and 105 ft. in length, and, with the aisles and transepts, gives seating accommodation for 900. The tower is not yet completed.

The style of the new church is a free treatment of Early English. The most interesting things in the church are the pulpit, dated 1651, the canopy over the altar, the lectern in the chapel, and some chairs, all of them very fine specimens of Flemish seventeenth century carved woodwork; the canopy over the altar probably came from some Jewish synagogue, but the other furniture was all brought from a church in Bruges.

Luckily the members were favoured with fine weather. The arrangements for the visit were made by Mr. F. J. Osborne Smith and Mr. F. Dare Clapham.

URALITE.

URALITE is a fire-resisting material made chiefly of flocculent asbestos rolled into thin sheets. On Wednesday, the 13th inst., some experiments testing its fireproof qualities were carried out on the premises of the British Uralite Co., Ltd., at Higham, near Rochester. In one of these tests an iron-framed hut, covered with two sheets of Uralite inside and outside, was attempted to be burned down. This hut has been experimented with on many occasions. Inside the hut was placed a dead-box constructed of wood and lined with uralite, one layer of the soft variety of the material separating two layers of wood, and two layers (one soft next the wood and one hard outside) inside and outside of the box. This box was supported inside the hut on iron standards 2 ft. 6 in. in height. A pyrometer couple was arranged 3 in. below the centre of the bottom of the box, underneath which combustible material was placed. In a short time after the fire was started a temperature of about 2,000 deg. Fahr. was attained. On the conclusion of the experiment it was ascertained that the wood nearest the fire was charred right through, but the middle layer of uralite was sound. The outer layers of that material, however, were porcelainised and badly cracked, and the joints of the box had started in some places to about 1 in. At the same time the contents of the box, consisting of papers, &c., were intact—they were somewhat discoloured, but not charred.

In another experiment, two wooden platforms had been erected, one of which was covered with uralite sheeting. Combustible material was placed under each platform and set alight. In the end it was found that the unprotected platform had been completely destroyed, whilst that covered with uralite was charred underneath to a depth of 1/2 in., and its legs were charred to a depth of 3/4 in. The last-mentioned platform, however, was still strong enough to withstand the weight of a man in the middle. The maximum temperature obtained during the conflagration was over 2,200 deg. Fahr.

In a third experiment a brick hut had been erected. The building was rectangular on plan, and on each side a door was placed. There were suitable air-holes through the brick walls. The principal object of this test was to prove the fire-resisting qualities of the doors, each one of which was differently constructed, but all partly composed of uralite. Combustible material was placed inside the hut, and was fired. The doors were shut. We need not enter into particulars concerning the construction of the doors, but one was of wood, armour, and uralite, two were of wood and uralite, and the other of wood, half armour, and uralite. The maximum temperature obtained during the test was over 2,200 deg. Fahr. At the conclusion it was found that in regard to one of the doors the hard outer layer of uralite next the fire was porcelainised, a soft layer of the material was crumbly, and the tin armour plate was buckled up, but still sound. In a second door the uralite was porcelainised, and practically all

the wood used in the construction of the door was burnt off. In the third door the outer urallite next the fire was porcelainised, but the layer of soft urallite in the middle of the door was uninjured as to texture. In a fourth door a hard outer layer of urallite next the fire was porcelainised, the soft urallite was crumbling, and the tin plate used in its construction was buckled but sound.

The whole of the experiments satisfactorily demonstrated the value of urallite as a fire-resisting material. There can be no question that a fire arising in a room lined with the material, its progress would be greatly retarded. Urallite is at present manufactured in two grades—one hard, the other comparatively soft. Its natural colour is light grey—almost white—but during the process of manufacture it may be coated to any desired tint. It may be painted upon, grained, or polished, and glued together like wood; it may be cut with a knife or saw, veneered to form panelling for walls, &c. It does not split when a nail is driven through it, and it is a good non-conductor of heat. In regard to its durability, it is difficult to say how it will withstand the action of the weather, but, judging from the material as used in the form of roofing slates at the company's works at Higham, it seems to weather very satisfactorily indeed; the buildings in question were erected about two years since. It is anticipated that the material will be largely used, amongst many other applications, for covering partitions and ceilings in lieu of plaster; there is the advantage of quick application and the absence of wet and dirt, as compared with plastering. In joinery work, where wide panels are required, in which it is difficult to prevent shrinkage, urallite may be used with advantage, as it neither shrinks or swells.

There is no occasion for us to give details of the process of manufacturing the sheets of urallite, though the whole was explained to us on the occasion of our visit to the works. It will suffice to remark that the asbestos employed comes chiefly from Canada, and in a lesser degree from Russia. It arrives at the works as a flocculent fibrous material, the fibres being short, and it is somewhat gritty. The first part of the process is to free the asbestos from this grit. That having been done, it is passed through various stages, and in a wet condition is rolled into sheets. The asbestos would not, by itself, form a very compact, hard sheet when dry, and this difficulty is overcome by cementing the fibre with colloidal silica, and some chalk is also present. There is a large installation of silica tanks at the works. Great care is taken in the manufacture of the material, which is subjected to daily tests in the well-appointed chemical and physical laboratory on the company's premises. Speaking generally, as far as we can see, urallite is an excellent fire-resisting material, and is useful for many purposes to the builder.

COMPETITIONS.

CARDIFF UNIVERSITY COLLEGE BUILDINGS.—New college buildings for the University College of South Wales and Monmouthshire are to be erected in Cathays Park. The following architects, it is stated, have been asked to send in plans for final consideration:—Mr. Basil Champneys, Mr. W. D. Caröe, Mr. W. C. Marchall, and Mr. John Belcher. These gentlemen are invited to send in plans for consideration, and it is arranged that the unsuccessful three shall each receive a premium of 150 guineas.

HIGHER GRADE SCHOOL, WEST HARTLEPOOL.—Mr. J. W. Simpson, F.R.I.B.A., has acted as assessor in the competition for Higher Grade Schools, Elwick-road, West Hartlepool. Sixty-eight sets of designs were received, and the assessor's award is as follows:—1st, Mr. Richard Holt, 45a, Dale-street, Liverpool; 2nd, Messrs. J. M. Bottomley, Son, & Wellburn, 28, Albert-road, Middlesbrough; 3rd, Messrs. Jones & Sellers, Union Bank-chambers, Oldham. Mr. Holt has been appointed to carry out the work subject to the conditions contained in the instructions.

BAPTIST CHURCH, STREATHAM.—The competition recently held for the London Baptist Association Church, Mitcham-lane, Streatham, S.W., has been decided in favour of the design marked "New Era," the authors of which were Messrs. George Baines, F.R.I.B.A., and K. Palmer Baines, 5, Clement's-inn, Strand. The

first portion of the buildings, which includes the nave, tower, vestries, and temporary apse, is to be at once proceeded with. The estimated cost of the complete block is 5,238*l.*, without tower, the latter increasing the cost by 440*l.*

CARNEGIE LIBRARY, COATBRIDGE.—A limited competition for the Carnegie Library, at Coatbridge, has just been decided. Mr. T. L. Watson, Glasgow, was selected as assessor, and he advised the Committee and the Town Council throughout the competition. On his recommendation the plans of Mr. Alexander Cullen, Motherwell, were adopted from amongst ten sets submitted, and premiums were awarded to Messrs. A. N. Paterson, Glasgow; George Arthur & Sons, Airdrie; and Alexander MacGibbon, Glasgow. The limit of cost is 10,000*l.*

ARCHITECTURAL SOCIETIES.

THE TRANSVAAL ASSOCIATION OF ARCHITECTS.—The following officers have just been elected, and Lord Milner, High Commissioner of South Africa, has accepted the post of Honorary President, 1902-3:—*President:* Mr. E. B. J. Knox, F.R.I.B.A., M.Inst.C.E.; *Vice-Presidents:* Messrs. W. Leek and G. A. H. Dickson, A.R.I.B.A. The Association numbers about thirty.

SOME POINTS IN THE CONSTRUCTION OF THE CONTINUOUS SEWAGE FILTER.*

DURING the past two years a considerable number of continuous sewage filters have been erected, and as the actual construction has in all cases been left in the hands of the several engineers concerned, a large body of experience has accumulated with regard to the original form of the filter, and to such modifications as have suggested themselves in practice. It has been thought that a brief record of this experience may be usefully presented to the Association.

The main principle underlying this type of filter is, of course, generally understood, and may be stated to be the preservation of the interstices of the filter as air spaces in the freest possible communication with the external atmosphere.

There is evidence of some weight to show that the ventilating currents essential for providing the necessary supply of oxygen follow closely the course of the liquid applied to the filter, and that the vertical continuity of the air spaces is of more importance than the horizontal; from which it follows that there must be no hindrance to the access of air to the surface and base of the filter. Experience proves indeed that, whilst no appreciable difference can be detected in practice between a filter wholly open at the sides and one so enclosed as to leave the base only in communication with the air, complete closure of the sides and base of the filter (with the exception, of course, of an outlet for the effluent) results in a total cessation of its oxidising action. A primary consideration, therefore, is that the filter body, especially as regards its base, must not be enclosed within impermeable walls. There will probably be little difference of opinion on this point; but, in view of the fact that as lately as within the last few months filters presenting this radical defect have been erected, a word of caution appears necessary.

Passing to the construction of the filter body itself, it is necessary to point out that there are three chief contributing factors to the ultimate closure of the interstices of the filter, and therefore to the cessation of its activity after a longer or shorter time, whatever its relation as a whole to the external atmosphere. These factors are, in order of importance, the disintegration of the medium, the deposition of sewage solids, and coating of the medium with organic growth. Of these, by far the most serious is the first, because the resulting fine material is quite permanent, and resists biological destruction. However carefully the filtering medium is prepared, fine gritty dust appears at the outlets of the filter, at first in a considerable quantity, later (but for a prolonged period) in smaller traces. Means of ensuring its removal must therefore be provided.

Sewage solids, in the very finely divided

condition in which alone they should be allowed to pass on to a filter, are largely amenable to microbic action, and, indeed, are not recognisable in the effluent from a filter in good condition; by themselves they will not do more than temporarily depress the action of a well-constructed filter, but, of course, they will materially add to the mischief caused by the retention of the stable clinker debris.

The third factor, organic growth, is of two kinds, according to its position. That in the interior of the filter, after a permanent condition, and can therefore be satisfactorily allowed for. Upon the surface of the filter, however, as is well known, a more or less continuous layer of fungoid matter frequently forms, varying in extent and thickness from time to time, and may interfere with the proper feeding of the filter. It is probable that the best remedy for this condition is a superficial layer of very large clinker, so that the growth is unable to extend from particle to particle.

It has been suggested that the formation of this growth is promoted by the continuous dropping of tank effluent upon the same spots, and is obviated by the use of the intermittent appliances of short period known as rotating sprinklers. This suggestion, for which there are no scientific grounds, is completely disproved by the experience at Bristol, where of two continuous filters, and one filter fitted with an intermittent sprinkler, all being supplied with sewage of similar domestic character, the last alone has developed a "blanket" growth of a troublesome kind.

Now these materials, and especially the clinker dust, are, under the influence of the continuous flow, constantly making their way to the base of the filter, and if arrested there will, more and more rapidly as they accumulate, destroy the action of the filter. Means must be provided for their escape, and the first to be considered is the design of the floor. The form originally suggested, namely, a plain surface sloping towards the nearest exterior, has proved in practice to be the most effective, whilst it also lends itself to the conditions of ventilation noted above. The even sweep of the liquid over the plain surface seems to keep it clear of obstructions, as shown by the uniform discharge of effluent at all points in the circumference of the filter. The introduction of channels, especially if associated with inclined surfaces not in the direction of the flow, is found to check the current, and to encourage the local deposition of solids.

Next in importance is the grade of medium, the selection of which is necessarily a matter of debate, since two directly antagonistic considerations have to be weighed. The capacity for work of the continuous filter is in direct proportion to the extent of surface offered by the medium, and that surface is obviously greater the smaller the particles of which that medium is composed. The most active filter, therefore, will be that in which the grade of material is finest, provided the interstices are kept open. The latter proviso demands a certain coarseness of medium in order to prevent choking by the agencies already referred to.

Now a long and tedious series of experiments has shown that coarse sand becomes ineffective in a day or two, 3-in. clinker in three months, 3-in. clinker in seven months, and so on. On the other hand, the 3-in. material ultimately adopted was deliberately chosen as being entirely free from tendency to choke, and this is so valuable a feature as to render it worth while to sacrifice a certain amount of additional temporary efficiency to secure it. It is, however, quite open to others to maintain that it may be possible by means of an improved material, and perhaps at the expenditure of some trouble in cleansing, to keep a finer filter open, and obtain increased efficiency.

It is probably the desire to retain the use of a fine medium that has led to the introduction from time to time of various systems of aerating pipes into the body of the filter. This is a perfectly useless proceeding. If the medium at the termination of the pipe is impervious, the latter is useless; if the interstices are open, aeration will look after itself. In any case, one layer of 6-in. material on the floor is advisable.

Reference has already been made to the question of a retaining wall, and to the necessity of freely piercing any such wall at its base. On grounds of economy alone it would seem advisable to dispense with masonry altogether. Furnace clinker, which up to the present has

* A paper read by Mr. F. Wallis Stoddart, F.I.C., F.C.S., before the Incorporated Association of Municipal and County Engineers, at the annual meeting, held at Bristol, July 10, 11, and 12, 1902.

even the best results of all the numerous materials tried, forms an excellently coherent ed, the outer surface of which may be almost quite vertical without danger. The appearance is by no means bad, and the least possible obstacle is offered to aération. As an instance of the danger of departing, even to a slight extent, from the conditions are laid down, mention may be made of the continuous filter erected at the Manchester sewage works, since it has already been made the subject of a public report. In this case, though the upper part of the filter is retained by spaced boards only, the lower part, to a depth of about 2 ft., was sunk in the soil, egress of the effluent being provided by two 2-in. pipes. The floor of the filter was dished to the centre. The effect, as was foreseen, has been exceedingly unsatisfactory. Not only is there a total absence of the essential basal aération, but there is no free exit for the effluent, and no doubt the greater part of the effluent after a few weeks' flow became completely clogged, especially as coke, the medium used in this case, is known to be very friable. A subsequent attempt to improve matters by digging away the soil on two sides did not lead to the desired result, partly because the mischief was already done, and partly because it effected no improvement in the faulty direction of the flow, which remained as before, directed towards the centre instead of towards the circumference of the filter.

In reference to the method of feeding the filter, it will only be necessary to state here that the most satisfactory will be that which in the most economical manner combines the most complete comminution of the liquid with the least expenditure of force and the least disengagement of odour, due importance being also attached to the conservation of fall. If, as is undoubtedly the case, the maximum amount of work is to be obtained from a given volume of effluent, the body by uniformly maintaining the proper proportions of liquid and air, there can be no advantage, but, on the contrary, a loss of efficiency, in arranging for alternating periods of rest and overworking. The distributing apparatus therefore should work perfectly uniformly over long periods of time, and should, if possible, be practically independent of supervision. These features are combined in the distributor, which forms an essential part of the continuous sewage filter.

This apparatus was fully described by your President at last year's Conference, but in order to correct a widespread error in its mode of application, it is necessary to recall that it consists of a number of narrow gutters entered at both ends into specially designed annuli which both feed and supply them. The whole of this system must be laid perfectly level, no fall whatever in the supply annuli being required. The escape of liquid from the distributors is so free and unimpeded that with the maximum flow along the channels measurable rise in level is apparent. The stems of channels may be directly connected with the outlet of the tank, their floors being flush with the invert of the latter; if circumstances necessitate a length of channel between tank and filter, a baffle chamber should be interposed to steady the flow. In several instances the supply channels have been laid with a distinct fall, and the effect has been, of course, to feed only the most distant distributors, and even those irregularly. There are no matters connected with the use, rather than the construction, of this filter which may usefully be mentioned here. It is surprisingly easy to find sewage works with an efficient means of gauging the flow, and the trifling means made by the drops of liquid falling from the points of the distributor is so deceptive that these filters are commonly, though unintentionally, much overworked. It should be remembered that one drop per second from each point is equivalent to a flow of 22 gallons per square yard, the full dose for a tank filter; and that, assuming that only one-fourth of the points are working, each should deliver only four drops per second. It is almost impossible without direct measurement to persuade the inexperienced observer that the actual flow is so considerable.

Secondly, it has been pointed out elsewhere that a dilute tank effluent is more amenable to treatment than a strong one, because the additional water provides means of applying the dissolved oxygen to the oxidisable impurities. In many localities there must be considerable quantity of more or less

polluted and useless subsoil water, the removal of which from the neighbourhood of dwellings would add to their healthiness, and which at small expense could be brought into the works, and there added to the tank effluent before its application to the filter. By thus increasing the total volume to about 50 gallons per head of population, the oxidation of the organic impurities would be greatly facilitated.

It has frequently been suggested that prolonged and severe cold must prejudice the bacterial treatment of sewage by inhibiting the activity of micro-organisms generally. However true this statement may be of some steps in the process, there are no good experimental reasons for assuming it to extend to the final stage of oxidation. The known persistence of nitrification in the surface soil throughout the winter, and some direct experimental proof that rise of temperature tends to stay the series of changes at the penultimate stage of nitrification, are sufficient to throw doubt upon the cessation of biological oxidation at temperatures short of actual freezing; whilst the largely increased solvent power of water for oxygen at low temperatures is, of course, a favourable factor.

However, there are mechanical as well as biological matters to be taken into consideration, and the prolonged frost in February of this year afforded a welcome opportunity of ascertaining whether the continuous sewage filter was affected as a whole by a sustained low temperature. The frost commenced with the month of February, but became severe on the 7th, and continued so until the 20th.

The observations taken were not so complete as would have been the case if it had been possible to foresee the spell of cold weather; but the following tables give such results as were noted, and suffice to show that during the whole of the time nitrification was fully maintained, whilst the incubator test proved the effluent to be uniformly imputrescible.

TABLE NO. I.—HORFIELD CONTINUOUS SEWAGE FILTER.

Relation of Temperature to Nitrification.

Date.	Minimum Temperature of Air, Fahr.	Nitric Nitrogen per 100,000.
Feb. 7	24	Greater than 2.0
8	26	
9	25	
10	21	
11	18	
12	18	2.90
13	15	
14	18	
*15	10	
16	20.5	
17	18	3.10
18	21	2.75
19	32	
20	32	

* TABLE NO. II.—ANALYSIS OF FILTER EFFLUENT, FEBRUARY 15.

	Parts per 100,000.
Saline ammonia	9.1
Albuminoid ammonia	0.33
Nitric nitrogen	2.75
Oxygen absorbed in 4 hours at 80 deg. Fahr.	1.51
Chlorine as chloride	11.70

The first table shows the actual minima of air temperature during this time and the determinations of nitric nitrogen on the later days; the figure on the 17th was corroborated independently by Dr. Rideal. The lowest temperature noted for the effluent from the filter was 35 deg. Fahr. The second table gives the analytical data furnished by the effluent on February 15. Considerable freezing occurred in the distributors, especially at nights; and the outlets and tip of the filter were thickly coated with ice; the action of the filter, however, as a whole was entirely unimpaired; and it appears unlikely that the cold in this climate will ever be sufficient to cause any interruption in working.

CITY SURVEYORSHIP, NEWCASTLE.—At the meeting of the Newcastle Town Council, on the 6th inst, Mr. T. H. Holford, of the Surveyor's Department, Liverpool, was appointed, out of 101 candidates, City Surveyor of Newcastle.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

At the meeting of the Building Act Committee of the London County Council, held the day before the Council adjourned for the summer recess, the proceedings were governed by the clause in the order of reference which empowers the Committee at certain seasons to act on behalf of the Council in relation to matters included in the Committee's order of reference. The names of applicants are given in parentheses:—

Lines of Frontage and Projections.

Wandsworth.—Rebuilding of the Forester's Arms beer-house, on the west side of Mitcham-road, Tooting (Mr. H. Griffiths for Mrs. C. Beard).—Consent.

Paddington, South.—Porches on the ground floor, and oriel windows and balconies on the first and second floors on Nos. 18 to 23, inclusive, Hyde Park-place, Paddington (Mr. E. K. Purchase for Messrs. G. T. Smith and R. G. Knox).—Consent.

Poplar.—Dwelling houses on the east and west sides of Cahir-street, and west side of British-street, Millwall (Mr. W. Clarkson for Messrs. W. G. Wells and T. B. Benton).—Consent.

Woolwich.—A house on the north side of North Park, Eltham, at the corner of Park-place (Messrs. B. J. White & Son for Mr. A. B. Hutchings).—Consent.

Lewisham.—Additions to the basement stories of Nos. 24 and 26, Brandram-road, Lee (Mr. F. W. W. born for Mr. R. B. A. Chambers).—Consent.

Chelsea.—A block of buildings on the eastern side of Beaufort-street, Chelsea, at the corner of Cheyne-walk, with projecting bay windows and balconies (Messrs. W. Dunn and R. Watson for the Town and Gown Association).—Consent. (The erection of oriel windows not agreed to.)

Clapham.—Two houses, with shops on the ground floor, on the east side of Northcote-road, Battersea, to abut upon Broomwood-road (Mr. J. Dickson).—Refused.

Hammersmith.—A two-story addition to No. 3, Evelham-street, Ladbroke-road, Hammersmith (Mr. P. Moore for Mrs. M. Moore).—Refused.

Lewisham.—Houses, with shops on the ground floor, on the east side of Bromley-road and south side of Sangley-lane, Catford (Mr. A. W. Osborn for Mr. J. Watt).—Refused.

Peckham.—One-story shops on part of the forecourts of Nos. 656-674 (even numbers only, inclusive), Old Kent-road, Peckham (Messrs. Holman & Goodham for the Royal London Friendly Society).—Refused.

St. George, Hanover-square.—Three two-story oriel windows in front of No. 5, Stafford-street, St. George, Hanover-square (Messrs. J. T. Wimperis & Arber for Messrs. Robinson & Fisher).—Refused.

St. George, Hanover-square.—An addition in front of No. 9, Grafton-street, Piccadilly (Mr. W. A. Large for Messrs. Matkin & Lawson).—Refused.

Hackney, Central.—Blocks of dwellings on the south side of Dalston-lane and east side of Navarino-road, Dalston (Messrs. N. S. Joseph, Son, & Smithem for the Four per Cent. Industrial Dwellings Co., Ltd.).—Refused.

Hackney, North.—A showcase on the forecourt of No. 4, Manor-road, Stoke Newington (Messrs. Martin & Sanders).—Refused.

Paddington, North.—A block of residential flats, with one-story shops in front, on the site of Nos. 212-220 (even numbers only, inclusive), Harrow-road, Paddington (Messrs. Falgrave & Co. for Mr. E. J. Read).—Refused.

Width of Way.

Hampstead.—A one-story cottage on the site of two two-story cottages on the north side of Gayton-road, Hampstead, at the rear of Nos. 22-24, High-street, with a forecourt boundary at less than the prescribed distance from the centre of the roadway of Gayton-road (Mr. B. E. Atkinson, jun., for Mr. J. W. Fenn).—Consent.

Westminster.—A building on the west side of Great Smith-street, Westminster, with the external walls at less than the prescribed distance from the centre of the roadway of Orchard-street (Mr. G. A. Hall for the Mutual Tontine Association, Ltd.).—Consent.

Bermondsey.—A building on the east side of Bermondsey-street, Bermondsey, and south side of Crucifix-lane, with the external walls at less than the prescribed distance from the respective centres of the roadways of those streets (Mr. E. J. W. Hider for Mr. W. H. Hazard).—Consent.

Marlybone, West.—Buildings on the south side of Samford-street, St. Marlybone, with the forecourt boundary at less than the prescribed distance from the centre of the roadway of the street (Mr. F. W. Hunt).—Consent.

Southwark.—A building on a site on the south-west side of Dantzie-street, Southwark, abutting upon Butcher's-row, with the external walls of such building at less than the prescribed distance from the respective centres of the roadways of Dantzie-street, Parliament-street, and Market-row (Mr. E. J. Edwards for the Highways Committee of the Council).—Consent.

Hampstead.—A shop front at the flank of No. 70, High-road, Kilburn, at less than the prescribed

distance from the centre of the roadway of West End-lane (Mr. G. A. Sexton for Messrs. A. Phillips, Ltd.).—Refused.

Space at Rear.

Lambeth, North.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of a one-story water-closet addition at the rear of No. 10, St. James' Mansions, Kennington-road (Mr. G. A. Lansdown for Mr. J. E. Lamerton).—Consent.

St. George, Hanover-square.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of a two-story addition at the rear of Nos. 17, 18, and 19, Old Bond-street on the open space at the rear of those premises (Mr. G. Carter for Messrs. Russell & Allen).—Consent.

Brixton.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of stable buildings, with lofts over, on land at the rear of Nos. 26 and 27, Stockwell-green, and Nos. 11 and 13, Burgoyne-road, Brixton, without an open space at the rear (Mr. S. Parker for Messrs. C. Hammetton & Co.).—Refused.

Strand.—Certain deviations from the plans certified by the District Surveyor under Section 43 of the Act, so far as relates to the proposed erection of a building on the site of Nos. 1, 3, and 5, Ryder-street, St. James's (Mr. W. Woodward for Mr. C. Guifanti).—Refused.

St. George, Hanover-square.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of an additional story on the rear portion of No. 95, Piccadilly (Mr. F. Muntzer for Lieut.-Colonel Seymour).—Refused.

Line of Frontage and Width of Way.

Hackney, North.—One-story shops on part of the forecourts of Nos. 101, 103, 105, and 107, Upper Clapton-road, Clapton (Mr. A. Tighe for Dr. W. B. Benjafield).—Consent.

Dejford.—A house on a site northward of No. 32, Dennett's-road, Queen's-road, Peckham, with the external walls of the house at less than the prescribed distance from the centre of the roadway of Franklin-grove (Messrs. E. Simpson and A. E. Harris for Mr. C. Adams).—Refused.

Marylebone, West.—An addition at the rear of No. 61, Montagu-square, St. Marylebone, with the external walls at less than the prescribed distance from the centre of the roadway of Montagu-mews West (Messrs. Hudson & Hunt for Messrs. W. Phillips & Sons).—Refused.

Width of Way and Construction.

Fulham.—A wood and iron cycle shed at the William-street Schools, Fulham, at less than the prescribed distance from the centre of the roadway (Mr. T. J. Bailey for the School Board for London).—Refused.

St. George-in-the-East.—An open play-shed at the Christian-street Schools, St. George-in-the-East (Mr. T. J. Bailey for the School Board for London).—Refused.

Lines of Frontage and Construction.

Bow and Bromley.—The retention of the temporary wood and iron street fire-station on a piece of land on the north side of Wallis-road, Hackney Wick, at the corner of Windsor-road (Mr. O. Fleming for the Fire Brigade Committee of the Council).—Consent.

Artisans' Dwellings.

Hackney, Central.—Dwelling-houses, to be inhabited by persons of the working-class, and proposed to be erected, not abutting upon a street, on a site at the corner of Dalston-lane and Navarino-road, Dalston (Messrs. N. S. Joseph, Son, & Smith for the Four per Cent. Industrial Dwellings Company).—Consent.

Marylebone, West.—Dwelling-houses to be inhabited by persons of the working-class and proposed to be erected, not abutting upon a street, on a site at the corner of Samford-street and Salisbury-street, St. Marylebone (Mr. F. W. Hunt).—Consent.

Formation of Streets.

Bow and Bromley and Hackney, South.—That an order be issued to Messrs. Wigg, Oliver, Hudson, & Co., sanctioning the formation or laying out of a new street for carriage traffic, proposed to be named Waterden-road, to lead from Carpenter's-road to Homerton-road, Hackney Wick.—Consent.

Fulham.—A deviation from the plan sanctioned on January 23, 1900, for the formation of four new streets on the Beaufort House Estate, North End-road, Fulham, so far as relates to the position of the street to be named Sedlescombe-road (Messrs. Boynton Pegram and Buckmaster).—Consent.

Lewisham.—That the application of Messrs. Taylor, Willcocks, & Lemon, for Mr. G. F. Darby, for an extension of the period within which the roadways of three new streets out of the eastern side of Grafton-road, Perry-hill, Catford, were required to be clearly defined throughout by posts and rails, or so otherwise be granted.—Consent.

Wandsworth.—That an order be issued to Messrs. Holloway Bros. sanctioning the formation or laying

out of three new streets for carriage traffic, proposed to be named Littleton-street (in continuation), Waynflete-street (in continuation), and Sussy-road on the Magdalen College Estate, Garratt-lane, Wandsworth.—Consent.

Battersea.—That an order be issued to Mr. W. M. Wilkins, sanctioning the formation or laying out of new streets for carriage traffic on the north side of Sheepcote-lane, Battersea (for the Council of the Metropolitan Borough of Battersea).—Consent.

Wandsworth.—A further deviation from the plan sanctioned on February 19, 1901, for the formation of new streets on the Totterdown-fields Estate, Upper Tooting-road, Wandsworth, so far as relates to the position of the streets to be named Coteford-street and Lessingham-avenue (Mr. K. Robertson for the Housing Committee of the Council).—Consent.

Hackney, South.—That an order be issued to Mr. C. Thompson, refusing to sanction the formation or laying out of a street for carriage traffic to lead out of the north-eastern side of Chatsworth-road, Hackney (for Messrs. Snewin Bros. & Co.).—Agreed.

Means of Escape from Top of High Buildings.

St. George, Hanover-square.—Means of escape in case of fire, proposed to be provided on the fifth and sixth stories of an addition in Berkeley-street to the Berkeley Hotel, Piccadilly, St. George, Hanover-square (Mr. W. H. Lees for the Berkeley Hotel Company).—Consent.

Westminster.—Means of escape in case of fire, proposed to be provided on the sixth and seventh stories of Rutland-court, Knightsbridge (Mr. D. Joseph for Mr. H. Lovatt).—Consent.

Buildings for the Supply of Electricity.

Lambeth, North.—A addition to one of the motor-rooms and an addition to one of the cooling towers at the generating-station No. 88, Commercial-road, Lambeth (Mr. W. B. Pinney for the Charing Cross and Strand Electricity Supply Corporation, Ltd.).—Consent.

Height of Buildings.

City.—A building on the south side of Tallis-street, City, between Carmelite-street and John Carpenter-street, to exceed in height the width of those streets (Mr. F. Fox for Messrs. M. Patrick & Sons).—Consent.

Dwelling-houses on Low-lying Land.

Poplar.—That the Solicitor do prepare a licence under Section 122 of the Act to Messrs. W. G. Wells & T. B. Benton, for the erection of fifty-two houses on low-lying land situated at British-street and Cair-street, Millwall (Mr. W. Clarkson).—Consent.

THE FIRE AT SWANSCOMBE CHURCH, KENT.

AT about five o'clock on Thursday afternoon last, August 14, the church at Swanscombe was struck by lightning during a violent thunderstorm. A fierce fire broke out immediately, destroying the shingled spire, the floors of the tower, the bells, the roofs of nave and aisles, and practically all the internal fittings of the church, except those of the chancel. Some of the mural monuments were destroyed, and the curious font of carved chalk was utterly ruined, but the walls, as far as can be discovered by a superficial examination, appear to be practically uninjured. Fortunately no harm has been done to the interesting little Anglo-Saxon window in the south wall of the tower, but the effect of the fire has been to peel off the internal coat of plaster, showing in an admirable manner the original walling. This resembles in every respect that of the exterior of the wall, blocks of rag-stone being freely used with a rather small proportion of chalk flints and a smaller proportion of Roman bonding-tiles. The window is a good example of its kind. It is semi-circular headed and double-played, the splayed arch being ingeniously turned in Roman bonding-tiles. The jambs, both within and without, are largely constructed of Roman tiles. The same materials are employed in the upper parts of the tower, where the use of rag-stone is less pronounced. Roman materials, however, are found quite high up in the western wall of the tower.

Now that the spire has been destroyed, and the tower stands out gaunt and uncovered, with its internal surfaces largely exposed, it is impossible to resist the impression that it is entirely of Saxon workmanship. Of course, the windows are later insertions, but there is in the gables an approach (not very pronounced, it may be confessed) to long-and-short work, which tends to confirm the idea. Traces of long-and-short work, it may be added, were

noticed in the lower part of the tower as long ago as 1852, when the Rev. Arthur Hussey published his book on the "Churches of Kent, Sussex, and Surrey."

The iron chests containing the church plate, and the registers were (for safety) removed from the vestry before any very serious harm was done, except that the books of vellum and paper are too much swollen with water to be moved from the safe in which they were tightly packed.

The results of this unfortunate fire can hardly be considered to be as serious as one would imagine from the accounts which have been given in the daily papers, because it was the more modern parts of the church and its furniture, generally speaking, which perished, whilst the more interesting and valuable architectural and archaeological features are practically unimpaired.

Now that the damage is done the church must be immediately made watertight, and steps will doubtless be taken to provide for an effective lightning-conductor.

BOOKS RECEIVED.

THE MODERN CARPENTER, JOINER, AND CABINET MAKER. Prepared under the editorship of (Lister Sutcliffe, A.R.I.B.A. London: The Gresham Publishing Co., Southampton-street, Strand.

THE GEORGIAN PERIOD. Being measurements and drawings of Colonial work. Part X, Boston, 1902. *The American Architect and Building News Co.* London: B. T. Batsford.

LANCASHIRE, CHESHIRE, AND N. WALES BUILDING TRADES EMPLOYERS' FEDERATION YEAR BOOK: July, 1902, to June, 1903. Compiled by Robert Hall, Frederick-street, Bury.

THE ROYAL CONVERTING AMERICAN DOLLARS INTO ENGLISH POUNDS. London: The Fairbank Co., City-road.

Correspondence.

FIREPROOF WOOD.

SIR,—In your interesting article in a recent issue, entitled "Lessons from the City Fire," you make no allusion to a lesson which, above all others, should be drawn from that deplorable event. Such lesson is that the London County Council ought to avail itself of the recent advance in science that renders wood, which is practically the only fire-spreading material in a structure, immune against flame.

It is now common knowledge that when wood is treated with boric acid, sulphate of ammonium, tungstate of soda, and other well-known crystalline chemicals, such wood cannot afterwards catch fire, or spread flame, but will merely carbonise slowly; the point of contact with fire. The extra cost for such wood in New York, where it is largely employed in building construction (the authorities in that city having enacted a law making its use in high buildings compulsory), is about 20 per cent. above the cost of ordinary wood.

A few years ago a factory was erected on the Thames, in London, to supply such wood to builders, and numerous samples were sent to the Architect's department of the London County Council for test.

These tests showed that the wood was as represented, but the County Council seems to have done nothing further, the reason, it is stated, being that although fully satisfied that such wood is proof against fire spreading, they will not specify it to be used by builders because it is a patent.

This can hardly be considered a sufficient reason for not meeting a great public want. If the County Council wish to protect the public against a monopoly, all they have to do is to specify not any particular company's wood, but wood that has been rendered fireproof to the satisfaction of the County Council, thus leaving the field open for competition.

If the woodwork in the Queen Victoria-street buildings recently burnt out had been fireproof, no lives would have been lost there.

W. C. DICKENSON.

A CONTRACT FOR THE BOROUGH OF POPLAR.

SIR,—Almost on a par with the recent "competition" offers of certain public bodies, as noted in the *Builder*, is the conduct of the Borough Council of Poplar in the matter of a contract for decorative repairs to Poplar Town Hall, Bow Vestry Hall, and Bow Public Health Offices, advertised in the *Builder*.

For a copy of the specification the builders had to pay 10s., a receipt being given on the usual sanitary deposit receipt form (the word "deposit" not being struck out). The builders had to take out their own quantities for the three jobs and make up their estimates to Poplar Town Hall, Bow Vestry Hall, and Bow Public Health Offices, advertised in the *Builder*. The result of the tenders, the builders were refused the return of the 10s. paid for the specification, and

* See our issue for August 2.

"No information will be given to unsuccessful contractors" was the only message vouchsafed. Upon writing to the Council, a letter to the same purport was received.
ONE OF THE BUILDERS.

BILLS OF QUANTITIES.

SIR,—If a quantity surveyor omits certain items in his bill of quantities that are shown on the contract drawings, or are described in the specification, is he, or is the employer, liable to pay the builder the value of such omitted items—the bill of quantities not being part of the contract?
R. O. D.

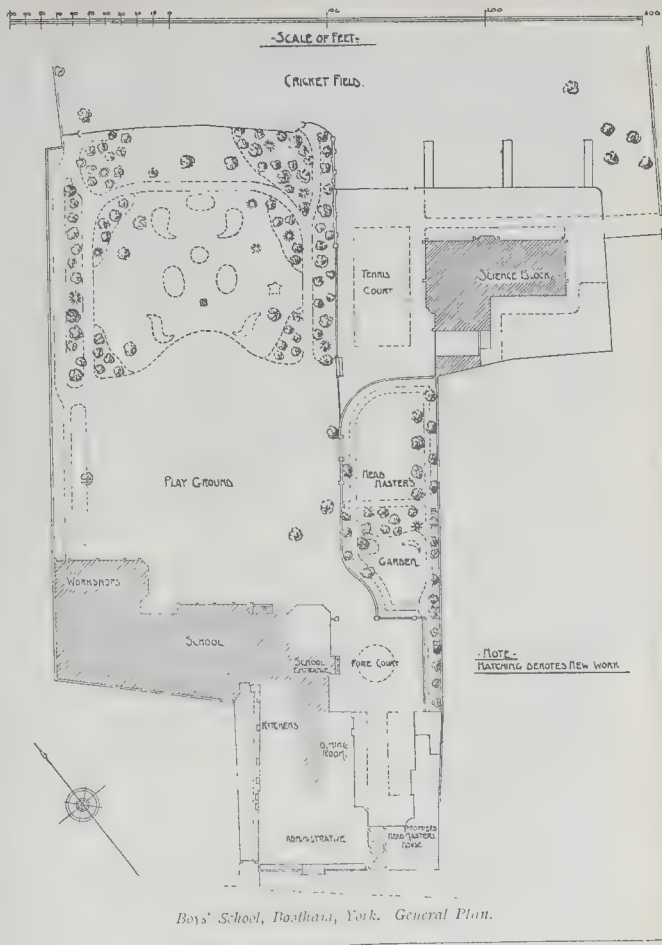
Illustrations.

PREMIATED HOUSE FAÇADE, No. 29, AVENUE RAPP, PARIS.

THIS house is one of the six houses premiated this year by the jury of the annual "Concours de Façades" at Paris. The architect, M. Lavirotte, whose various interesting work in modern design is well known at Paris, has made a speciality of decorative house fronts in which coloured ceramic and stoneware materials play an important part. One of the chief points in this house, which won favour from the jury, apart from the novel design of the façade and the employment of modern materials, was the ingenious system of construction employed for the entire building, a system which, whilst it permitted the architect to obtain constructional effects which would otherwise have been impossible, possessed the further advantages of economy in cost of construction, additional solidity and durability, a certain economy in space—no small advantage for a town building—and the security afforded by an absolutely fireproof building.

The cost of the house is estimated to be 22 per cent. under the cost of ordinary construction. The whole of the interior and exterior walls of the building, including that of the façade, are constructed after the Cottancin system of armoured cement, and brick, and stoneware materials strengthened by steel insertions. The walls of the staircase and lift are built of armoured brick of a thickness of 4½ in. from basement to roof; the staircase itself is constructed entirely of armoured cement, and is therefore quite fireproof; the usual thick walls and chimney breasts to contain the many flues and conduits for smoke and heating purposes, and generally useless for the purpose of supporting floors, have been replaced in this case by hollow walls of 2½ in. armoured brick with space in the hollow to contain the various smoke and heating flues, and these walls have the additional advantage of being useful for supporting purposes. The space thus gained by the suppression of the chimney breasts and thick flue-walls has been about 60 superficial feet of ground surface in the building. The courtyard walls are formed of a double thickness of 2½ in. armoured brick from basement to roof, with air space between, which, besides being useful for heating and ventilation purposes, keeps the interior comfortable both in summer and winter. All the floors are fireproof and are constructed of armoured cement, the wire core of which is tied to the wire cores of the brick walls. These floors consist of an upper thickness of two inches of armoured cement, supported by similar cement ribs tied to the core of the walls; the ceilings are formed of slabs of armoured plaster which, having first served as centering for the cement surface above, were lowered to the level of the ceiling, forming a hollow, soundproof and fireproof floor. The whole of the roofs and flats are formed of armoured brick and cement, with hollow spaces similar to those of the floors; no timber of any description enters into the construction of the floors or roofs, the whole is therefore, with the additional advantage of the small section of wire trellis employed which remains unaffected by heat from fire, entirely fireproof, and has earned the highest praise from the Fire Brigade Service. The hollow roofs afford the advantage of making the attic rooms comfortable both in summer and winter. The courtyard sides of the roofs and flats have been left with their cement surfaces exposed; the fronts on the Avenue have been covered with coloured tiles tied to the metal core of the roofs.

The façade, with the exception of the lower



Boys' School, Bootham, York. General Plan.

floor, is entirely constructed of coloured enamelled ceramic and stoneware materials, manufactured by M. Bigot, of Paris, and all these materials forming the façade are reinforced with wire cores on the Cottancin system, and tied into the basket work cores of the brickwork of the walls and floors. This method has allowed the architect to execute a very bold design and carry forward considerable projections of heavy materials which would have been impossible otherwise. The front wall is lined at the back by a 2½-in. armoured brick wall with air space between. All zinc and lead work has been suppressed on the roofs, and a considerable economy in maintenance is thus made.

The details of the system of construction employed are of considerable interest, though we very much question the advisability, in the long run, of admitting such a quantity of metal into the whole material of walls and floors of a house. In regard to the design, aesthetically considered, we may leave our readers to form their own opinion. As the system of offering premiums for the best designs for street fronts has been set on foot in Paris, we thought it would interest our readers to see what kind of architecture is thought worthy of such distinction.

PROPOSED LADY-CHAPEL, ST. PATRICK'S CATHEDRAL, NEW YORK

This design was submitted in a limited international competition for a memorial chapel proposed to be added to St. Patrick's Cathedral, New York. Mr. W. D. Carie is out of town, and for that reason we have not been able to obtain a description of his design.

FRIENDS' BOYS' SCHOOL, BOOTHAM, YORK.

THE Society of Friends' School in Bootham, York, was founded in 1829. In 1846, the existing house fronting to Bootham (a handsome residence of the Georgian period), with extensive grounds in the rear, was acquired, and subsequently large additions were made to provide the necessary school and classroom accommodation.

A destructive fire in the spring of 1899 burnt down a considerable portion of the school buildings, and it was then resolved to rebuild on an extensive scale, and to provide accommodation and equipment of modern character suitable for the purposes of a high-class public boarding school.

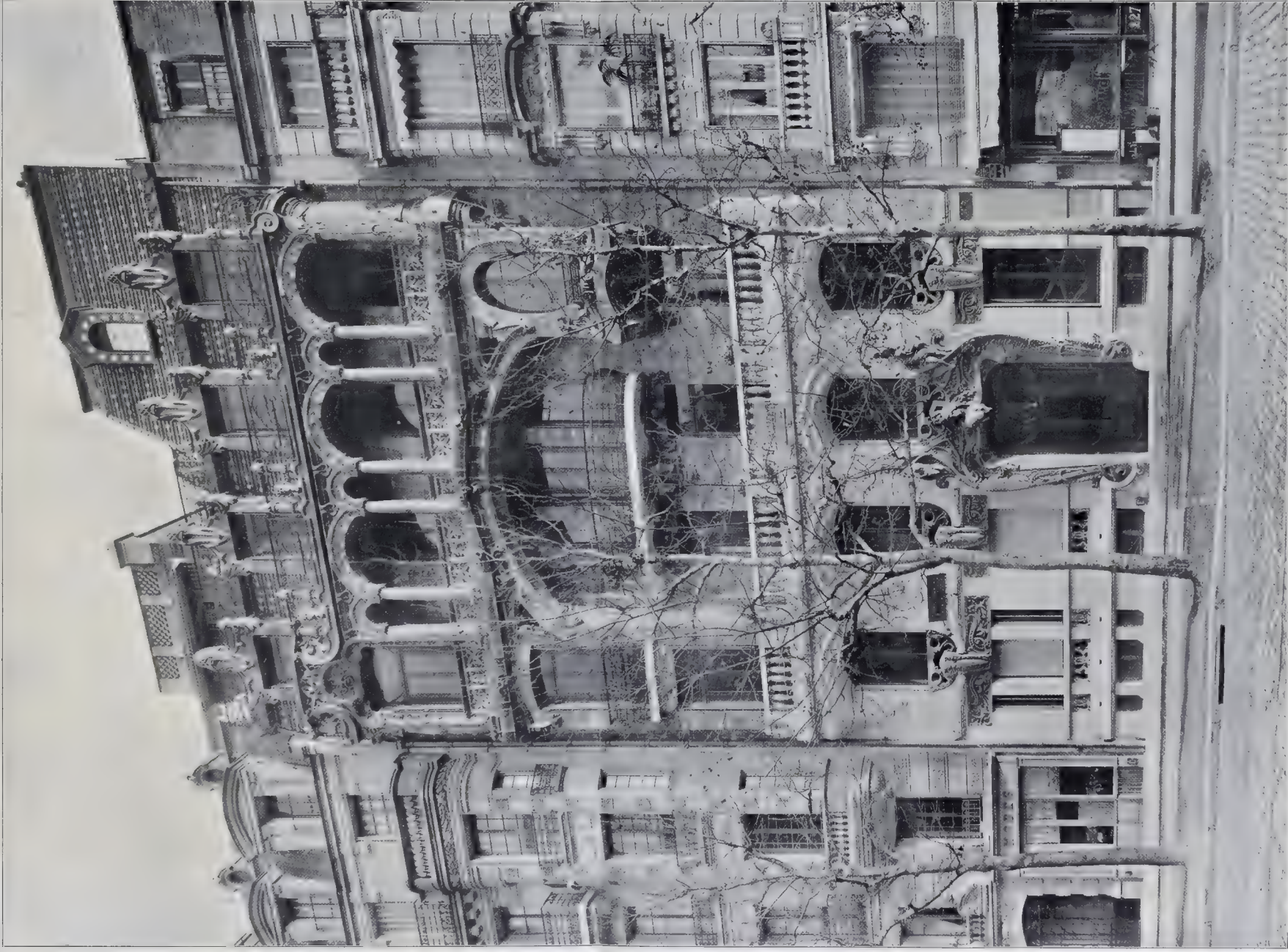
The residential block adjoining Bootham was uninjured by the fire, and this portion of the building, with some interior remodelling, has been retained; but, with the exception of a modern classroom, the whole of the premises in the rear is new.

Messrs. William H. Thorp, of Leeds, and Fred Rowntree, of Westminster, both old pupils of the school, were appointed joint architects of the new works; and from their designs, and under their superintendence, aided by Mr. W. H. Tarran, of York, the clerk of works, the new buildings, involving an expenditure of about 23,000l., have been erected.

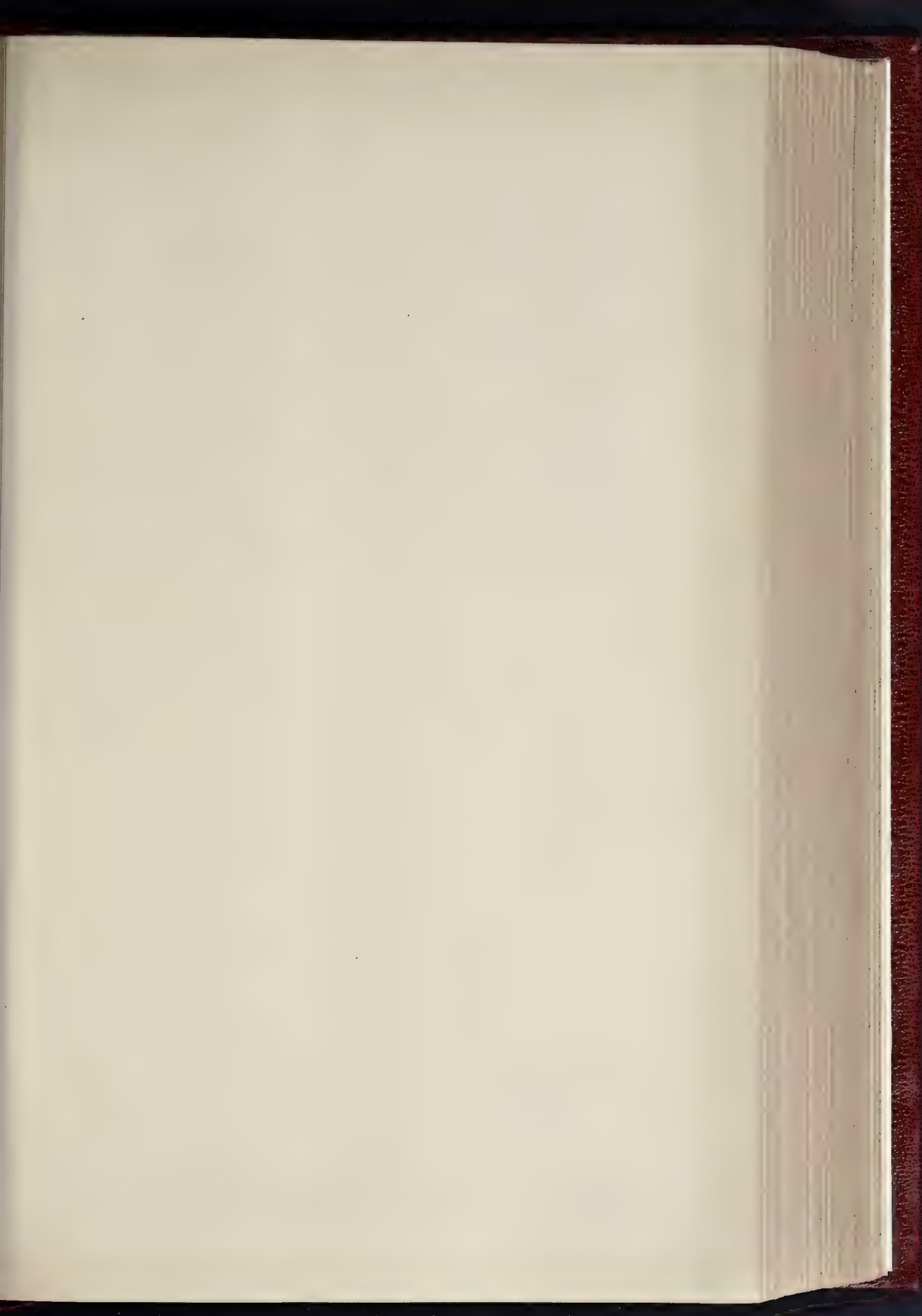
For the purposes of description the buildings can be classified under three heads:—

1. The Residential Block.
2. The School Block.
3. The Science School.

The two former are connected, but the Science School is an entirely separate block and adjoins the cricket field.



HOTEL FRONT, AVENUE RAPP, PARIS. M. LAVIOLLETTE, ARCHT.
One of the St. Louis Hotel Designs in the Street towards Croix-Rouge, St. Louis.





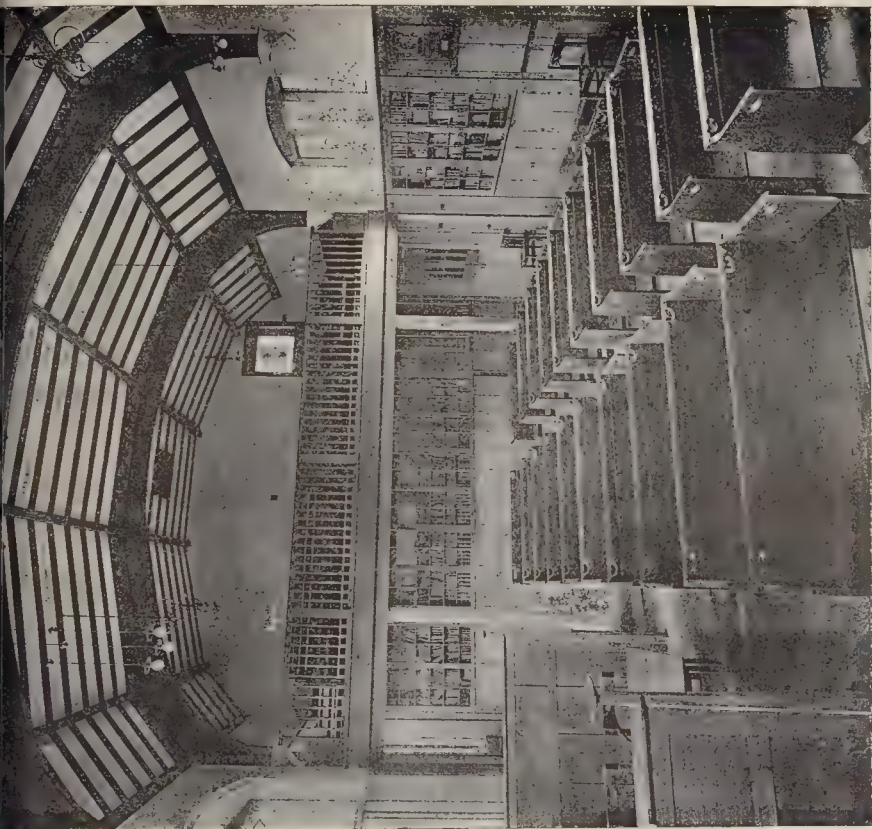
PRINCIPAL SCHOOL BUILDING.



JOHN BRIGHT MEMORIAL IN LIBRARY.

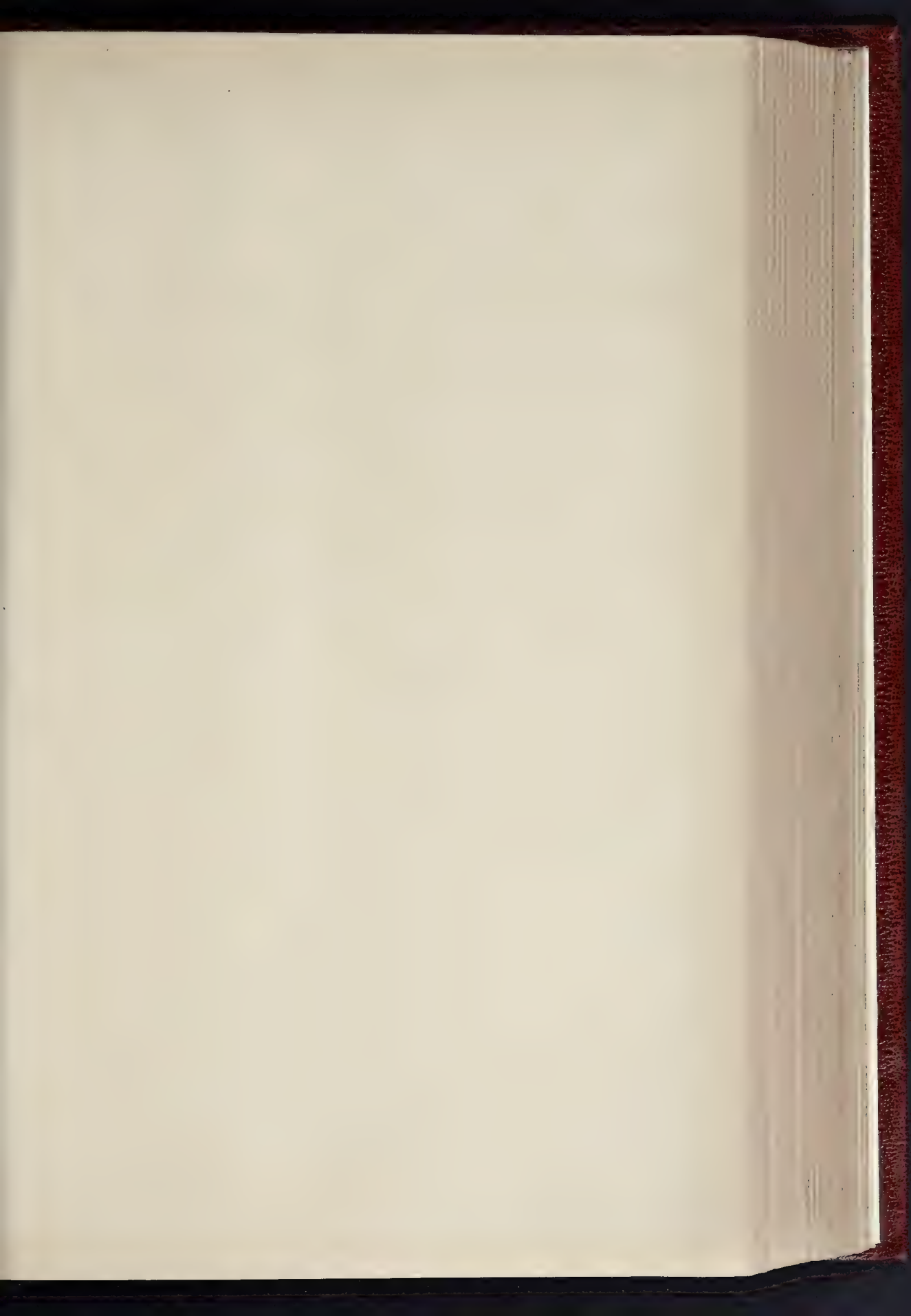


ENTRANCE PORCH.



INTERIOR OF JOHN BRIGHT LIBRARY.

THE BOOTHAM SCHOOL, YORK.—MESSRS THORP & ROWNTREE, ARCHITECTS.

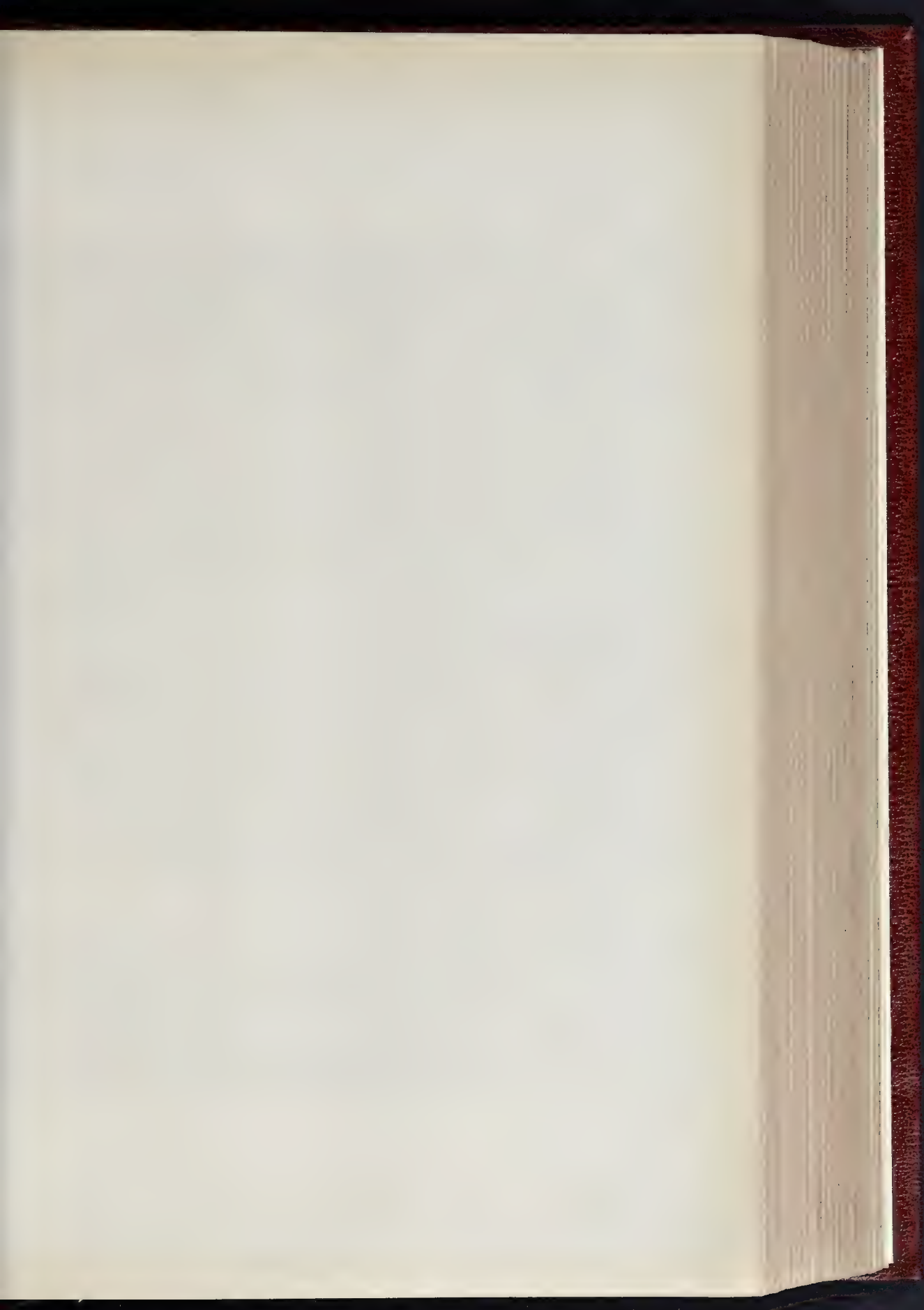


THE BUILDER, AUGUST 23, 1902.

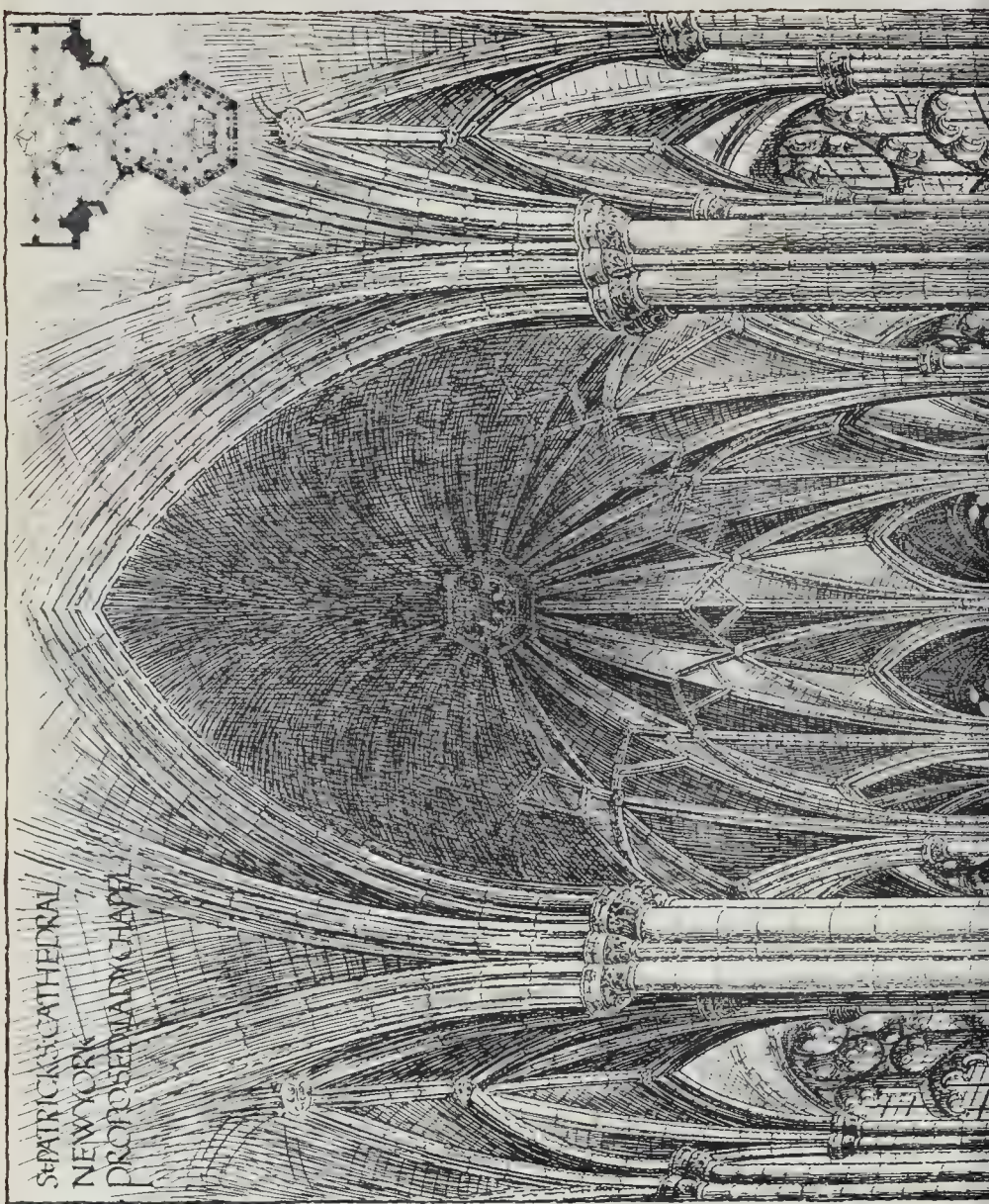
SHEPHERDSON.
HARVEY'S HOME.
EWING/TORDANCE.



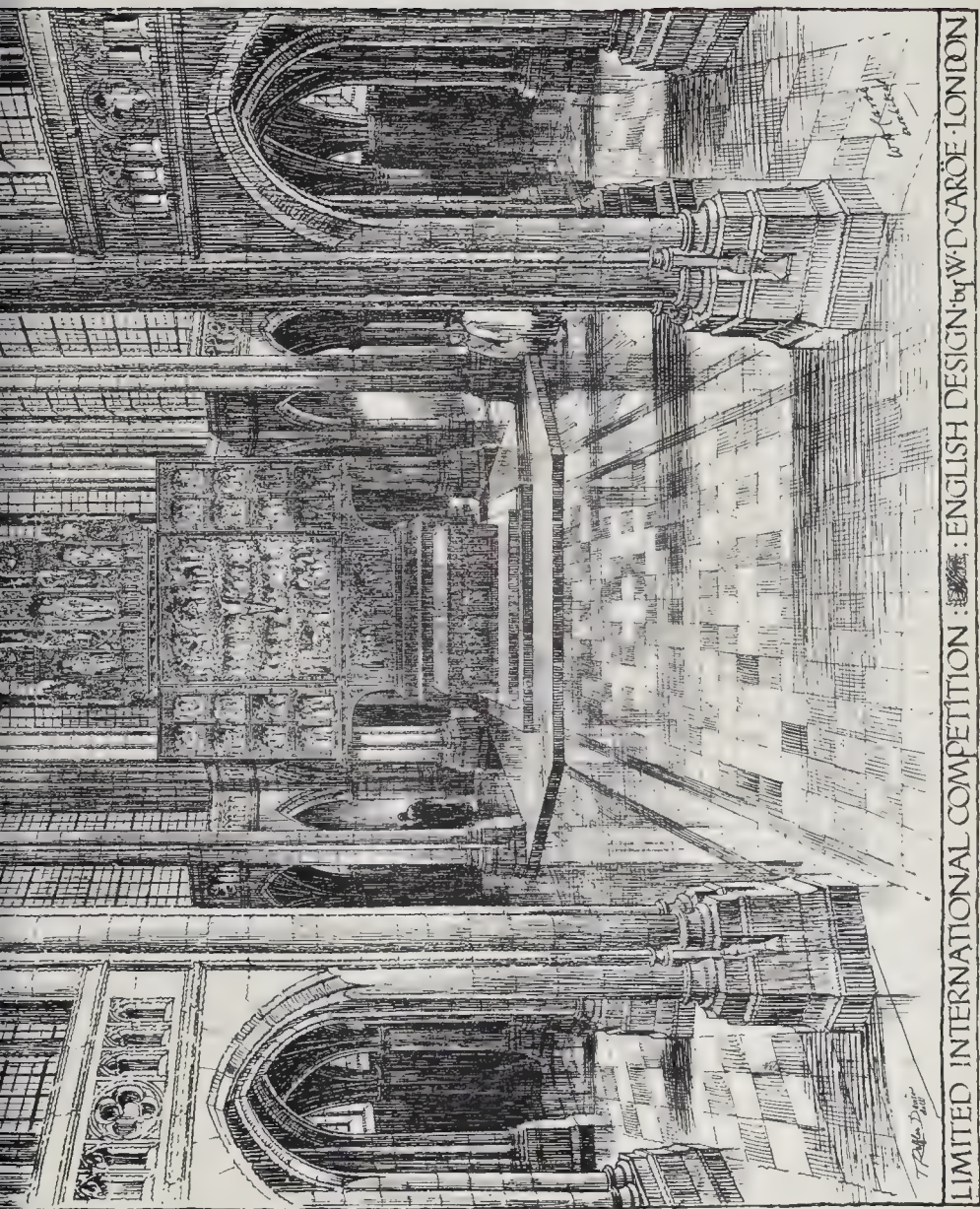




THE BUILDER, AUGUST 23, 1902



ST. PATRICK'S CATHEDRAL
NEW YORK
PROPOSED MAIN CHAPEL



LIMITED INTERNATIONAL COMPETITION : ENGLISH DESIGN BY W.D. CAROE LONDON



Another important room on this floor is the gymnasium, 55 ft. by 25 ft., with a spectators' gallery at one side. A high dado of Kauri pine surrounds the room, the upper walls being finished in red bricks. The main roof trusses are placed 8 ft. apart, and a height of 18 ft. above the floor. The gymnasium is fitted up on the Swedish system, and was equipped by Mr. G. L. Melio, of the Strand, W.C.

Two class-rooms for natural history pursuits, a large drawing class-room (provided with a good collection of casts), a masters' common room, and private masters' studies are also provided on this floor.

On the second floor, in addition to the galleries of the library and gymnasium, a set of music rooms is provided, comprising a room for collective practice and teaching, surrounded by small classrooms with sound-proof partitions, each containing a piano.

Adjoining the Music School is a department of photography, with all requisite dark room accommodation, and fitted up with sinks and modern scientific apparatus.

At the opposite end of the upper part of the building is a set of studies for the use of the teachers and the senior boys, which has previously been referred to, and which forms a connecting link between the school and the residential blocks.

The Science School.—The Science School is an entirely separate building which has been erected on a vacant piece of ground on the

estate adjoining the cricket field. With the exception of the astronomical observatory, which is carried up to a considerable height, with a conical revolving roof, the building is one-storied. The accommodation provided is as follows:—

A science lecture-room, 30 ft. by 24 ft., with raised seats, dual desks, lecturer's table, and lantern and diagram screens. A chemical laboratory, 40 ft. by 24 ft., fitted up with laboratory benches for sixteen students, and slate tables in the window recesses for twelve boys in addition, draught closets for combustion purposes, a lecturer's platform and table with large sliding blackboard, and ample shelving space.

Midway between the lecture-room and chemical laboratory is the science master's room, also used as a preparation-room, and opening from the laboratory are a balance-room, provided with slate shelves built into the walls for the balances, and also a storeroom. An additional storeroom is also provided for apparatus required for lecture-room purposes. The observatory is fitted up with a powerful telescope and a transit instrument.

Grouped with the Science School, and forming a portion of the same block, are two five courts, one covered and the other open, their size, respectively, being 33 ft. by 16 ft. 6 in. and 26 ft. by 16 ft. 6 in. The former is top-lighted, and is provided with a gallery at one end for spectators to watch the games. A games store completes the group.

The fittings of the Science School, which were specially designed by the architects in conjunction with the science master, were provided by Messrs. Reynolds & Branson, of Leeds; and the desks and seating in the lecture-room by the North of England School Furnishing Company.

The new buildings are faced with red bricks supplied by Messrs. Williamson & Co., of Newport, near Brough. Red terra-cotta is used for the dressings. That supplied for the main buildings was provided by Mr. J. C. Edwards, of Raabon; and Messrs. Gibbs & Canning provided the terra-cotta for the Science School.

The buildings throughout are covered with strong greyish-green slates from the Tilberthwaite quarries.

Electricity is used for lighting purposes, and a very complete installation has been introduced by Messrs. Christy Bros. & Middleton, of Chelmsford, with current supplied from the Corporation mains.

The buildings are heated by hot water on the low pressure system. The scheme has been carried out by Messrs. William Richardson & Co., of Darlington, who have also supplied the hot-water service. The vitiated air is carried off by means of trunks communicating with ventilating turrets on the roof and specially constructed chimneys, the upward current of air being assisted by the introduction of coils of hot-water pipes.

To interfere as little as possible with the

working of the school, the building operations have been carried out in three contracts, and have extended over a period of two and a half years.

The Science School and gymnasium wing were built by Mr. T. P. Barry, of York. Messrs. H. Arnold & Son, of Doncaster, have erected the main school building and extensive alterations and additions to the residential block, and Messrs. W. Bellerby & Son, of York, were responsible for raising and altering the upper floor of dormitories.

NURSES' HOME, SHEFFIELD.

This building is a part of the new infirmary buildings now being erected at Firvale for the guardians of the Sheffield Union. It is built of red brick with Stoke Hall stone dressings, and the roof is covered with Tilberthwaite green Westmoreland slates.

Bedrooms are provided for about fifty nurses, and the building has proper kitchen and servants accommodation. Tea, recreation, and charge nurses sitting-rooms are provided.

The contractors were Messrs. J. Eshelby & Son, of Sheffield, and the architect was Mr. E. W. Mountford.

As the architect is out of town we have been unable to obtain a plan.

PROPOSED CATHOLIC CHURCH, CAMBERLEY.

SUFFICIENT funds have not as yet been collected for the building of this church, the site for which is in the London-road, near the entrance to the Staff College. Tenders have been obtained, the lowest estimate received being from Mr. E. C. Hughes, of Wokingham, of 3,100l., which includes heating, ventilation, and all fittings, but not decorative painting.

It is proposed to face the walls internally with red brick facings, and to ceil the roof timbers as shown. All woodwork is to be painted in oils in plain colours, except rood and screen. The plan is explanatory of the arrangement of chapels, sacristy, and processional path.

Mr. Paul Woodroffe has designed the internal decorative work, and will do the glass. Externally the elevations are simple. The walls will be faced with red brick facings, with bands of grey Guildford stocks; the roof covered with tiles.

C. H. B. QUENNELL.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

8.—PORTLAND CEMENT—AERATION—THEORY OF SETTING—ADULTERANTS—SPECIFIC GRAVITY—TYPICAL SPECIFICATION—FAJTA AND OTHER TESTS.

THE AERATION OF CEMENT.—Portland cement should not contain any free lime, but is always liable to contain a small proportion, and when the temperature at which the cement mixture has been calcined has been too low the "underburnt" cement contains a considerable quantity.

Underburnt cements, when mixed with water, set very rapidly, and part of the free lime is locked in the hard mass of set cement before water has obtained contact with it. Sooner or later, however, the particles of free lime absorb sufficient water from the set cement in which it is embedded to enable them to change from quicklime to hydrate of lime, and the expansion which accompanies the change produces cracks in the hardened cement.

If the cement be exposed to the atmosphere for some time before being mixed with water for use, any free lime which it may contain will absorb water vapour and carbon dioxide from the air, and will not then be liable to cause injury to the cement after setting. If, however, the cement be exposed to the atmosphere for too long a period, it will absorb sufficient atmospheric water vapour to cause some of the silica, lime, and alumina to enter into chemical combination and become inert to liquid water.

It is therefore important that cement should be exposed to the atmosphere until any quicklime which may be present has been converted into hydrate or carbonate of lime, but not for a period sufficiently long to cause any consider-

able proportion of the cement to become "dead" through over-exposure.

The Setting of Portland Cement.—It has already been stated that the hardening of Portland cement is due to the formation of insoluble hydrated calcium silicate and aluminates. There are, however, several calcium silicates and calcium aluminates, of which some do not possess the power of setting under water. The different calcium silicates and aluminates have been carefully studied by Le Chatelier and others, and the following summary of their properties, so far as they relate to hydraulic cements, is for the most part taken from the summary of Le Chatelier's work drawn up by Messrs. Newberry:—

Mono-calcium silicate, CaSiO_3 , found in nature as Wollastonite, is not acted upon by water, and therefore plays no part in the hardening of cement.

Di-calcium silicate, 2CaSiO_3 , formed by heating chalk and powdered quartz in proper proportions, falls to powder on cooling, in the same manner as over-clayed cement clinker. This spontaneous pulverisation is due to a change of crystalline form. Di-calcium silicate has little or no hydraulic power.

Tri-calcium silicate, 3CaSiO_3 , is the principal active material in Portland cement. When strongly heated it decomposes into quicklime and di-calcium silicate ($\text{CaO} + 2\text{CaSiO}_3$), and overheating, therefore, tends to destroy the hydraulic power of Portland cement. When tri-calcium silicate is treated with water, it decomposes and passes in the form of a hard crystalline mass of hydrated mono-calcium silicate ($\text{CaSiO}_3 \cdot x\text{H}_2\text{O}$), mixed with crystalline calcium hydrate.

Mono-calcium aluminate, CaOAl_2O_3 , is nearly infusible and sets rapidly under water.

Di-calcium aluminate, $2\text{CaOAl}_2\text{O}_3$, is moderately fusible, and sets quickly under water, like plaster of Paris; but the mass, after setting, falls to pieces when boiled with water.

Tri-calcium aluminate, $3\text{CaOAl}_2\text{O}_3$, is easily fusible, and sets rapidly with water.

Portland cement consists, according to Messrs. Newberry, of tri-calcium silicate with varying proportions of di-calcium aluminate. When water is mixed with Portland cement the calcium aluminates and silicate unite, and form double compounds of calcium.

Adulterants in Portland Cement.—From time to time Portland cement containing ingredients not naturally present in a calcined mixture of carbonate of lime and clay is placed on the market, the alleged object of the addition of the foreign matter being improvement of the quality of the cement.

Gypsum in Portland Cement.—In order to retard the rate of setting it is a common practice to add gypsum, a form of sulphate of lime, in quantity not exceeding 2 per cent. to the cement as it leaves the kilns. This addition is permitted by the London Chamber of Commerce and other mercantile authorities. Messrs. Stanger & Blount have concluded from the results of experiments that no harmful effect on the strength of the cement is produced by this addition.

Mr. H. H. Humphreys considers that the addition of this 2 per cent. of gypsum is unnecessary, as he has found that the retardation of the rate of setting can be equally well secured by more careful aeration of the cement and that the addition of the gypsum does not render careful aeration less necessary.

Kentish Ragstone in Portland Cement.—About ten years ago Kentish ragstone was being ground with Portland cement by several cement makers, it being maintained that the addition of 10 to 20 per cent. of ragstone improved the strength and quality of the cement. The statement regarding the good effect of the ragstone was honestly believed by some of the manufacturers, and was based upon the results of experiments. In 1894 the London Chamber of Commerce requested Messrs. Stanger & Blount to investigate the matter, and after completing a long series of experiments those experts reported as follows:—

1. Ragstone is not a cementitious substance, and its addition to cement is an adulteration.

2. Perfectly sound cement is weakened by the addition of ragstone.

3. This weakening is not fully proportional to the percentage of ragstone added, because the latter acts as a fine filling material, and fills up the interspaces naturally present in set cement.

4. Cement which is not perfectly sound may be temporarily improved by the addition of

ragstone. When the cement has become sound by aeration, this improvement disappears.

Blast Furnace Slag in Portland Cement.—In the opinion of Messrs. Stanger & Blount blast furnace slag of the best quality may possibly be of use in Portland cement to combine with the free lime liberated when Portland cement is mixed with water and allowed to set, but cannot be legitimately mixed with Portland cement, and when so mixed the cement ought to be sold under a distinctive name. There is, moreover, some probability that the sulphur which is commonly present in slag to the extent of about 1 per cent. slowly oxidises, and during oxidation expands and tends to disrupt the cement. Ordinary waste slag, which is a stony material run into trucks and allowed to cool spontaneously, should on no pretext be permitted, since it can exert no beneficial chemical influence, such as might result from the use of rapidly-chilled slag, and is equally liable to contain injurious impurities.

Specific Gravity of Portland Cement.—The specific gravity of Portland cement should not be lower than 3.10. Cement which has not been calcined at a sufficiently high temperature and which contains a considerable proportion of free lime, varies in specific gravity between 3.00 and 3.10. Good cement when fresh usually has a specific gravity of about 3.15, but the specific gravity gradually decreases with age, because the cement absorbs carbon dioxide and water vapour from the atmosphere. A high specific gravity does not, however, necessarily prove the cement to be of the best quality, for adulteration with blast furnace slag does not reduce the specific gravity of the adulterated cement below that of genuine cement.

Typical Specification for Cement.—For important works for which large quantities of Portland cement are used, it is customary to draw up a specification enumerating the conditions with which the cement must comply. The following is a typical specification recommended by Mr. H. H. Humphreys:—

Fineness of Grinding.—The cement shall be prepared from thoroughly burnt clinker only, without any admixture of under-burnt portions or other substances. Not more than 5 per cent. residue shall remain on a sieve of 14,400 meshes to the square inch.

Setting.—A sample of the cement shall be made into a paste, and if the rise of temperature be more than 6 deg. Fahr. during an hour after mixing, the cement shall not be considered ready for use nor for testing.

Specific Gravity.—The cement when freshly burnt shall have a specific gravity of not less than 3.15, or 3.08 when weathered to 6 deg. Fahr.

Chemical Analysis.—A sample shall not contain more than 1 per cent. magnesia, 12 per cent. sulphuric acid, 1 per cent. carbonic acid, 1 per cent. insoluble residue, and shall not contain more than 65 per cent. nor less than 58 per cent. of lime.

Tensile Tests.—Test blocks, of not less than 1 sq. in. cross-section, shall be made with 20 per cent. of water after the cement has been weathered, and the mixture shall be placed in a water bath without ramming, and kept at one day in a moist atmosphere of a temperature not less than 50 deg. Fahr., and shall afterwards be placed in water of temperature not less than 55 deg. Fahr.

Some of the blocks shall be made of neat cement, and some of 1 part cement with 3 parts by weight of standard dry sand; the latter shall have 10 per cent. of water only. The neat cement blocks shall bear a stress per square inch of 400 lbs. after seven days, 500 lbs. after fourteen days, and 600 lbs. after twenty-eight days.

The cement and sand blocks shall bear a stress per square inch of 100 lbs. after seven days, 150 lbs. after fourteen days, 200 lbs. after twenty-eight days.

Slabs or cubes shall be made with 20 per cent. of water and shall be kept in air for twenty-four hours; afterwards they shall be immersed in cold water and raised to boiling heat, and maintained at this temperature for three hours. No signs of warping, checking, or radial cracking shall show on them.

A pat made with 20 per cent. water shall not take less than three hours to harden, and not more than seven hours. All cement shall show a uniform growth of strength.

Adhesive Test.—A pat of cement 3 in. in diameter and $\frac{1}{2}$ in. thick shall, after the expiration of seven days, adhere firmly to the natural surface of a Welsh slate; the slate to be placed in water prior to the application of the cement, and to be kept moist during the interval.

Expansion.—The cement shall be shot on to a perfectly dry floor in a watertight shed near the site of the works, and to a depth not greater than 1 ft.; it shall be permitted to remain as long as the architect shall direct, and shall be turned over from time to time as the architect shall direct.

The Fajta and Other Tests.—Methods for the chemical analysis of cements, mortars, and other building materials, will be given in the concluding chapters of the present series, but the following useful tests commonly adopted for the examination of Portland cement may conveniently be considered here.

Fajta's Hot Water Test.—Cement is usually tested for soundness by the test devised by Mr. Henry Fajta, which consists in subjecting a freshly gauged pat to a moist heat of 100 deg. to 105 deg. Fahr. for six or seven

hours, or until thoroughly set, and then immersing it for the remainder of a period of twenty-four hours in water maintained at a temperature of 115 deg. to 120 deg. Fahr.

The test apparatus consists of a vessel in which water is maintained at the required uniform temperature, the vessel being provided with a cover so that the space between the surface of the water and the cover shall contain a moist atmosphere of a temperature of about 100 deg. Fahr. The cement pat is first placed on a grid in the moist atmosphere, and subsequently completely immersed in the heated water.

By this means an artificial age is imparted to the cement, and any bad qualities which it may possess are speedily made apparent. If the pat does not exhibit any signs of cracking or blowing at the end of the twenty-four hours, it may be regarded as of good quality; but if it shows slight cracks, or blisters, or friability on the edges, it should be regarded with suspicion. Before condemning the cement it is, however, necessary to ascertain that the unsatisfactory result is not due merely to the cement having been tested before it had been properly aerated.

Vicat Needle Test.—The time required by the cement to become set hard is determined by means of a Vicat needle. The needle has a flat point and is loaded with a weight. The exact dimensions of the point and the weight of the load is not always the same. Some use a needle having a point 0.1 in. in diameter loaded with a weight of 3 lbs.; others a needle having a square end with $\frac{1}{8}$ in. sides and loaded with a weight of 2½ lbs.

To determine the rate of setting a pat of cement is gauged with a minimum quantity of water and at uniform intervals, say, of fifteen minutes, the point of the Vicat needle is allowed to rest upon the pat for about one minute. When the needle fails to make any considerable impression in the pat the cement is said to have set hard. Ordinary Portland cement should not set in less than one hour, and should preferably require four or five hours.

Bottle Test for Aeration.—Mix some of the cement with the minimum quantity of water required, and while still wet carefully fill a bottle with it, and cork the bottle. If the cement be insufficiently aerated it will expand, and crack the bottle; if over-aerated it will shrink on setting, and fail to completely fill the bottle. When properly aerated, the cement will neither crack the bottle nor shrink.

Colour.—Good Portland cement is usually of a grey or greenish-grey colour. Cement containing too much clay usually has a brown colour, while that containing too much lime is commonly of a blue-grey colour. As, however, small proportions of highly-coloured oxides may be present in cement without affecting its cementitious value, reliance should not be placed upon the colour of cement as an indicator of quality.

OBITUARY.

M. JAMES TISSOT.—We regret to announce the death, at the age of sixty-six, of this talented French painter, a former pupil of Hippolyte Flandrin. Mr. Tissot was well known in London, where he lived for some years, and painted many pictures of London society and the Thames scenery. Among the best pictures of his earlier period are "Faust et Marguerite," which is in the Luxembourg Museum; "Une jeune Femme dans une Eglise"; and "Partie Carrée." Among his London Society pictures, "Too Early," a scene in a ballroom, and "Hush!" a scene at a fashionable concert in a private house, will be remembered by all who saw them for their brilliancy of execution and their truthful and rather satiric representation of types of London Society. About 1887 some change, which has been variously explained, came across Tissot's mood, and from a lively painter of Paris and London Society he became a devoted religious painter, consecrating his whole time and powers to the illustration of the Life of Christ, in the remarkable series of small paintings which were exhibited in London some years ago. In these, as in his earlier works, Tissot was a brilliant executant rather than a great painter; his colouring was rather crude and he never acquired breadth of style; but his "Life of Christ" series showed real earnestness of purpose as well as careful study of accessories. Tissot was also an admirable etcher.

COTTAGE HOSPITAL, EXMOUTH.—A new cottage hospital is being erected at Exmouth, at an estimated expenditure of 4,000l. The architects are Messrs. Tait & Harvey, of Exeter, and the builder is Mr. A. Hayman.

GENERAL BUILDING NEWS.

WESLEYAN SCHOOLS, &c., BARTON, NEAR HULL.—A Wesleyan lecture hall and Sunday schools, &c., are being erected at Barton, at the rear of the Wesleyan Town Chapel. The building is of red brick, and is Gothic in style. It comprises a lecture hall, capable of seating between 300 and 400 persons, with five classrooms, two on one side of the central hall, and three on the other. A ladies' parlour, for sewing meetings, &c., is also provided, as well as a school kitchen for tea and social gatherings, and cloak rooms and other conveniences. Entrances are provided on each side of the building, which is ventilated by Messrs. Kite & Co., London. The heating will be by means of hot water pipes. The large hall is to have a wood block floor, to be laid by Messrs. Roger L. Lowe & Co., Bolton. The total cost of the building is 2,000l. Mr. J. Gibson, Staleybridge, is the architect, while the contract was divided as follows:—Brick, slate, and plaster work, Mr. Benjamin Ashton, Saxby stone work, Mr. G. Coulam, Barton; joinery, Mr. John Stamp, Barton; plumbing, Mr. S. A. Smith, Bridlington; and painting, Mr. H. Woodcock, Barton.

CHAPEL, CWDARE.—On the 11th inst. the memorial stone in connexion with the new edifice of Elim Welsh Congregational Chapel, Cwmdare, which is being rebuilt at a cost of nearly 2,500l., was laid. The architect is Mr. W. C. Thomas, Swansea, and the contractors Messrs. Jones Brothers, Barry.

PRIMITIVE METHODIST CHURCH, SWALWELL, DURHAM.—The foundation stones of a new Primitive Methodist church to be erected in Napier-road, Swalwell, have just been laid. The new structure will be of Shersburn brick, with stone facings, and is estimated to accommodate 250 worshippers. The cost, including land, &c., will be about 1,000l. The building consists of chapel, and a large vestry, while provision has been made for the erection of a schoolroom in the future. The vestry is to be divided from the main buildings by a movable partition. The contractors for the work are Messrs. Shield Bros., Swalwell, the architect being Mr. T. E. Davidson, of Newcastle.

PRESBYTERIAN CHURCH, BUILTH WELLS.—The foundation-stones of the new Alpha Presbyterian Church, Builth Wells, were laid a few days ago. The contract for the new church has been let at 4,500l. to Mr. D. W. Richards, Newport; and the architects are Messrs. Habershon, Fawcner, & Groves, of Newport and Cardiff.

PRIMITIVE METHODIST CHAPEL, WOODHOUSE, LEEDS.—The foundation stone of a new Primitive Methodist Chapel in Jubilee-terrace, Woodhouse, which is to replace a wooden structure in Craven-road, was laid on the 10th inst. The building and site will cost about 2,500l. The chapel is to provide accommodation for about 500 persons. Mr. T. Hawhill is the architect and Mr. W. Alrey the builder.

RESTORATION OF CHURCH SPIRE, BIRMINGHAM.—The spire of Wycliffe Baptist Church, Bristol-road, Birmingham, which was last year found to be in a dangerous condition, has now been restored. Many of the crockets were found to have been fixed on with wooden dowels. The work of restoration has been carried out under the direction of Mr. Gerald McMichael, architect, of Birmingham, by Messrs. Barnsley & Sons.

PRIMITIVE METHODIST CHURCH, BLACKHEATH, NEAR BIRMINGHAM.—A new Primitive Methodist church is now being erected at Blackheath, near Birmingham. The church is 7½ ft. long by 30 ft. wide, and is being built externally with Leicester-shire bricks and red terra-cotta dressings, and internally with sand-faced bricks and Bath stone columns. The building will seat 900 persons, and will cost about 4,100l. The architect is Mr. Gerald McMichael, of Birmingham, and the contractor, Mr. John Dallow, of Blackheath.

CATHOLIC SCHOOL, WHITWICK, LEICESTERSHIRE.—On the 13th inst. the foundation-stone of a new day school, at Whitwick, was laid at Parson Wood-hill. The building will be capable of accommodating upwards of 500 children, and it was decided to put the boys', girls', and infants' departments together in the one block. The cost is estimated at about 5,000l. The buildings are designed on the central-axis plan, and consist of a hall 71 ft. by 33 ft., with hall plan, and a series of classrooms, four on each side of the hall and one at the end, each having accommodation for fifty and sixty scholars. All the classrooms are lighted from windows to the left-hand of the scholars, and separated from the central hall by movable glazed screens. Separate entrances and cloakrooms are provided for boys, girls, and infants, and private rooms and store closets are set apart for the head teachers. The hall is 30 ft. high at ceiling line, and has six open hammer-beam pitch-pine principals, carrying the roof: it is lighted from each end and the sides, and, as this hall can be extended to 90 ft. long, will be used for concerts, meetings, &c. The whole of the floors will be in wood-block, &c. The walls of the cloakrooms, which are to be of concrete slabs. All internal walls are to be lined with brown glazed bricks to a height of 4 ft.; the remainder of the walls, both internally and externally, will be faced with red bricks of local manufacture. The dressings externally are of red terra cotta and Ancaster stone. All roofs will be covered with green slates, and all ceilings plastered.

The schools throughout will be heated by hot water on the low-pressure system, assisted by open fires. Numerous fresh-air inlets are allowed for, also windows to open at ceiling-line. The foul air will be extracted by means of exhaust ventilators fixed in the roofs. The boys' and girls' playgrounds are divided by brick walls. The whole of the works are being carried out by Mr. Walter Moss, builder, of Coalville, under the supervision of, and from designs prepared by, Messrs. McCarthy & Co., Coalville.

SCHOOL, WISHAW.—A new school, erected by the Cambusnethan School Board in Alexandrastreet, Wishaw, has just been completed at a cost of 6,000l. The building gives accommodation for 644 pupils, and has been planned on the central hall system. The main feature of the school is the central hall, which occupies the entire space from wing to wing, and is available for ordinary teaching purposes as well as physical drill. The building is so planned that additions can readily be made. The architect is Mr. James Cowie, Wishaw and Motherwell.

INSTITUTION FOR THE LITTLE SISTERS OF THE POOR AT SUNDERLAND.—The institution which the Little Sisters of the Poor have erected at Sunderland was opened on the 16th inst. The new home, built of red brick, and standing on high ground, has four stories. The length of the building now completed is 212 ft., but the whole of the scheme adopted by the Little Sisters embraces some future extensions; the west wing will not be started for some time yet. Another item in the project that is left over for the time being is a new chapel, which is to occupy the site that will be cleared by the demolition of the old home. The largest room measure 46 ft. by 23 ft. The greater portion of the first floor is to be devoted to the purposes of an infirmary for those inmates who through ill-health or decrepitude are incapable of any great exertion. Along the front of the building there runs a balcony. Messrs. W. & T. R. Milburn were the architects, and Messrs. D. & J. Ranken the builders. Mr. John Straughan has acted as clerk of works.

PROPOSED SHOPS AND ARTISANS' DWELLINGS, SNAIG HILL, SHEFFIELD.—The Corporation of Sheffield propose to erect buildings on the surplus land in Snaig Hill. The scheme has been drawn up by the City Surveyor (Mr. C. F. Wike), from suggestions made by the Improvement Committee. The area proposed to be dealt with is all the triangular piece bounded by Snaig Hill, Water-lane, and Bridge-street, with the exception of a plot at the top of Water-lane occupied by the Imperial Hotel stock-rooms. The plan shows a four-story building, occupying the whole of the right-hand side of Snaig Hill (going from the centre of Sheffield), and having a frontage of 420 ft. At the bottom is a new hotel, standing partly in Snaig Hill and partly in Bridge-street, and having frontages of 80 ft. to the former and 160 ft. to the latter. There are thirteen shops in Snaig Hill and three in Bridge-street. Showrooms are provided above the shops, and the other stories are used for artisans' dwellings. Twenty-seven tenements of two rooms each, twenty-nine of three rooms, and six of four rooms, are projected. These would be built entirely over the fronts of the shops, the back parts of which would be lighted by lanterns in the roofs. Access to the tenements would be obtained by staircases approachable from both the front and the back, and at the back would be balconies running the whole length of the buildings, one on the first floor and others higher. In addition to the staircases in regular use, there would be others available in case of emergency. Owing to the shape of the site, the shops at the top of Snaig Hill could not be so deep as those below. The height of the buildings would vary from 50 ft. to 60 ft., and in designing the elevation means have been adopted to overcome as far as possible the difficulty caused by the steep gradient. An even roof would show too great a slope, and, therefore, turrets are planned at each end of the block, and gables are introduced to break the differences in height. The building, it is proposed, shall be of pressed brick, with stone dressings. The hotel is suggested to take the place of the Pack Horse and the Three Travellers. A commodious building is planned, with stabling for about forty horses. The method of utilising the spare land fronting to Water-lane is still undecided. One suggestion is that more artisans' dwellings should be built upon it, and another that it should be made into a playground for the children living in the Snaig Hill tenements. In connection with the improvement of Snaig Hill it has been decided to carry out a road diversion, which will make a straight way from Westbar to Bridge-street.

CO-OPERATIVE STORE, ROSEHILL, NEWCASTLE.—The Rosehill branch of the Howdon and Willington Quay Co-operative Society has just been opened. The new branch forms a section of the whole scheme, which, when completed, will cover an area of 126 ft. by 70 ft. Externally the building is constructed with Accrington red pressed bricks, relieved with moulded stone cornices, architraves, and other dressings. A feature of the elevation is the octagonal turret at the south-west corner of the building, which is surmounted by a lead covered dome and wrought-iron finial. When the whole scheme is completed it is intended to erect a corresponding turret at the opposite angle. The work has been

carried out by Messrs. W. A. Fishburn & Co., general contractors. The building is heated by hot water on the low pressure system. The whole has been carried out from the design and under the personal supervision of the architect, Mr. J. Walter Hanson, of South Shields and Jarrold, Mr. J. Thompson acting as clerk of works.

UNITED METHODIST FREE CHURCH LECTURE HALL, &c., TRURO.—The memorial stone of the new Methodist Free Church lecture hall and classrooms was laid at Truro recently. The total cost of the new work, the renovation of the chapel, and the erection of a new heating apparatus, is estimated at about 1,000l. The additional buildings are from plans prepared by Mr. Sampson Hill, of Redruth, and the builder is Mr. W. Nicholls, of Truro.

POST OFFICE, COUPAR ANGUS, N.B.—New Post Office and business premises are to be erected at the Cross, Coupar Angus. A large part of the building fronting George-street will be occupied by the Post Office premises. The buildings are by the designs of Mr. R. Gibson, architect, Dundee; and the successful contractors are:—Mason, David Reid; Joiner, John Adam; plumber, John Henderson; plasterer, Peter Donaldson; slater, George S. Mann, all of Coupar Angus.

SANITARY AND ENGINEERING NEWS.

SEWAGE DISPOSAL, DURHAM.—The Corporation of Durham have decided to adopt a bacterial system of sewage disposal, and have instructed their engineer, Mr. Harry W. Taylor, of Newcastle-on-Tyne and Birmingham to prepare the necessary plans.

CHROMER WATER WORKS.—The work of connecting Chromer with its new source of water supply at Melton—is now completed. The water, which has to come a distance of five miles, was turned into the mains a few days ago. Messrs. J. E. Kaye & Sons, Huddersfield, were the contractors, and Mr. Mellis was the engineer, with Mr. T. S. Tilley as clerk of the works.

STAINED GLASS AND DECORATION.

LIGHTFOOT MEMORIAL WINDOW, AUCKLAND CASTLE.—A new stained glass window, dedicated by the late Dr. Westcott to the memory of his predecessor, Bishop Lightfoot, has been placed in the private chapel of Auckland Castle. The window is situated in the north-west corner. The new window is by Messrs. Burlison & Gyllis, of London. The three middle panes, the centre one of which has a life-size portrait of Dr. Lightfoot in purple robes, depicts the reception of foreign bishops at Auckland Castle some years ago. The left hand lower corner pane has a representation of Bishop Barrington, in robes, holding a scroll, associated with his foundation of schools; and on the right hand side is a portrait of Bishop Van Mildert. The tracery lights are devoted to Bishop Cosin (founder of the chapel), Bishop Crewe, and Bishop Butler. The centre lower light contains an angel holding a scroll, on which is the Latin inscription detailing the features of the window.

FOREIGN.

FRANCE.—The Government will pass shortly a decree, which has been drawn up by M. Bouvard and M. Louis Bonnier, in regard to the heights and projections of Paris houses. The new regulations will permit architects more liberty in the treatment of façades, and lessen the monotony of design in straight streets.—A catalogue of the collection of drawings in the Louvre, of which there are more than 50,000, will shortly be issued.—An interesting exhibition has been organised at the Grand Palais by the management of the Gobelin manufacture, which will remain open till November 1. It will illustrate the productions of the Gobelins from 1602 to 1902.—A monument to Ferdinand Fabre, the author, is to be erected on a lawn in the Luxembourg garden. The general design is by M. Scellier de Glorsy, and the monument will consist of a pyramid of rockery supporting a stone crowned by a bust of Fabre by M. Marqueste, and further ornamented by a bas-relief modelled by M. J. P. Laurens, the painter. In front of the pedestal will be a group of a shepherdess and a goat.—The Commission des Monuments Historiques has purchased the remains of the ancient Abbey of St. Jean d'Aulph (Haute Savoie), the church of which constitutes a fine example of Cistercian architecture of the twelfth century.—The Government is about to commence some important works of improvement in the Port of Caen, at an estimated cost of 3,150,000 fr.—M. Louis Deschamps, the painter, has died at the age of fifty-five. He was a pupil of Cabanel, and had obtained a gold medal at the 1900 exhibition. Among his works may be mentioned the "Mort de Mireille" (1870), which is in the Marseilles Museum; "L'Abandonné" (1883), which is at the Luxembourg; the "Sommeil de Jésus"; "St. Vincent de Paul," bought by the State for the Luxembourg; and "Hebe," bought by the Municipality of Paris. Deschamps was well known also for his remarkable pastels.

RUSSIA.—An Art and Industrial Exhibition, to be confined to the Slav countries, is to be held at the

Imperial Taurida Palace in St. Petersburg, in 1904. The central organising committee is sitting at the Russian capital, under the presidency of the Assistant Minister of Finance, and sub-committees are being formed in Montenegro, Servia, and Bulgaria. It is believed that the arts and handicrafts of all Slav nations will be represented.

BELGIUM.—Considerable additions are to be made to the Palace of Laeken, near Brussels, and the plans of M. Marcel, of Paris, therefor have been approved by the King of the Belgians.

MISCELLANEOUS.

AVERY HILL, ELTHAM.—This estate, which the London County Council have just decided to acquire at a cost of 25,000l., as a public open space, extends over 84 acres, and formerly belonged to the late Colonel J. T. North, once popularly known as the "Nitrate King." The house was extensively altered and enlarged, in red brick with Portland stone dressings, for Colonel North, mainly under the superintendence and directions of Mr. T. W. Cutler. Vast sums of money were also expended upon the fittings and decorations of the interior, without the happiest of results—that is to say, in so far as homeliness, repose, and refinement are concerned. The principal apartments include three halls, with a long corridor and a gallery opening into six reception-rooms, a sculpture gallery, a picture gallery and ballroom, and a marble Turkish bathroom fitted with faience having a Moresco character in design. There are also a winter garden, 100 ft. square, a large fernery, stabling for twenty-four horses, and a stud farm and park. Beautiful materials and in many instances beautiful workmanship were lavishly displayed in the decorations. At the projected sale by auction of the property in July 1899, Messrs. A. Wilkinson & Son stated that the residence had cost between 250,000l. and 300,000l. On that occasion only one bid, for 50,000l., being made, the reserve, 100,000l., was declared, and the house and 143 acres were withdrawn from sale.

THE GREENWICH UNION AND THE NEW WORKHOUSE.—The Greenwich Union Board of Guardians have not yet obtained a purchaser for their new buildings at Grove Park, S.E., which were recently erected at a contract cost of 175,000l. for 770 inmates by Mr. T. E. Rowbotham, of Birmingham (Mr. John Bint being clerk of the works), on a site of 93 acres, with a frontage to Marvel's-lane. For his plans and designs, described in our columns of June 3, 1899, Mr. Thomas Dinwiddie was awarded a diploma of merit at the Paris Exhibition, where he exhibited a bird's-eye view of the buildings, which embody all the latest improvements. It appears that the new workhouse is found to be unnecessary by reason of a change in the administration of the Poor Law which gives the Guardians an increased latitude in the granting of outdoor relief. The Board of Guardians now have permission from the Local Government Board to dispose of the buildings on condition that they will enlarge the existing workhouse. Mr. T. Dinwiddie is the architect also of the new Children's Homes which are being built by Mr. T. E. Rowbotham, who contracted for 107,000l. (Mr. John Bint being clerk of the works) on a site of 60 acres at Halfway Street, Sidcup. The old mansion known as "The Hollies" is converted for administrative purposes. The new blocks comprise four, to receive fifty boys apiece, two for twelve apiece, ten pairs of boys apiece, and two for twenty boy probationers, and twenty girl probationers respectively; an isolation block, steam laundry, swimming bath and gymnasium; and an electrical light generating station. The houses at Sidcup, to be opened in the autumn, will replace the Guardians' Schools at Sutton.

ST. GEORGE-IN-THE-EAST BURIAL GROUND.—The Chancellor of the Diocese has agreed to the issue of a faculty from the Consistory Court of London, empowering the Borough Council of Stepney to take over the maintenance of the burial ground in that behalf. The rector and churchwardens have already entered into an agreement with the Council whereby the latter undertake to maintain the ground for the use and enjoyment of the public, and the former grant an easement or right of user, but not the freehold, of the ground. The Vestry, the late Metropolitan Public Gardens Association (1875), and the Metropolitan Public Gardens Association (1885) shared the cost—about 4,175l.—of laying out the disused burial grounds covering two acres; upon one portion, the Wesleyan burial ground, a sum of 2,700l. out of the aggregate amount was expended, and a sum of 175l. in respect of the Vestry, the church, the annual charge—about 200l.—for maintenance has hitherto been defrayed from out of the rates.

CHELSEA POLYTECHNIC.—The result of the examination in connexion with the University Extension Lectures on "The History of Architecture," held at the Chelsea Polytechnic last session, has just been announced, as follows:—J. G. Wiles, G. Wilson, A. C. Goulder, H. Stewart, J. Henry, R. Crosthwaite, E. Heath, G. Gifford, A. Cooke, F. Hedges, H. Helin, E. Fowler, E. Topping. The lecturer was Mr. Banister Fletcher, A.R.I.B.A., and the examiner was Professor W. R. Lethaby, of the

Royal College of Art. The lectures will be continued next session, the first being given on Monday, October 6, at 7 p.m. (The names with an asterisk take Certificates of Distinction.)

IMPROVEMENT SCHEME, SOUTHEAST.—It is proposed to spend 340,000l. for improving the front at Southend. Mr. A. Fidler, the Borough Engineer and Surveyor, has drawn up a plan of what the Works Committee propose. The Marine Parade would be widened its entire length to a width of 140 ft. A new sea wall would be built, carrying a drive 50 ft. wide, curving out to sea from Champ's Restaurant at the east end to Darlow's Green on the west. That would enclose a strip of the foreshore 300 yards wide and over a mile long. The area reclaimed would be about 80 acres, or land worth 100,000l. at the present local value. That would be laid out as a playground with a dumb-shaped lake, 22 acres in size, open-air baths, space for an Eiffel Tower, and a big wheel and other attractions.

REREDOS FOR RIPON CATHEDRAL.—The Dean and Chapter of Ripon Cathedral had before them on the 5th inst. a petition offering to have a design prepared by Mr. Bodley, architect, for a reredos at the east end of the cathedral, to take the place of the hangings to which exception has been taken. The Dean and Chapter accepted the offer, but the hangings are to remain until the design for the reredos is presented.

HIGH SCHOOL BUILDING CONSTRUCTION CLASSES, GLASGOW.—The Glasgow School Board Building Construction evening classes will commence on September 15, at Elmbank-street. Mr. D. Baueist Dobson is the architect lecturer, and the assistant teachers are Mr. James Barron and Mr. W. McCaig. A successful feature of last session was the introduction of workshop practice in Kent-road School, which will be continued this session as a branch experiment. At the High School, the two classes working in conjunction with one another as formerly. There will be only two courses of building construction this session, first and second.

PLUMBERS' APPRENTICESHIP.—At the half-yearly meeting of the Central Board of the National Association of Master Plumbers of Great Britain and Ireland, at Huddersfield, the President, Mr. W. L. Harrison, R.P., read a report of the work of the Educational Committee with reference to the form of indenture for apprentices, which had been drawn up in conjunction with the Worshipful Company of Plumbers. The form of indenture was adopted, providing for a seven years' apprenticeship, unless the lad has been previously pursuing his education to fit him for his trade at a technical school, on conditions varying according to localities.

NORWEGIAN TIMBER AND STONE.—According to a report by Mr. Dundas, British Consul-General in Norway, the exportation of timber from that country during the past year was very much less profitable to exporters than in 1900. Prices declined at the beginning of the year, and so continued, the fall ranging from 25 to 40 per cent. The following were the quantities (in cubic metres) exported from Christiania in 1901:—Planned timber, 77,614; sawn, 57,081; hewn, 2,509; round, 59,862; staves, &c., 2,502; laths, 534; being altogether 30,793 cubic metres less than in 1900, or about 10 per cent. Owing to the diminished activity of the building trade in Christiania, the local consumption of timber has been proportionately reduced. The establishment also of several new planing mills has occasioned a number of failures, and it may, Mr. Dundas thinks, safely be said that this branch of the business has been overdone. With a view to improving the market for the Norwegian timber, the Norwegian Flooring Association have agreed to restrict their purchases of logs to the extent of 33 per cent. Mr. Vice-Consul Franklin, at Porsgrund, echoes the general complaint as to unsatisfactory results during the year, occasioning losses to exporters, especially as selling prices in the United Kingdom and on the Continent were not at all proportionate to cost of wood. But the shipment of the log scale for autumn, 1902, and spring, 1903, will be so curtailed in consequence of the smaller log cutting during the past winter that the supply and demand will be in favour of the timber merchant. The United Kingdom is by far the largest consumer of Norwegian timber and timber products, taking over two-thirds of the total value of the exportation of unworked, half-manufactured, and manufactured timber, Belgium, France, and Germany coming next in order. Of the total value of timber and the products of timber exported in the year, actual timber accounted for 3,347,450l.; wood pulp and cellulose, 1,492,324l.; matches, 403,701l.; reeds and other wood goods, 13,388l. Passing to the stone trade, the Consul-General observes that the export of granite is chiefly to the United Kingdom, and is said to have increased considerably of late, especially hewn granite for paving purposes. Both in regard to the quantity exported and the prices there was little difference in 1901 compared with 1900. The German consumption of granite has, however, decreased, owing, it is asserted, to Germany's desire to develop her own quarries. The chief centre of the granite production in Norway is Smaalen. A union has been formed among the Norwegian exporters of kerstones to the United Kingdom. Of other kinds of stone exported may be mentioned soapstone ("Klæbersten"), which is used in buildings, chiefly for ornamental purposes, and which is

most durable, unaffected by heat or cold; marble; felspar, which goes principally to Germany and France; and quartz. The total quantity of heavy stone exported to the United Kingdom was 68,205 tons.

CAPITAL AND LABOUR.

BRADFORD JOINERS' ARBITRATION.—As a result of the action of the Mayor of Bradford (Mr. W. C. Lupton) in connexion with the strike or lock-out of joiners in the city, which has extended over a period of fifteen months, affecting 500 men in the first instance, and keeping 200 of them idle up to the present time, the final stage of the settlement was entered upon on the 10th inst., when Mr. R. G. Leitch sat to arbitrate on the question of wages. The proceedings were of a private character, five witnesses being heard on either side. All other matters were left to the arbitrator, and it was stipulated that the masters should not ask the men to accept less than 8s. 3d., nor the men to demand more than 10s.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

7,930.—CLOSET SEATS: *W. Cassels.*—The seat, which is of glazed freelay, and is also available for use with earth-closets, is fashioned in the shape of a recess with a rounded opening above the pan or trough, a space being interposed between the two portions named, with a strip of wood at the front.

7,902.—FLUES AND CHIMNEYS: *G. A. Case.*—The flues for houses, factories, and other buildings are arranged as are street sewers, and convey the smoke to a power-house wherein fans are driven by an engine to set up draught in the flues. The pipes that join the flues to the chimneys are fitted with dampers, and there are manholes at the intervals. Provision is made for a final discharge of the smoke through a stack, and for its disposal otherwise.

8,018.—A FEED-MOVEMENT FOR WOOD-WORKING MACHINES: *E. C. Merwin.*—The invention is intended more particularly for sawing and planing machines. In the case of band-saws, spring-supported rollers are carried by the fence immediately in front of the feed-roller, which is positively driven, and in such a manner that without forcing the wood off the fence they will lessen its pressure. At the back of the table is a dovetailed slide for adjustment of the fence.

8,053.—A METER FOR OIL, WATER, AND OTHER LIQUIDS: *J. Barr.*—In one form of the apparatus a drum, which contains a set of blades or vanes, is carried by a spindle, and will rotate within a casing which is rather more than half-filled with mercury. A pipe conveys the liquid through the drum and casing, its end being bent upwards to open above the mercury, which acts as a valve. As the forward end of a blade dips into the mercury, the liquid passes into the closed space thus formed and will lift the blade and cause it to revolve, the liquid is then discharged through an outlet. Worm and toothed gearing transmit the movement of the spindle to some counting apparatus outside the meter. In other specified forms the vanes consist of a multi-ported screw, set so that a disk is affixed to middle spindle, or they are placed between the inner and outer rings of an inclined disc, which has a peripheral bearing.

8,138.—IMPROVEMENTS IN LATCHES AND LOCKS: *H. Harrison, F. H. Harrison, and A. E. Harrison.*—The inventors contrive that the bolt of a draw-back lock or night-latch can be readily reversed for adapting it to doors that open both inwards and outwards. An equal-sided bolt has a bevelled head: the shank of the working-knob passes through a hole in the bolt and a slot in the casing, the squared part through the slot constitutes a shoulder, against which the bolt is fastened with a nut upon the screwed end of the shank; the nut is inserted through a slot or hole in the cap-plate so that one can readily remove the knob for a reversal of the bolt, without taking off the cap-plate. Guard-plates pinned on to the casing, and which will act as wards, serve as guides for the bolt; they are separated with distance-plates, and their forward ends are played outwards.

8,154.—A TENONING TOOL: *R. Roberts.*—The tool is composed of two chisels, of which a screw adjusts the distance apart, and is screwed into one of them, being joined to the other with a pin that is into the head of a screw. The tool is described as being especially available for mortising machines.

8,184.—CONSTRUCTION OF WALLS AND FLOORS: *H. Habrich.*—A floor is built of girders that are joined to one another at intervals with metallic pieces, and of twisted hoop-iron strips or bars extending over several spans and embedded in beton; the flanges of the lower girders carry the centering that sustains the concrete. For quay walls, circular tanks for gasometers, and similar buildings are used twisted hoop-iron strips with pairs of standards carried by struts that are secured in foundation locks of concrete for a metallic skeleton, about which concrete is filled in, segmental wooden enterings being affixed to the flanges of the standards.

8,195.—A SLOW-COMBUSTION STOVE: *R. Winter.*—The fireproof lining of the stove is inclined upwards and inwards, and has grooves, of which those in the front are narrower than those in the back, for conveying away the gases of combustion, and for the entry of air from the ash-box. Obstruction of the flow of gases by the fuel is prevented by the particular form of the filling funnel; the funnel, however, may be discarded, and the upper ends of the grooves are then closed; the closing-pieces turn the gases to the interior of the stove.

8,202.—GULLY TRAPS: *J. Woods.*—Recesses are fashioned in the top of the gully for engagement with projections from the grating, so as to leave a space for a current of water outside the grating. The key which liberates a bolt that locks the grating also forms a handle whereby the grid can be lifted.

8,206.—RUNGS FOR LADDERS: *B. Speight.*—The reduced ends of the rungs are adapted to fit into shouldered recesses cut in the sides of the ladder, and washers at their ends fasten tension-wires, either straight or twisted, that are laid in grooves cut in the undersides of the rungs.

8,238.—VENTILATION FANS: *F. de Mare.*—The inventor devises a fan having hollow wings, through which steam or an expanding gas or cold liquid may be caused to circulate as it flows in and out through the axle, or the wings are fitted with electrical conductors in another form; they are made up of rods encased with stellite or other suitable casing, and wound around with electrical resistances. The fans are intended for cooling or heating the air.

8,253.—DRUMS FOR HAULING AND WINDING MACHINERY: *W. R. Renshaw.*—Instead of a middle framing, there are radial arms fitted on to hubs and joined to one another with tie-bars and plates. A bar is wound spirally upon the conical surface thus produced, and provides a groove for the winding-rope, drums for the dead-rope and band-brakes are mounted upon side-brackets.

8,271.—A MACHINE FOR COPYING STATUARY AND MODELS: *A. Boulton.*—As a guide-plate or tracing-point is moved over the model by the hand the boring or carving tools are correspondingly moved by fluid pressure or electrical agency. A balanced frame holds the model or blocks that are to be carved, and worm gearing moves them simultaneously upon vertical axes; a double-piston valve upon the pointer slides in a cylinder mounted upon a balanced rod carried by a ball-and-socket or universal joint. The swivelling motion of the rod is restricted with a guard-ring; a swivelling standard on the frame or table carries the trunnions of extended bearings of the shaft in which each tool is placed. With the motion of the pointer axially towards or away from the model the table, together with the tools, is moved automatically in the same direction by means of fluid pressure, and the moving of the table continues until the piston-valve has cut off the supply, whereupon the tools assume the same position as the pointer does. With a horizontal movement of the pointer levers swivel the tools to a corresponding extent upon vertical axes, the levers being worked by fluid pressure. Endless bands and hollow pulleys drive the tool-spindles, to which they are joined with radial cranked keys sliding in keyways or slots in the spindles. Other adaptations are specified.

8,275. and **8,281.**—APPLIANCES FOR INCANDESCENT GAS BURNERS: *Sec. Luminarie Boule.*—The inventors seek to obtain a complete mingling of gas when supplied at a high pressure with the air in the Bunsen tube by replacing the customary single central nozzle with a series of small-bore gas nozzles as inlets. (8,281) In order that the mantle may retain its position concentrically with the burner, and to provide for its adjustment without concussion, the mantle is affixed or otherwise adjusted by the loosening of a set-screw, which enables one to slide or turn upon the burner a sleeve on which the mantle-rod is mounted.

8,282.—AN ARTIFICIAL SUBSTITUTE FOR CERTAIN BUILDING MATERIALS: *F. Bos.*—A substitute for bricks, stone, tiles, roofing materials, &c., is made by mixing sand and lime, previously slaked and stored, with some magnesian silicate in the form of olivine or chrysotile, serpentine-asbestos, or serpentine or hornblende rock or mineral, and water. The plastic mass is moulded under pressure, and then hardened with steam. For the magnesian silicate may be substituted burned magnesite, or magnesium salts other than silicates. The compound is stated to possess refractory and frost-resisting properties, and to be a bad conductor of heat and sound.

8,310.—PROCESS OF SAND-PAPERING: *J. M. Nash.*—The strips of sand-paper are wrapped around the flanges of the projecting ribs of a disc secured to a turning shaft. There are brackles upon the disc and pivoted spring-logs between which the strips are gripped; the latter have brushes on their backs, and the brushes are mounted in pivoted sockets to be forced outwards with springs. A spider upon the shaft prevents the strips from leaving the flanges sideways, and the various working parts are protected by an annular plate.

8,325.—A PIPE-JOINT FOR CLOSET-BASINS: *F. C. Bassick.*—A pipe-joint between the basin and the

outlet is provided by means of a flange having a V-shaped section which is fashioned in one piece with the basin and reposes upon a similarly flanged collar screwed on to the flooring. V-section half-rings that are bolted to one another by their lugs render the joint secure. Outlets also at the sides can be fitted with the joints thus specified.

8,335.—A CLUTCH: *C. Newson.*—A sleeve loosely carries a pulley that is fastened with rings and bolts, and has each of its sides faced with a wooden friction surface. The sleeve will freely move endwise upon a feather on the shaft, and carries two discs that slide upon feathers and two loose rings. As the sleeve is moved inwards cam levers that are pivoted to one of the loose rings and are linked to the working-sleeve will bear against the other loose ring and so force the two discs upon the sleeve against the pulley.

8,338.—A MITRE-BOX ATTACHMENT: *W. Potter.*—The end of an arm that turns in a bearing at the top of a frame screwed on to the mitre-box carries the saw guiding-pieces; on the axis of the arm is pivoted another arm that will drop into notches and so retain the saw-guides at the angle desired. In a loop around the axis of the first-named arm is a set-screw wherewith its axis can be clamped when the arm has been adjusted.

8,345.—MANUFACTURE OF LARGE BLOCKS OF CONCRETE: *A. H. Oules.*—A conveyor and swivelling measuring-chambers carried by vertical pivots feed cement to hoppers, whilst side-tipping trucks that run along rails and are charged from the above feed ballast into some adjacent hoppers. The cement and ballast together drop into mixing-barrels carried upon trucks, whence moulds receive the resultant concrete. The charging platform, rails, conveyor, and other parts are made removable in order that the travelling crane may be passed across the yard. In another arrangement the moulds and the charging platform are upon the ground level, and the mixers are run up to horizontal rails over the moulds.

8,361.—FITTINGS FOR PIPES FOR HEATING AND COOLING PURPOSES: *H. F. Worsam.*—In systems of circulation-pipes a middle bolt that projects from the end of a pipe secures that pipe to the common duct. In one application of the contrivance the pipe is inclined downwards, and there are separate channels for condensed water and steam. In another mode, when the pipe is inclined upwards it is closed with a cap, no return pipe being needed. If the condensed water and steam are not separated, a pipe that extends almost to the bottom of the duct serves for the discharge of water by the steam pressure.

8,364.—A SLEEVE FOR AN EXPANSION AND SWIVEL JOINT: *H. A. Humphrey.*—An expandable and slightly swivelling joint comprises a sleeve set loosely around the ends of the two pipes, and having packed recesses at its ends against which collars, suitably drawn together, press elastic packing-rings. Otherwise a flange may be substituted for one of the collars, and a packed recess takes one end of the sleeve.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 1.—By J. C. H. ROBINSON (at Bedford).

Bedford.—24 and 25, Harpur-st. (S), f. y. r. 31f.	£298
28 to 36 (even), Hasset-st., f. w. r. 62f.	900
10 to 26 (even), Pateshall-st., f. w. r. 61f. 8s.	680
77 to 83 (odd), Grey Friars-walk, f. q. r. 44f.	700
Harrowden, Beds.—Enclosures of pasture land, 19 a. 11 f. 36 p., f. y. r. 53f.	1,560
Eleven cottages and 2 a. o. r. 8 p., f.	410
Two fields of gardening land, 39 a. 3 r. 4 p., f.	2,275
Enclosure of pasture land, 13 a. 2 r. 24 p., f. y. r. 40f.	1,020

August 8.—By C. F. MOORE (at Stroud).

Bisley, Glos.—Priest House Farm, 32 a., f. y. r. 44f. 15s.	1,000
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By COTTON & CHAPPELL (at Droitwich).

Wychbold, Worcester.—The Crown Inn, u. r. 2,745 yds., papered around rent	1,650
Twelve cottages with gdn.s, f.	725

August 12.—By DAVID BURNETT & Co.

City of London.—57 and 58, Lombard-st., and 1, 2, 7 to 12, George-yd., f. y. r. 4,450f. (one seventy-second share)	2,400
--	-------

By FRANKLIN & JONES (at Thame).

Oakley, Bucks.—Freehold farm, 94 a. 3 r. 22 p., f. y. r. 75f.	1,600
Haddenham, Bucks.—Grove End Farm, 99 a. o. r. 33 p., f. and c. y. r. 147f. 17s.	3,250
Grove End closes, 8 a. o. r. 30 p., c. y. r. 25f.	010

By COTTON & CHAPPELL (at Bromsgrove).

Hanbury, Worcester.—Lower Hollow Fields Farm, 248 a. 1 r. 13 p., f.	7,150
Park Hall Farm, 88 a. 2 r. 13 p., f. y. r. 100f.	1,550
Catshill, Worcester.—Wild Moor-lane, freehold cottage and land	125

By C. R. MORRIS, SONS & PEARD (at Salisbury.)

Winterslow, Wilts.—Old Manor Farm, cottages, and enclosures, 229 a. o. r. 8 p., f. y. r. 273f. (in lots)	4,416
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CONTRACTS¹ AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Tramway Offices, Laid-street	Birkenhead Corporation	C. Brownridge, Civil Engineer, Town Hall, Birkenhead	Aug. 23
Granite Road Metal (2,400 tons)	Dunstable Town Council	G. Simcox, Surveyor, Town Hall, Dunstable	do.
School Buildings, North Featherstone-lane	Featherstone School Board	W. H. Pearley, Architect, Station-lane, Featherstone	do.
School Buildings	Grangemouth School Board	J. Strang, Architect, Vicar-street, Falkirk	do.
Works at Alverham Lobson School	Himmsley School Board	H. G. Scapling, Architect, Himmsley	do.
Additions to Premises, Queensbury (Yorks)	Leeds & Thipton	E. W. M. Curbett, Surveyor, Castle-street, Cardiff	Aug. 27
Offices, Worsbrough, &c., Springside-lane	Leeds Corporation	City Engineer, Municipal Buildings, Leeds	do.
Academy for Business Preliminary, Wilsby	Great Horton Indus. Soc., Ltd.	J. Drake & Sons, Architects, Queensbury	do.
Street Works, Clarendon-street	Hemel Hempstead Town Council	W. R. Locke, Surveyor, Town Hall, Hemel Hempstead	do.
Road Works, Llandaff	Leeds & Thipton	E. W. M. Curbett, Surveyor, Castle-street, Cardiff	do.
Street Works, Raitour-road	Birkenhead Corporation	C. Brownridge, Civil Engineer, Town Hall, Birkenhead	do.
Additions to Hospital, Ringwood-road	Blakesome (Durset) L.D.C.	S. J. Newham, Architect, Council Office, Blakesome	do.
Chilvert Works, &c., Spun Burn	Aylton L.D.C.	J. F. Dalton, Engineer, Council Offices, Ryton-on-Tyne	do.
Granite Road Metal (2,400 tons)	Leeds & Thipton	E. W. M. Curbett, Surveyor, Castle-street, Cardiff	do.
Main sewers, Lee Moor, &c.	Stanley (Yorks) U.D.C.	F. Massey, Civil Engineer, Telsley House, Wakefield	do.
Generating station, &c., Constantine-road	Ipworth Town Council	C. S. Peach, Architect, 25, Victoria-street, S.W.	do.
Two Cottages, &c.	Farnham Gasworks	Friend & Lloyd, Architects, Aldershot	do.
Boundary Wall at Cemetery, Salford		J. Bower, Civil Engineer, Town Hall, Gateshead	do.
Nurses' Home, Gloucester		Walker & Son, Architects, 17, College-green, Gloucester	Aug. 25
Farm Buildings, Fawcather, near Baldon	Rotherham R.D.C.	J. Robertson & Son, Architects, 55, Tyndal-street, Bradford	do.
Sewerage Works, Treston, &c.	Gravel Corporation	H. F. Proctor, Civil Engineer, Temple Back, Bristol	do.
Foundations, Cwrtfa, &c., Avenbury	East Barnet Valley U.D.C.	H. York, Civil Engineer, Council Offices, East Barnet	do.
Granite Road Metal	Boole (Lancs) School Board	J. Cox, Architect, 11, Dale-street, Liverpool	do.
Foundations of school, Linacre-lane		J. Strang, Architect, Vicar-street, Falkirk	Aug. 29
Alterations to Chapel, Port Innowy		W. C. Williams, Surveyor, 29, Southgate, Halifax	Aug. 30
Additions to business premises, Dean		M. Hall, Architect, 29, Northgate, Halifax	do.
Street Works, Commercial-street, Halifax		J. S. Brodie, Engineer, Town Hall, Blackpool	do.
House, Lee Mill, Halifax	Blackpool Corporation	J. P. Lawrie, Surveyor, Birkenhead	do.
Chapel, schoolhouse, &c., Penrhyn-walk, Wales	Alston, D. Morgan & Co.	F. Moller, Architect, Merthyr Tydfil	do.
Additions to Destructor Works	Alston L.D.C.	T. Roberts, Architect, Aberystwyth	do.
Rebuilding Royal Oak Inn, Tredegar	Calne Corporation	H. C. Marks, Civil Engineer, 36, Fisher-street, Carlisle	do.
House, Dean, Tredegar	Sir W. Edell	P. H. Lavery, Architect, Bishop Auckland	Aug. 31
Steamer shed, St. George's Quay	Lancaster Corporation	T. C. Hughes, Town Hall, Lancaster	do.
Wall, St. George's Quay			do.
Board school, Walsall Wood	Norton under Cannock U.D.S.B.	T. H. Fleming, Architect, Darlington-street, Wolverhampton	do.
Well, Badbury, Lincs.	Wellton R.D.C.	J. R. Elliott, Civil Engineer, Nottingham	do.
Refuse Destructor, &c., Radford	Nottingham Corporation	A. Brown, Civil Engineer, Guildhall, Nottingham	do.
Additions to the Works, Abergavenny	Mr. R. H. Shaw	B. J. Francis, Architect, Abergavenny	do.
Movable Wood Flooring, &c., over Swimming Bath	Leyton U.D.C.	Harvey & Duffell, 5, Bridge-row, E.C.	Sep. 2
Pipe sewers, Gas Pipes, &c.	St. John's Sanitary Com.	W. Wyatt, Engineer, 94, Radford-road, Linsington	do.
Schools, Parkstone, Dorset	Kathley School Board	Start & Bower, Architects, Colchester	Sep. 7
Completion of Backaria Bedn, Colham	Epston R.D.C.	Beesley, Son & Niche, 11, Victoria-street, S.W.	do.
Construction of Railway Route	West Ham Council	Borough Engineer, Town Hall, West Ham, E.	Sep. 4
Generating Station	Alverton L.D.C.	E. Woodbridge, Architect, 55, Slesley-street, Manchester	Sep. 5
Erection of Chapel, Cwrtfa, &c., Avenbury	Urban L.D.C.	Connell's Surveyor, West-street, Cromer	do.
Rebuilding Peniarth Arms Hotel, Gwithan	Redruth Brewery Co.	H. W. Collins, Architect, Walsall	Sep. 6
Market	Llandoverly (Wales) Corporation	J. Thomas, Town Hall, Llandoverly	Sep. 7
Well Sinking, Sewerage Works, &c.	Nas R.D.C.	F. Bagn, Engineer, Kidderminster	do.
School, North Walsall	Walsall L.D.C.	H. E. Lavender, Architect, Bridge-street, Walsall	do.
Erection of Infirmary at Stapleton	Drum L.D.C.	H. P. Adams, Architect, 28, Womersley-place, W.C.	Sep. 10
Paving Works	Halifax Corporation	J. Lord, Civil Engineer, Town Hall, Halifax	Sep. 12
New Municipal Buildings	Woolwich L.D.C.	T. B. Thomas, Architect, 5, Queen Anne-street, S.W.	Sep. 18
Workhouse buildings, Wesham, Lancs.	Ryrie Guardians	Haywood & Harrison, Architects, Accrington	Sep. 22
Erection of Refuse Destructor	Acton District Council	Council's Surveyor, 242, High-street, Acton, W.	Oct. 7
Engine house, &c., Long Eaton	Harrington Mills Co.	J. Sheldon, Architect, Darby House, Long Eaton	no date
Additions to Club and Institute, Mexborough, Yorks		Castle & Son, Architects, Leek, Staffs.	do.
Stabling, &c., Maxwell-street		F. E. G. Braushaw, Surveyor, 30, Aldergate, Tamworth	do.
Ketting, &c., Aldergate		T. W. Grunby, Architect, Brighthelmston, Brighton	do.
Road Works, Wylton Estate, Ulverston		Edgington & Summerville, Architects, 7, Park-street, Windsor	do.
Electric Light Station, Blough, Bucks		Burles & Harris, Architects, Southend-on-Sea	do.
Two Houses, Crown-lane, Kaysleigh		H. A. Mearns, Architect, The Temple, Dale-street, Liverpool	do.
Generating Station Works, Stalybridge		E. F. Green, Architect, Gainsborough	do.
Hotel and Assembly Rooms, Carlisle		H. H. Adams, 211, Pallatine-road, Blackpool	do.
Stables, &c., this station, near Southey, Lancs.		R. C. D. Roberts, Braintree, Wickham Market	do.
Two Houses, Fawcather-lane, Blackpool		J. F. Buck, Station-road, Harpenden	do.
Village Works, Braintree-lane		Coxsage Colliery Office, Gosforth	do.
House, Station-road, Harpenden		E. Oaley, Architect, Clay Cross, Chesterfield	do.
Fifteen Cottages, High Colledge, near Newcastle		H. M. Miller, 44, Endelam-road, Bham	do.
Six Houses, Raitour-road, Clay Cross		F. P. Jones, Architect, 15, York-gate, Hatfield	do.
Bath Stone Work to Block of Shops, Bham		J. Stalker, Architect, 57, Highgate, Kendal	do.
Four Cottages, Raitour-road, Clay Cross		Borough Surveyor, Town Hall, Burnley	do.
Additions to National school, Kendal	Burnley Corporation		do.
Heating of Townley Hall			do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Superintendent of Technical Education, Lagos	Trus, Rebecca Hussey Slabe Chty.	2500, &c.	Sep. 1
*Sanitary Inspector	Barnesley Borough Council	1300, &c.	Sep. 4
*Clerk of Works	Eastbourne Corporation	32. 3s. per week	Sep. 8

Those marked with an asterisk (*) are advertised in this Number.

Contracts, pp. iv. vi. viii. & x.

Public Appointments, xix.

By JAMES ELEY (at Kilton).	By DARRERS (Holloway).	Victoria Pl.-79, Chapman-rd., ut. 60 yrs, g.r.	4/5
Kilton, Lincs.—Enclosures of arable and pasture land, 50 a. 3 r. 3 p. f. f.	Holloway.—112 and 113, Devonshire-rd., ut. 50 yrs, g.r. 122, 123, y.r. 80.	4/5	
August 13—By TYSEN, GREENWOOD, & CRIER.	6, Windsor-rd., ut. 50 yrs, g.r. 61. 6s., y.r. 38.	4/5	
Chiswick.—350, High-rd., f. y.r. 75.	By WALTER SIMMONDS.		
By SALTER, SIMPSON, & SONS	Brookley.—167 and 169, Malpas-rd., ut. 62 yrs, g.r. 94, y.r. 56.	615	
(at Bury St. Edmunds).	By SIMPSON & SONS.		
Lakenheath, Suffolk.—Bedford, f. 312 a. 2 r. 31 p. f. f. p.	Lee.—152, Lee High-rd., f. y.r. 28.	595	
By JAMES ELEY (at Boston).	New Cross-rd.—8, St. James, ut. 39 yrs, g.r. 61. 2s. 1d., c.r. 45.	350	
Fishoft, &c., Lincs.—Several closes of pasture, meadow, and arable land, 26 a. 3 r. 3 p. f. f.	Peckham.—Fennam-rd., f.g.r.'s 111, reversion in 541 yrs.	350	
August 14—By COLES & CO.	28, Gairloch-rd., ut. 74 yrs, g.r. 54. 5s., w.r. 114.	240	
Spitalfields.—100, Commercial-st. (S), ut. 35 yrs, g.r. 201, y.r. 100.	Kennington.—45 and 46, Aldred-rd., ut. 22 yrs, g.r. 101, w.r. 65.	300	
Dexley Heath, Kent.—Standard-rd., Portland and Maud Villas, f. y.r. 54.			

Victoria Pl.-79, Chapman-rd., ut. 60 yrs, g.r. 4/5, w.r. 254.

August 15—By G. A. WILKINSON & SON.

Hove, Sussex.—The Drive, Arundel House, f.g.r. 2501, reversion in 941 yrs.

By HEAPS, SON, & REEVE.

Twickenham.—1 to 5, Fins Parade, f. c.r. 201.

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; r. for ground-rent; c. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; w.r. for weekly rental; y.r. for yearly rental; u.t. for unimproved rental; p.a. for per annum; y.r. for years; s. for street; rd. for road; sq. for square; p. for place; ter. for terrace; cres. for crescent; av. for avenue; g.dns. for gardens; yd. for yard.

PRICES CURRENT (Continued).

LEAD, &c.

		Per ton in London.			
		s.	d.	s.	d.
LEAD—Sheet, English, 3 lbs. & up.	13	7	6	0	0
Pipe in coils	13	7	6	0	0
Soft Pipe.....	16	17	6	0	0
IN—Sheet.....	24	0	0	0	0
Vielie Magné..... ton	23	15	0	0	0
Silesian.....	23	15	0	0	0
COPPER—.....					
Strong Sheet..... per lb	0	0	10	0	0
Sheet.....	0	0	11	0	0
Copper nails.....	0	0	11	0	0
BRASS—.....					
Strong Sheet.....	11	0	10	0	0
Sheet.....	11	0	10	0	0
IN—English Ingots.....	10	0	14	0	0
GOLDER—Plumbers'.....	11	0	7	0	0
Tinmen's.....	11	0	9	0	0
Tinsmiths.....	11	0	9	0	0

ENGLISH SHEET GLASS IN CRATE			
5	oz. thirds	32d.	per ft. delivered
1	fourths	3d.	10
1	oz. thirds	32d.	33
1	fourths	3d.	33
8	oz. thirds	32d.	33
1	fourths	3d.	33
2	oz. thirds	32d.	33
1	fourths	3d.	33
1	fluted sheet, 75 oz.	3d.	33
1	21 1/2	3d.	33
1	Hartley's Rolled Plate	1d.	33
1	33 10 33	24d.	33
1	33 10 33	24d.	33

OILS, &c.		£ s. d.
Raw Linseed Oil in pipes or barrels ..	per gallon	0 5 6
" " " in drums ..	"	0 3 0
Boiled " " in pipes or barrels ..	"	0 3 11
" " " in drums ..	"	0 3 0
Turpentine in barrels ..	"	0 10 0
" " in drums ..	"	0 3 0
Green Ground English White Lead ..	per ton	21 0 0
Red Lead, Dry ..	"	20 0 0
Best Linseed Oil Putty ..	per cwt.	1 12 0
Stockholm Tar ..	per barrel	1 12 0
VARNISHES, &c.		Per gallon
Fine Pale Oak Varnish ..	£ s. d.	0 8 0
Fine Pale Copal ..	"	0 10 6
Fine Extra Hard Church Oak ..	"	0 12 6
Superfine Hard-drying Oak, for Seats of Churches ..	"	0 14 0
Superfine Elastic Carriage ..	"	0 12 6
Superfine Pale Elastic ..	"	0 16 0
Fine Pale Maple ..	"	0 16 0
Finest Pale Durable Copal ..	"	0 18 0
Superfine Pale Copal Body ..	"	1 4 0

White Shell Flatting Varnish	0	13	0
White Copal Enamel	1	4	0
Extra Pale Paper	0	13	0
White Colored Paper	0	13	0
Best Black Japan	0	16	0
Black and Mahogany Stain	0	9	0
Best Black Japan	0	16	0
Merlin Black	0	16	0
Knottin	0	10	0
French and Brush Polish	0	10	0

DISCOUNTS.

S. S. P. (Amount should have been stated).

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atters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announce-

* Denotes *accepted*. † Denotes *provisionally accepted*.

ABOYNE (N.B.).—For the erection of house and
ops, for Mr Peter Grant, Aboyne. Mr W. F. Gauld,
chitect, 258, Union-street, Aberdeen. Quantities by

Masonry.—James Gertie, Cambus O'May..... £19: 10 10
Carpentry.—Innes & Sons, 59, Dundee Street, Aberdeen..... 12: 2 6

Broad-street, Aberdeen	174	7	0
Slating—Wright & Son, Aboyne	37	1	8
Plastering, — Munro & Wright, Aboyne	32	0	0
Painting, Crawford Abel, Westfield, Ballater	70	12	10
Plumbing, — Walter Simpson, 446, Union-street, Aberdeen	27	10	0

[Forty-seven tenders in all.] L493 2 4
[See also next page.]

BARNES.—For new school for 350 infants, for Barnes School Board. Mr. C. Innes, architect, 5c, Cannon-street, E.C. 4.

Parkins	£7,553	Lorden & Sons	£5,777
Mark	6,850	Barker & Co.	5,752
Balaam Bros.	6,300	Sharphington	5,598
Stimpson	6,100	Kuffey	5,546
Hunt & Sons	6,050	Knight	5,514
Barrett & Power	5,870	Nightingale	5,405
Patrick	5,855	Renshaw	5,197
Dove Bros.	5,805		

BRENTWOOD.—For the erection of a fire-station, Hart-street, for the Urban District Council. Mr. J. E. Fothergill, Surveyor, Town Hall, Brentwood. Quantities by Surveyor:—

Oak Building Co., Ltd.	£990	0	0
Clare Bros.	938	0	0
Thompson & Co.	853	8	9½
Ernest West	825	0	0
Dix & Co.	803	0	0
Burtwell & Jarvis	795	0	0
Harris & Rowe, Ltd., Shoeburness* ..	740	0	0

CARDIFF.—For the erection of warehouses, 41 and 42, St. Mary-street, for Mr. David Morgan. Mr. Edwin Seward, architect, Queen's-chambers, Cardiff:—

F. Williams	£5,250	James Allan	£4,050
Lattrey & Co.	4,454	Turner & Sons	3,968
D. H. Davies	4,350	Joseph Thomas	3,985
Geo. Griffiths	4,350	W. Symonds	3,935
G. Hallett	4,050	Thomas & Co.	3,897
F. Couzins	4,095	Beames & Nephew ..	3,845
Knox & Wells	4,070	Evans & Bros., Cat-	
F. Small	4,035	hays, Cardiff*	3,764

HULL.—For the construction of foundations, Victoria-square, for the Corporation. Mr. J. H. Hirst, Architect, Town Hall, Hull:—

Boyce, Bradley, & Co.	£4,225	13	6	W. Burkett	£3,950	16	10
J. Coates	4,200	0	0	H. Medforth	3,807	3	6
M. Harper	4,111	0	0	J. Sangwin*	3,608	0	0
				[All of Hull.]			

LONDON.—For alterations at Bow-street Police Station:—

	Credit.	£
Mowlem & Co.	—	5,379
Kilby & Gayford	30	5,180
Clarke & Brassy	—	5,057
Lascelles & Co.	22	5,052
Higgs & Hill	24	4,994
Grover & Sons	20	4,922
Holloway Bros.	—	4,921
F. & H. Higgs	—	4,891
Lovatt	33	4,850
Willmott & Sons	—	4,796
Lathey Bros.	—	4,779
Ashley & Horner	—	4,751
Laurance & Son	30	4,630

LONDON.—For decoration work at Hampden Residential Club, for Hampden House, Ltd. Mr. Edwin G. Salter, architect, 13, Phoenix-street, N.W.:—

H. M. Dove	£342	0	0	T. Sharphington	£256	0	0
C. & W. Hun-				Marchant &			
tings	315	0	0	Hirst	225	0	0
W. G. Edwards	291	0	0	Cavin Bros., Wil-			
Fowler Bros. ..	265	0	0	son-street* ..	195	1	6

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MAKING.

NOTTINGHAM.—For erection of house, Arkwright-street, for Dr. W. Hunter. Mr. William R. Gleave, architect, 18, Low-pavement:—

Wm. Maule, Nottingham*	£1,670
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Lowest of eleven tenders, four under £1,700.
[Architect's estimate, £1,675].

PURLEY.—For construction of roadway at Foxley Estate, Purley (first portion). Mr. Frank Windsor, architect and surveyor, 9 and 10, Bank-buildings, George-street, Croydon:—

Sreeter Bros. ..	£1,223	0	F. Chappell, Pur-
W. Langridge	929	0	ley*
			£927

SLOUGH.—For the erection of three cottages, &c., Salt Hill, for the Bucks County Council. Mr. R. J. Thomas, M. Inst. C.E., County Hall, Aylesbury:—

Butcher & Hendry ..	£1,240	J. H. R. Atkins	£1,172
A. Chennels	1,200	Burfoot & Son	1,171
Scott & Son	1,176	Lane & Son, Colin-	
H. D. Bowyer	1,175	brook*	1,085

WESTHOUGHTON (Lancs.).—For the erection of municipal buildings, for the Urban District Council. Messrs. Bradshaw & Gass, architects, 19, Silverwell-street, Bolton:—

Townson & Sons, Ltd., Park Hill Saw Mills, Bolton	£4,922
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Proposed Rebuilding of the Venice Campanile.



It appeared from a letter in the *Times* last week, the Royal Academy have given their approval, and promised their aid as far as possible, to the rebuilding of the fallen Campanile at Venice on its old lines—that at least is what must be concluded from the terms in which the subject is referred to. However desirable it may be, as has been remarked, that the Royal Academy should oftener act in its corporate capacity in promoting or supporting artistic enterprises, their rather unexpected zeal in this case is hardly well-judged. We do not in the least believe that any but a very small proportion of the original worked stones can be available for re-erection of the structure, though there may be enough left to give accurate sections of mouldings and other details. The Campanile re-erected on its old lines must therefore really be a new building, pretending to be the old one, and thus adding one more to the list of architectural shams born of the idea of "restoration." It can never have the archæological and historic value of the original.

Were the Campanile a work of architectural beauty in itself, this would be of less consequence. We might then be glad to see the beauty of design restored, even though it could not pretend to be the real original building. Unfortunately this is not so. But people have got so accustomed in the present day to look upon everything ancient in architecture as necessarily beautiful merely because it is ancient, that they seem for the most part to be absolutely unable to judge of the architectural design of an ancient building from the standpoint of pure art. It is fine, because it is old; and though no one, probably, would venture to state this as an argument, even in his own mind, in so many words, it is what is for the

most part practically acted on. We have indeed one remarkable example among modern writers on architecture of the maintenance of private judgment in regard to ancient buildings; an example from which the cultivated section of the public might have learned something if they had given more attention to it. That example is given by Fergusson in his great work, "The History of Architecture." We are far from holding up Fergusson as an impeccable critic. His judgments seem in some cases captious and unsympathetic; the latter quality partly the result of his hard, logical Scottish temperament. But he did, nevertheless, set up and practically maintain the important principle, that buildings of all ages were to be judged, as architecture, on their own inherent merits, independent of whatever glamour might be cast over them by centuries of historic association. Even in the case of a building which he enthusiastically admires, he points out what he considers its shortcomings, just as if he were reviewing a modern design. But this healthy example seems to have had little effect. The majority of architects and architectural amateurs still continue to bow down to all ancient buildings, and sketch them and worship them indiscriminately, as if everything that is old were necessarily, *ipso facto*, admirable.

This seems to be the case in regard to the Venice Campanile. Any one who is able to keep his judgment uninfluenced by place and association must see that the late Campanile, as we may call it, was not by any means a beautiful structure. It was a clumsy design as a whole, patched up at different times, and capped by a singularly ugly and heavy pyramidal spire. If such a design were sent as part of a modern competition design, it would certainly not receive much admiration; it would probably be severely criticised, and would unquestionably not improve its author's chances of success in the competition. The late Campanile was an important feature of Venice; it was endeared by centuries of historic association; but it was not beautiful, and it is not worth while to build what can only really be a modern imitation of it. The fact that

people should desire to do so, and should be supported in their desire by such a body as the Royal Academy, only shows how dead among us the real spirit of architecture is. In any previous period of history, if an important building fell down, the immediate desire would have been, not to "restore" it, but to erect something better and finer in its place. Modern architecture is perfectly capable of producing something better—it would be in a very bad way if it were not—if it would only believe in itself and nourish ambitious aims and aspirations, instead of merely bowing down before every kind of ancient building, and sighing—"We can do nothing equal to it." We are not likely to, if we have not the spirit even to try.

The Royal Academy, in supporting the restoration, has not recognised what ought to be its proper function. It is not an Academy of restorations, but (nominally at all events) an "Academy of Arts." Practically, owing to the immense preponderance of painters in its ranks, and the greatly disproportionate space given to pictures in its exhibitions, it is rather an Academy of Painting. The President is a painter who probably knows very little of architecture, and perhaps is not particularly interested in it. The most brilliant of the Academy's presidents in recent times, Lord Leighton, really did understand architecture, and was deeply interested in it; so, we know, is one of the present Royal Academy painters. But we do not think that the Royal Academy as a body either knows or cares much about architecture, or is very well qualified to form a judgment in the present case; and at all events it has gone quite out of its right course in endeavouring to promote a restoration. Its proper business is to promote art, which is a very different thing.

What we should like to see—and what would probably have taken place in the Renaissance period of Italy—would be an architectural competition for the best design for rebuilding the Campanile, preserving as far as possible the height, bulk, and something of the general outline of the old structure, but improving the detail and proportion of parts, and crowning it with a better and more graceful spire.

FONT COVERS.

By F. C. EDEN.



DURING the last five or six years ecclesiologists have devoted a great deal of attention to the Altar and its furniture. Indeed, almost all their research has been directed to the investigation of the English Altar as it was about the year 1548. The font has suffered from corresponding neglect, and its cover is usually dismissed with a bare allusion. This is the more strange seeing that the matter is one of practical no less than antiquarian interest; for by a provincial constitution of 1236, still in force, and often acted upon so late as the seventeenth century, all fonts are required to be provided with locks and covers.

Evidence that this constitution was at one time generally obeyed is supplied by the fonts themselves. Even when the covers have disappeared, examination will almost invariably detect the marks where the staples for bar and padlock were leaded into the stonework of the rim. The bar itself is very rarely found. In 1859 it still remained in Farcet Church, Northants; and at Wickenby, Lincs., "the original fastening remains, consisting of an iron bar, one end of which is thrust through a hole in an upright wooden handle in the centre of the cover, and into a staple at the side; the other end has an eyelet or loop, which is padlocked to a similar staple on the opposite side" (Paley, *Baptismal Fonts*, p. 25).

Allusions to these irons are not infrequent in parish accounts; e.g., in 1498 the churchwardens of Leverton paid "for stables and hoder things to ye font iijd." At Cowfold in 1481-2 sixpence was paid "pro yre pro flante et a Locke." And the inventory of the chapel at Temple Balsall in 1538 describes a "faunt-stone of tymbre lyned with lede with a small berr of iron over." This wooden font is curious. I have only come across one other example, viz., that at Efenechtid in Denbighshire. There seems no reason why timber should not have been used where stone was scarce.*

It is probable that the earliest covers were mere flat lids fastened down in some such manner as that at Wickenby, and possibly the majority of covers which have been lost were simple boards† so fastened. But that some were already of considerable size and elaboration before the first quarter of the fourteenth century came to an end, we gather from an entry in the Exeter Fabric Rolls, under the year 1323-4. "For a cord for the baptismal font 3d.": a cord, that is to say, for the suspension of the cover; showing that the latter was even then, too heavy to be conveniently raised without mechanical contrivance. In the fifteenth and sixteenth centuries such an entry is common enough, and in 1466 the wardens of St. Michael's, Cornhill, bought no less than "xliij fadom corde" for the purpose.

But not all of the heavier covers were suspended, and great variety of design and contrivance is found, as the following rough

classification of English font covers will show:—

I.—Fixed.

(a) Erections of a monumental character, of the nature of a canopy or baldacchino, and forming quasi-baptisteries. There is one of stone at Luton, of the fourteenth century; others of wood, at Trunch, of the fifteenth; of the sixteenth century in St. Peter Mancroft; and of the seventeenth, in the Cathedral Church of Durham.*

(b) "Buffet covers," as they have been called. These are usually fixed to the rim of the font, and provided with shutters to open triptych-wise. They are fairly numerous. Gothic examples are at Bramford and Hepworth, in Suffolk. Marden, Walpole St. Peter, and Burgh possess covers of later date.

(c) Cases that enclose the entire font from the floor upwards. They are provided with doors for access to the bowl in the same way as the "buffet covers." Littlebury and Thaxted possess Gothic cases; and at Swymbridge is a fine late example.

(d) Covers fixed to the roof, or to a beam, or crane, at their upper extremity, the lower stage being so arranged that it can be pushed up to slide over the upper, telescope fashion. It is kept in position by a counterpoise in the interior of the upper part, like a modern window sash. At Ufford, Sudbury (St. Gregory), and Castle Acre are magnificent specimens of this class of cover. That at North Walsham has lost its lower stage. At Sheringham the beam only remains.

(e) A canopy of wood suspended a few feet above the font. One exists at Tuxford, dated 1673.

(f) Testers or canopies with panelled backs, after the manner of a pulpit sounding-board. These are of late date, and are used in conjunction with counterpoised covers, as at Swymbridge and Pilton (Devon) and Astbury (Cheshire).

(g) In some late examples the bowl of the font is provided with a lid which opens in two leaves (as in St. George's, Tombland, Norwich), or slides out (as at Saham Toney), beneath a dome-like canopy carried by four short columns fixed to a frame on the rim of the font.

II.—Movable.

(a) To lift off by hand: a large class to which the majority of late covers belongs. The prevailing Gothic type is a short spire or ogee dome, often crocketed, on a flat board. The latter type is as follows:—An octagonal lid, moulded on the edge, bears eight radiating trusses, rising from the angles and meeting at the head of a central baluster-shaped post, just below the finial: the whole roughly suggesting a crown.

(b) Counterpoised. — These are hung either from roof, beam, or crane, and vary greatly in size, some being almost as large as the larger fixed covers, and others being light enough to lift off by hand. The balance weight takes a variety of forms, e.g., a rose at Ewelme, a cherub at Frindsbury, a vase of iron painted at Skirbeck. Often it is a simple annular weight of lead through which the suspending rope runs; or it resembles an ordinary clock-weight at St. Andrew's, Newcastle, or a simple stone is used, as at Takeley. Sometimes the counterpoise is out of sight above the tower ceiling,

or is concealed in the supporting framework of crane or tester, as at Astbury and Pilton.

(c) To wind off with a winch. The most interesting example of this method is at Sall, where a very tall cover is suspended at the end of a wooden crane that projects some 10 ft. from the front of the ringers' solier.

The material of all these covers is oak. The metal covers so much in vogue in the Low countries were unknown in England. The only undoubted example to the contrary which I have been able to find is at St. Werburgh's, Derby. It is of late date, 1711, but of good design and workmanship, with a brass pelican for a finial. The latter has now been converted into a book-rest for the lectern, and the beautifully wrought iron framework into a stove ornament! There is a tradition that the lost cover at Borden, in Kent, was of iron. There was formerly one of stone at Cockley Cley, Norfolk. The finial of old covers is often an interesting feature. Sometimes it is a pelican, as above and at North Walsham; the B.V.M., as at Freiston; or some other saint. Often, as in several late examples at York and elsewhere, it is, appropriately, the Holy Dove. Ewelme has an angel. I know of no mediæval example in which the cross occurs in this position except as a clumsy modern restoration, nor have I found St. John Baptist.

The eastern counties are the richest in font covers, both as to quality and quantity. Out of about 200 ancient examples of which I have collected data, seventy belong to Norfolk, Suffolk, and Essex; and this is probably not more than half the total number there existing. Other counties, Shropshire, for instance, have none, so far as I have been able to ascertain. Great numbers were lost or destroyed during the last century. An interesting late specimen at Little Walsingham was destroyed in 1861 at a restoration under G. E. Street. Some have been made up into pulpits, lecterns, vestry cupboards, &c.; others may be found lying in odd corners as useless lumber, while the fonts they were destined to protect become convenient receptacles for dust, dusters, and decorations—*quæ honestius est tacere quam dicere*, as Lyndwood says of other malpractices connected with fonts, to guard against which was the original use of the locked cover.

In addition to those already alluded to, fine covers are found at Hepworth, Worlingworth, and Bramford (Suffolk); at Burgh and Frieston (Lincolnshire); at Merton, Terrington, St. Clements, Walpole St. Peters, and Worstead (Norfolk); at Takeley (Essex); and the Cathedral and St. Andrew's Churches, Newcastle-on-Tyne.

The following extracts from Churchwardens' accounts have been selected as covering the period of 350 years during which the best joiners' work was done in England, and all the more interesting covers were made. Locks and ropes are the items of most frequent occurrence.

HEDON.

1372-3. Item pro factura unius co-	
periture pro fonte in eccle-	
sia	ijs.
Pro clavus pro eadem co-	
peritura	ijd.

ST. MICHAEL'S, CORNHILL.

1466. Itm payde for tymbre and

* Archbishop Edmund's constitution (alluded to above) requires the font to be *lapideum vel aliud*, on which Lyndwood's gloss is that it must be *durabilis, et fortis, ac aqua infusa retentiva*, a requirement which oak lined with lead seems to fulfil. A Scottish provincial council enacts that the font is to be *lapideum vel ligneum*; but the Canons of 1603 require a "font of stone in every church" where baptism is administered.

† But even these were sometimes decorated in colour, as at St. Michael's, Cornhill.

* For illustrations of this and of a good many other font-covers, see the lithograph plates in the present issue.

workmanship of the font
lydde ijs. ijd.
Itm for ij polyes and ij ropes
for the same iiijd.
Itm for peynting of the font
lydde ijs.
ROTHERFIELD, SUSSEX.
532-3. Item receyved of diverse
persons to the tabernacle of
the fonte iij li.
This cover is still in existence, though
restored and beautified," as an inscription
testifies, in 1816. The whole amount ex-
tended on this cover was 3*l*. 10*s*. 6*d*. The
word "tabernacle" may be contrasted with
the simple "lydde" of the preceding ex-
act, and suggests (as, indeed, the cost
proves it to have been) a much more elabo-
rate affair.
LEVERTON.
535. To Karver of boston when he
cam to se ye fonte iiijd.
To ye same for makyn g
covering to the fonte Vs.
STRATTON, CORNWALL.
538. Payd for a loke to the fonte vjd.
ST. MARTIN'S, LEICESTER.
570-1. Payd unto Wyllyam Sym-
sone and Robert Craftes for
takyn downe ye thyng
over the funt xijd.
WIGTOTT.
599. Itm, paid to Wyllm Bown for
a lyne to ye font vjd.
Itm. to thoms ye Wryght for
a pulle and for dryvyn g
ym ijd.
ALL SAINTS, DERBY.
620. Item paid to William Wads-
worth for 2 paire of bonds, a
hasp, and a staple, a lock, a
hooke, a pin to hang the
pullis on, another at the top
of the cover, and 2 staples,
all these are about the font 5*s*. 8*d*.
Paid to Jno. Borne for a cord
for to hang the cover in of
extraordinary hemp and
waxed 5*s*.
523. Item for mending the font
and for a locke for the same
(This lock was provided to
comply with an Injunction of
Bishop Morton, of Coventry).
STOCKTON, NORFOLK.
531. It. for coullering for the fonte 1*s*. 0*d*.
It. for the cover of the fonte 13. iiij.
It. for the painting of the
fonte 4*s*. 0*d*.
(So at St. Mary's, Reading, 11*s*. 0*d*. was
paid for painting both font and cover in
536.)
ALL SAINTS, DERBY.
563. Item for putting to the font
rope 10*d*.
571. A rope for the font 1*s*. 0*d*.
ST. MARY-LE-TOWER, IPSWICH.
719-20. Paid Mr. Hardy for a new
cover for the font 18*s*.

THE HOUSING OF THE WORKING
CLASSES.

At the beginning of the present
Session of Parliament, a Joint
Committee of the two Houses of
Parliament was appointed to con-
sider the Standing Orders relating to
houses occupied by persons of the labour-

ing classes, and the clauses relating to
them in Local Bills and Provisional Order
Bills. The Report of this Committee was
published before the adjournment of the
Session, and, more recently, the model
clauses which are a sequel to the actual
Report.

The main suggestions of the Committee
can be very shortly summarised. They
suggest, in the first place, that the model
clauses shall be embodied in a general Act
of Parliament, and they also recommend that,
in settling schemes for providing new houses
in place of those demolished, the Central
Authority should have a full discretion.

The next suggestion is one which will
commend itself to most people's common
sense—namely, that new houses should not
be too ambitious in character and design.
This recommendation would have been a
good deal more valuable if we had been able
to obtain some kind of definition of the
words "character" and "design." It is
obvious that what one person will think
sufficiently good for a labouring man another
will consider inadequate; and we should
deprecate anything like jerry-building or
skimping of size of rooms, since there is
nothing so important as that the labouring
classes should be adequately housed. The
importance of the Report, therefore, really
lies in its sequel—namely, in the clauses
which, it is suggested, shall be placed in an
Act of Parliament. These are divided into
two main sections: a clause for London and
a clause for places outside the Metropolis.

It would, we think, have been more work-
manlike if the clauses had been sub-divided
into separate classes, and not into sub-
sections; but it may be taken that these
recommendations are subject to the amend-
ments of the Government draughtsman, and
it is scarcely likely that they will become law
without considerable discussion in the
House of Commons itself.

Taking first the clause relating to London,
the first portions relate to the necessity of
new buildings at all; but when we get to
Sub-Section 5, we arrive at a point where
schemes are regarded as necessary. The
two main provisions are contained in Sub-
Sections 5 and 10, the first-named of which
runs as follows:—

"5. With respect to schemes under this section—
(a) the time within which a scheme is to be carried
out shall be fixed therein; (b) the Secretary of State
may direct provisions to be inserted in any scheme
requiring the new dwellings to be completed fit for
occupation before the persons in respect of whom
the scheme is made are displaced, and prescribing
the rents to be charged; and (c) the Secretary of
State may, if he thinks fit, attach to his approval of
any scheme any conditions not being conditions in
excess of the conditions imposed by the London
Building Act, 1894, or any other Act or Acts, by-law
or by-laws, relating to buildings in the County of
London, and also may require the company to give
security for the carrying the scheme into effect."

The clause relating to places outside is
much more lengthy and elaborate than
that which refers to the Metropolis, and
has evidently required more consideration,
owing to diversity of interests and localities.
In the first place, the approval of the
Local Government Board to a scheme
for new dwellings must be obtained,
and, before giving their approval, the
Local Government Board may take into
account the number of persons of the
labouring classes who, at any time during
five years preceding, resided in the houses
or in houses already demolished, and

were displaced in view of the acquisition of
land by the company.

In approving any scheme the Local
Government Board also is to consider to
what extent, if at all, the company has
given financial assistance to any schemes or
arrangements of any Local Authority for the
provision of labouring class dwellings
This, one would have thought, came within
the question whether provision was required
or not, since it is obviously intended to meet
the case of a considerable transference of
the labouring classes within a locality
before a company begins to carry out its
operations.

The Local Government Board is also by
Section 9 to hold any inquiries which may
be necessary in relation to the purposes of
the Act—in other words, a company which is
displacing a number of artisans will have to
carry out its operations under the eye of the
Central Authority; indeed, the object of the
new sections appears to be to give a larger
control over promoters of undertakings in
urban districts. The amendment of the
Standing Orders is in this direction also,
since on every Provisional Order Confirma-
tion Bill in which power is given to take
land compulsorily or by agreement, or to
appropriate land elsewhere than in London,
a number of clauses are to be inserted which
will have the effect of limiting the freedom
of promoters. For example, clauses will be
inserted authorising the Secretary of State

"(c) In determining the number of persons for
whom new dwellings are to be provided, to take
into account the number of persons of the labouring
class who within the five years preceding have been
displaced in view of each acquisition of the land by
the promoters.

(d) Authorising the Secretary of State, if he thinks
fit, to prescribe the rents to be charged to the
tenants of the new dwellings."

We hear a great deal at the present time
of the difficulties of railway companies,
but these new clauses will increase their
public burdens. At the same time it is quite
obvious, from what has occurred in regard
to railway Bills during the present Session,
that the House of Commons is determined
that where promoters, whether railway com-
panies or not, take land in populous districts,
they shall provide adequate accommodation
for the artisans who are displaced, within a
reasonable time.

NOTES.

THE McKinley Memorial Com-
mittee, 320, South Broad-street,
Philadelphia, Pa., U.S.A., invite
designs from sculptors, without restriction as
to citizenship or nationality, for a memorial
to the late President, which shall include a
portrait statue of President McKinley, with
a suitable architectural setting. The site
selected is the point of ground in line with
the centre of the window of the eastern
pavilion of Memorial Hall, Fairmount Park
(presumably at Philadelphia), immediately
opposite the eastern avenue of the Welsh
Memorial, facing the roadway which extends
from the Smith Memorial Gateway, west-
ward; but the General Committee reserves
to itself the right to change the location,
should such action be found necessary. The
designs, which are to be deposited with the
secretary between February 2 and March 2,
1903, are to be in the form of sketch-
models, in plaster, at a uniform scale of
1½ in. to the foot, and a typewritten descrip-
tion of the design and material is to accom-

pany the sketch-model: a competitor may submit more than one sketch-model. The cost of the memorial, placed in position and complete, shall not exceed the sum of 30,000 dols., and this sum is to include the erection of a full-sized model in staff at the site indicated. All expenses of delivery of sketch-models must be prepaid by the competitor, and upon request by competitors models will be returned to them "collect." Those belonging to competitors outside of Philadelphia will be placed in the care of a responsible packer. The five designs that receive the prizes by the decision of the Jury of Award shall be publicly exhibited at the discretion of the General Committee, but the sketch-models submitted and not receiving prizes will not be exhibited or published until after the award of the Jury is made public, and then only with the consent of their authors. The Jury of Award, no member of which is to be a competitor, has already been appointed, as follows:—Wilson Eyre, Jr., and Theophilus P. Chandler, appointed by the Pennsylvania Academy of the Fine Arts; Edward H. Coates and Charles E. Dana, appointed by the Committee on Works of Art, Fairmount Park Art Association; J. Q. A. Ward and Paul Bartlett, appointed by the National Sculpture Society; and Frank Miles Day, appointed by the Philadelphia Chapter of the American Institute of Architects. The Jury will examine the designs submitted, and shall report on the same in writing to the General Committee, within sixty days after March 2, 1903, as follows:—

"1. Selecting the five designs to receive prizes of five hundred dollars (500 dols.) each, provided that no prize shall be awarded for a design which, in the opinion of the Jury of Award, cannot be executed for a sum not exceeding thirty thousand dollars (30,000 dols.). More than one prize shall not be awarded to any one competitor. The decision of the Jury of Award regarding these prizes shall be final. Five hundred dollars (500 dols.) shall be paid out of the fund of the General Committee, McKinley Memorial, to the author of each selected design immediately upon receipt of the report of the Jury of Award.

2. Selecting from the authors of these five designs the one to be recommended to the General Committee for the commission for the entire work, provided the said Jury of Award decides that any one of these designs is deemed worthy of such recommendation."

In an interesting letter to the *Times* Mr. Killingworth Hedges points out the danger arising to many of our public buildings owing to their insufficient protection from lightning. The British Museum, for example, is only protected from lightning by means of a few isolated conductors, and when it was struck a few years ago the lightning ignored these altogether and preferred to travel by a rain-water pipe to earth, luckily doing no damage. Mr. Hedges emphasises the danger arising from the presence of the electric-lighting mains at the Museum, which form an easy path to earth for any lightning stroke, and make the fire risk a very real one. He instances the Victoria and Albert Museum, South Kensington, the National Gallery, and the Tate Gallery as cases where the lightning conductors are insufficient to afford the protection demanded by the national importance of the buildings. The apathy shown by public bodies, and even by experts, with regard to the protection of public buildings in this country is extraordinary, seeing the great attention paid to

this matter abroad. The Cavendish Laboratory, Cambridge, which one would have expected to be efficiently protected, seeing that on its staff are several electricians of world-wide reputation, was recently struck by lightning and narrowly escaped being burned down. The lightning side-flashed on its way to earth from a copper conductor to a gas-pipe, and it was only the happy chance of the gas being turned off at the metre that prevented a fire. We agree with Mr. Hedges in thinking that the Office of Works might do a little more to protect our public buildings. Considerable advances have been made in our methods of protection from lightning, and systems which might have escaped criticism twenty years ago would now be condemned by experts as insufficient. As the cost of the upkeep of a good modern system of lightning conductors for a public building need only be 1 per cent. of the sum spent annually in structural repairs, it will be seen that the policy of the Office of Works is a very short-sighted one.

PERHAPS the infrequency of disastrous fires caused by lightning stroke may account for the apathy displayed by the Office of Works and the general public with regard to the question of protection against lightning. Even when conductors are adopted, it not infrequently happens that they are inadequate for the intended purpose, and so are responsible for a false feeling of security. This appears to have been the case at Swanscombe, where the ancient parish church was recently the scene of a devastating fire. This ancient and interesting building was certainly fitted with a lightning conductor, and it was recently stated by the rector that this supposed safeguard was examined a few days before the disaster, and that it appeared to be free from any defect. As a matter of fact, the lightning stroke was diverted into the building, and in a few minutes the whole structure was blazing furiously. We now learn that the conductor at Swanscombe Church was merely an old iron pipe passing into the foundations of the tower, without any earth-plate. Since its erection some thirty years ago this so-called protection had never been tested, and the examination mentioned by the rector appears to have been nothing more searching than a passing glance bestowed by churchwardens who were concerned with a damaged rain-water pipe. The iron pipe passing for a lightning conductor was broken through 1 ft. above the ground, so that a gap of 1 in. existed between the two parts. Under the circumstances the resistance would be very great, and the diversion of current to ironwork in the tower is not at all a matter for surprise.

The Baker-street and Waterloo Tube.

SATISFACTORY progress has been made since the commencement of operations upon the new subway that is to connect Waterloo Station and Baker-street. At the present time only about one and a half miles of single tunnel remain to be constructed, so that three-fourths of the subway between the points named are now finished. Lift shafts are already completed at Waterloo, Piccadilly-circus, and Baker-street, and a similar shaft at Oxford-circus is now started. Staircase shafts at Waterloo and Oxford-circus are sunk, and the booking-hall at

Waterloo is covered in, ready for internal fittings. Land for all the station sites is in the possession of the company, with the sole exception of that in Trafalgar-square and as financial difficulties are now removed there is reason for hoping that the works will be pushed to a speedy conclusion. Current for operating the line is to be furnished by the Metropolitan District Electrical Traction Company, at a price to be agreed upon or settled by arbitration. The new line will be of the greatest value to the numerous passengers who are now compelled to find their way from Waterloo to the Western district by circuitous routes in slowly-moving vehicles.

WORK upon the new dry dock at Chatham is temporarily stopped by the failure which occurred a few days ago. The first indication of something being wrong was afforded by the presence of water, which rapidly increased in depth. As the dam constructed by the contractors appeared to be perfectly sound, bags filled with clay were placed against the wall of the adjoining repairing basin so as to form a barrier against the steady inflow. In spite of this, water continued to rise, and the conclusion was arrived at by the officials that a "blow" had taken place beneath the wall of the repairing basin. Subsequent examination by divers proved the accuracy of the assumption, and it was discovered that the foundation had become honeycombed, so that it was unable to resist the pressure of water held up. Fortunately, the tide happened to be rising at the time, otherwise leakage into the dock would have resulted in the partial emptying of the basin, and serious risk to several warships lying there. As it was, the damage was sufficiently alarming, for the adjacent roadway subsided for a distance of about 50 ft., a trolley railway was carried away, and some water mains were burst. The new dock was flooded to a depth of 30 ft., causing the submersion of locomotives, cranes, and other plant; the dock railway was lifted, and the rails, attached to sleepers, floated on the surface. Energetic measures were at once taken to cope with the difficulty and to prevent further damage, but the work of construction cannot be resumed for some weeks. The incident is a striking illustration of the sleepless energy stored up in water, which is always ready to take advantage of any opening for mischief. Sometimes it finds a chance of pouring in and swamping the work of months (as in the present case), and at others it finds a way of escape from some stratum of the subsoil and so endangers the stability of buildings that have stood in safety for centuries. No engineering or architectural works require more watchful care than those in connexion with which the latent potentiality of water may be aroused.

FOR the support of the massive roadway of the New East River Bridge, New York, four remarkable cables have recently been completed and hung in position. Each cable is 18 in. in diameter, nearly 3,000 ft. long from anchorage to anchorage, and the combined weight of the four cables is not less than 5,000 tons. The actual dead load to be carried is 8,000 tons, and the live load is estimated at 4,500 tons. Each of the cables

consists of 10,397 steel wires and has a breaking strength of 25,000 tons. According to the specification, a resistance of 30,000 lbs. per square inch was demanded, and it is satisfactory to note that upon being tested the cables were shown to have an average breaking strength of 225,000 lbs. per square inch. An excellent system of protection against weather seems to have been adopted, for the wire was thoroughly coated at the mills with a thick mixture of graphite and oil, and the completed cables were to be covered with protecting shields, consisting of half-round sheets of steel, one to be placed above and the other below the cable, while in the annular space so formed a mixture of graphite and oil will be poured hot. These are the largest suspension cables hitherto made, and the tensile strength of the material is probably higher than any previously employed in bridge building.

IN his recent report to the Town Council of Dumfries, Professor Capper considers at some length the comparative advantages of producer gas and steam for the development of motive power in connexion with electric generating plant of moderate size. As our readers are aware, the introduction of the Mond gas producer makes it possible for coal to be gasified at comparatively low temperature, and the sale of ammonia occurring as a by-product effects a large reduction of the cost. Professor Capper is therefore clearly justified in stating, when discussing the application of gas-engines, that "the Mond process stands out conspicuously as one which is likely to overbalance, under suitable conditions, the universally admitted practical difficulties in applying such engines to rapidly and widely fluctuating loads." Unfortunately, when the plant is of less capacity than 1,000 horse-power, it is not economically practicable to attempt recovery of the ammonia, and when of smaller size than about 500 horse-power, there is a difficulty in obtaining gas of uniform quality with widely varying loads. Moreover, the liability of a gas-engine to stop if a load exceeding the normal load be suddenly thrown upon it, is a distinct disadvantage, and, as the report says, the characteristic involves the employment of much larger engines than are required for normal average working. This adds unnecessarily to capital and working expenditure, resulting also in low efficiency with accompanying irregularity of speed. The conclusion arrived at is that the undoubted thermal efficiency of the gas-engine can only be effectively taken advantage of in the case of large plants working on a load not liable to great fluctuation. The further objection to gas-engines, in the case mentioned, is found in the comparatively low speed attained when such motors are of moderate size, thereby necessitating the use of unnecessarily large and costly generators, or of more or less complicated gearing. Professor Capper expresses the opinion that there is no probability of gas plant being introduced within a reasonable time likely to meet the present requirements of Dumfries, and which for practical working will equal or in economy so surpass a steam plant as to warrant its experimental use. Of course, the report does not apply to the many cases where small gas-engines are found to be extremely suitable, but for power stations of

moderate capacity, it must be taken that a steam plant is more reliable and economical in every way.

Little Wild-street Chapel, St. Giles-in-the-Fields. OFFICIAL notice is given by the London County Council of their intention to take the burial-ground attached to the present mission chapel on the south side of Little Wild-street, near Lincoln's Inn-fields, for purposes of their new street from High Holborn to the Strand. The removal of human remains to the cemetery of the Necropolis Cemetery Co. at Woking will be effected in the course of October next. The chapel itself, which will shortly give way to the local improvements, is closed, and the services will be held in the Olympic Theatre pending the erection of a new chapel, for which a subsidy of some 7,000*l.* has been granted, together with a site in the triangle to be laid out in the adjacent Wild-street. The chapel, originally established more than two hundred years ago, can boast of a very interesting history. Of late years it has been closely associated with the labours of Sir Robert Anderson and Mr. William Wheatley in the reclamation of criminals, and since 1873 has formed the head-quarters of the St. Giles's Christian Mission to Discharged Prisoners, founded and conducted by Mr. George Hutton. The present building, erected soon after George III.'s accession to the throne, possesses a striking interior, and is well worthy of a visit. In the course of some alterations made in 1874, the vaults beneath containing, it is said, 500 coffins, were bricked up and cemented over on either side of the middle passage. In former days, and when the local surroundings bore a very different aspect, people of means and quality mainly constituted the congregation. The earlier pastors included Dr. Joseph Stennett, Dr. Andrew Gifford, the learned numismatist and librarian of the British Museum, whose collection of coins was purchased by George II., and Dr. Samuel Stennett, who there preached the funeral sermon of John Howard, the prison reformer, a member of the congregation. Gifford left the chapel in 1735, and, together with those who followed him, founded the chapel in Eagle-street, afterwards Kingsgate-street chapel, which also was lately demolished for the improvements on the east side of Southampton-row. Mr. Arthur Keen's designs for the rebuilding of that chapel were recently published in our columns. Adjoining the chapel in Little Wild-street, on its west side, is a curious block of old houses, built of red brick, and having a tiled roof and wooden front-railings, which should not be passed unnoticed.

THE autumn term of this school (situate in Renfrew-street), the head-master of which is Mr. Francis H. Newbery, is from September 8 to October 25. The school has been recognised by the Scotch Education Department as the central institution in the district for higher education in art; and judging from the prospectus before us it is carrying on an excellent work. The architectural tuition of the school aims at (1) the preparation of students for an architectural career; (2) supplementing the office training of the pupil and assistant; (3) imparting

an appreciation and knowledge of architectural form to painters, sculptors, and workers in the decorative arts. Exclusive of preparatory studies, the course extends over four years. The instruction given meets the requirements of the examinations for the membership of the Royal Institute of British Architects; but in addition to the subjects included in that scheme, the School course provides also for the study of Nature and from life. Architect students learn the elements of construction, the nature of materials and the mechanics of architecture, draw from the cast, study the historical development of architecture in Europe, acquire a knowledge of the principles and growth of ornament, measure and sketch buildings and receive instruction in architectural design. Concurrently with this, they study drawing and modelling from the antique and life, and attend the lectures on ornamental design, anatomy and proportion, and figure composition. The Director of this section is Mr. Alex. McGibbon, A.R.I.B.A., assisted by Mr. W. R. Watson, and others. Fourteen special lectures will be given this session, commencing with the winter term. They will be delivered fortnightly. Six on Byzantine architecture, by Mr. McGibbon, four on sculpture, and four on subjects to be afterwards announced. The lectures are open to the public. An exhibition of the work of the students of the School will be held in the Royal Glasgow Institute of the Fine Arts, from November 4 to 17, 1902.

Failure of a Cast-iron Bridge. PART of the cast-iron bridge across the Severn at Ironbridge, Shropshire, was disabled this

week, owing to the sudden breaking of the girders. The structure possesses some interest, as it was the first iron bridge of large dimensions to be built in this country, being cast and erected in the years 1777-9 by the Coalbrookdale Company, whose works are in the immediate vicinity. The span of the arch is 100 ft., the width, exclusive of parapets, 26 ft., and the height from base line to centre 40 ft., while the weight of iron in the bridge is about 380 tons. No details are at present available as to the cause of fracture, but it is not improbable that "fatigue" due to long-continued vibration may have some connexion with the collapse. Among other powers conferred on the trustees by the Act authorising the construction of the bridge is included the right to levy toll on all vehicles, including mail coaches, and on all persons, including his Majesty's forces and all members of the Royal Family.

THE CAMBRIAN ARCHÆOLOGICAL ASSOCIATION.

THE town of Brecon, the administrative, ecclesiastical, and commercial capital of the county of the same name, was the rendezvous of the members of this Association for its annual excursions and meetings during the week ending the 23rd instant. Lord Glanusk, the Lord Lieutenant of the County, accompanied the members in all their journeyings, and presided at the evening meetings.

The history of Brecknockshire has, like the history of every other portion of our island, been largely determined by its physical characteristics. It is essentially a district of hills and valleys, the hills at their best rising to heights and extending to chains that must have given pause to every succeeding invader from the west; the valleys filled with innumerable streams which, in earlier days, must have rendered the progress of such invaders painful, dangerous, and slow. Yet the county is one

of such exquisite beauty that, apart from the love of adventure, greed and combat—the three ruling motives of the Middle Ages—it must always have exercised a fascination over those whom the westward course of their fortunes brought to its confines. Its administrative organisation—that is, its formation into a county—is almost the last chapter in its history. The “county” of Brecon rose almost at the same moment as its monastic establishments fell. Previously it had been in that somewhat vague and indeterminate area called the Marches of Wales. Still earlier it had been the district of Brycheiniog, the patria of Brychan, though it must not be inferred that the modern county was coterminous with Brycheiniog, or with the still earlier Garthmadryn. Tradition has it that the latter name, for which there is no authority of early script or stone, existed during the period of paganism. With the advent of Brychan at the close of the fifth or commencement of the sixth century, whose cross and whose father’s grave are the glories of Llanspyddid church (two miles south-west of Brecon) the entire region became Christianised, and took on a new name—Brycheiniog, the district of Brychan. Brychan, through the medium of a half a hundred sons and daughters, almost all of whom became saints, and are known to the Triads as the first of the “Three Holy Families of Britain,” had a good deal to do with the evangelisation of other parts of Wales. The scientific method has already damaged much of the story of Brychan and his children, but as it appears almost full-blown in one of the earliest and most valuable of Welsh manuscripts (British Museum—Cottonian, Vespasian, A. XIV.; see “A Catalogue of the Manuscripts relating to Wales in the British Museum,” by Mr. Edward Owen), there are difficulties in the way of relegating it to the category of monkish fables. The witness of Giraldus Cambrensis, who lived for some years within a mile of the town of Brecon, should also not be forgotten. He says:—“Erat autem antiquitus regionis illius, quæ Brecheniaca dicitur, dominator vir potens et nobilis, cui nomen Brechanus [cf. Brachanus] a quo et terra Brecheniaca denominata. De quo mihi notabile videtur, quod ipsum viginti quatuor habuisse filias historie Britannicæ testantur, omnes a pueritia divinis deditas obsequiis, et in sanctis assumptis propositis vitam feliciter terminasse. Extant autem basilicæ adhuc per Kambrian multe, earum nominibus illustratæ.” Brecknockshire, of course, believes implicitly in Brychan, and accepts with almost equal credulity the most exaggerated number of his family; but the English visitor, while he may be wise in adopting the popular view as the readiest explanation of peculiarities of dedication and organisation, should be reminded that many of Brychan’s children are now relegated by competent scholars (Mr. Egerton Phillimore and the Rev. John Fisher) to the ancient Cymric district of Strathclyde. By whichever name, that of Garthmadryn or Brecheiniog, the Welsh may have known the district, it formed during the Roman period part of the country of the Silures (whence the later Welsh Esgyllwg). The mention of this brave people gives rise to all manner of ethnological conjectures based upon the description of them by Tacitus, with which we have no immediate concern here, though English visitors to Brecknockshire should always have them in mind if they wish to understand all that they see. Suffice it to say, however, that between the disappearance of the Roman and the arrival of the Norman, the history of the district is a blank. Thence it is all plain sailing. In its eastern division a congeries of manorial properties, largely dominated by two or three great baronial families, the de Bohuns and the Mortimers; in its western, Welsh lords and Welsh customs still continuing a vain struggle against the ever-aggressive English men and manners. These distinctions, if not obliterated, were reduced by the policy of the Tudors and the formation of the modern county, but a discerning eye will note how the peculiar features of church and castle still bear traces of the enduring influences of race. Perhaps in no county of Wales are Welsh and English upon better terms. The points of difference between the Celtic and the Teutonic character have not been accentuated here; it is the contrary that has happily happened. Brecon, nevertheless, remains a border district, and for that reason it will long retain features which make

it a veritable paradise to the antiquary. This introductory sketch has assumed serious dimensions, but some such foreword is absolutely necessary to an account of the Brecon meeting of Cambrian archaeologists.

The excursions commenced on Tuesday, the 19th inst. An unusually large party assembled at the open space in the centre of the town, which is known by the unexplained term of “the Bulwark,” and were conveyed in brakes (brought all the way from Merthyr Tydvil in the adjoining county of Glamorgan) first to Llanspyddid Church, two miles to the south-west of Brecon. This church was annexed to the monastery of Great Malvern by Milo FitzWalter, son-in-law of Bernard Newmarch, the Norman conqueror of Brecon, probably in the year 1123. From this cause, and from false etymology, it has been thought that it was a hospitium connected with the priory, and that the real name of the parish is Llanspytly. Architecturally the church possesses little of interest; it has a nave and chancel without structural division. There is an interesting oak sounding-board, the under portion being divided into six compartments, and the surrounding framework filled with delicate carving. The church is dedicated to S. Cadoc, one of the Brychan family of saints, and in the churchyard is an incised stone, popularly called the Cross of Brychan. It stands about 2 ft. high, and bears upon one of its faces two crosses, the upper one probably earlier, though not much earlier, than the lower. There is no inscription. The stone has been illustrated in *Archæologia Cambrensis* for July, 1861, but in the drawing the crosses have been joined improperly by the extension of the vertical arm of the upper to that of the lower cross. Both crosses are cut within circles, and both are equal-armed. The upper has a small external circle at each corner. Breconshire churchyards are noted for their yew trees, but Llanspyddid is especially remarkable for their number and for the magnificent size and beauty of their growth. The next stoppage was at Aberbrân, an ancient mansion of the great Brecknockshire family of Games, an Anglicised distortion of the Welsh Gam, signifying crooked or deformed. The house is interesting, and, with Newton, in the outskirts of Brecon—also a residence of the Games—would no doubt well repay attention, but as much of both is still occupied as farm dwellings, they cannot be properly examined by a large party in the time at command. Trallwng, usually spelt Trallong, has a church of the fifteenth century, which was restored about fifty years ago by Mr. Buckenridge, of Oxford. It is a plain, single-chambered structure without aisles; the windows on the north and south sides are double, with trefoiled heads; the easternmost window on the north side is of peculiar form and probably follows the original design. During the restoration an inscribed stone was found built into one of the windows; it is now fixed at the western end of the church, close to the north door. The discovery proved to be valuable, inasmuch as the stone bears inscriptions in two languages, one the peculiar notched characters termed Ogam, the other Latin, the letters being what is termed minuscules. Both inscriptions transliterate each other (so far as the name of the individual commemorated is concerned), reading, in Latin, “Cunocenni filius Cunoceni hic iacet”; in Ogam, “Cunacenni filiuffeto.” The party next proceeded to the site of the Roman camp of Bannium, known as the Gaer (locally pronounced Gare), at the junction of the rivers Usk and Yscir. Numerous articles have been discovered, which abundantly prove the Roman origin and occupation of this camp, a collection of which the visitors saw at a mansion called Ffrwdgrech, on a subsequent day. Amongst them was a tile marked Leg. II. Aug.; this, and a broken memorial tablet (now at another residence called Penoyr) with sufficient of the inscription remaining to show that it had been set up to a soldier of the same legion, prove the station to have been one of the second, the Augustan, legion, which had its headquarters at Caerleon-on-Usk. A chain of these fortresses, garrisoned by the auxiliaries of the legion, joined hands with those of the twentieth legion, which was stationed at another Caerllion—that upon the Dee, now Chester. The camp at Bannium measures 208 by 142 yards. The bases of the south and west portals are still *in situ*, buried beneath an immense hedge, but a little excavation revealed their true character. A clearly

defined road, having every appearance of being of the Roman period, runs up to the camp. By the side of another road, now degenerated into a rough and rather dirty trackway and not more than 200 yards from the camp, stands a stone on which can be faintly traced the figures of two persons, male and female. Tradition associates the spot and memorial slab with a vulgar murder, and has christened the stone the Virgins’ stone; but it is without doubt a monument to a Roman soldier and his wife. It is figured in Gough’s “Camden,” and there could then be deciphered the words “CONIVNX EIUS.” The stone should be removed before all traces of the figuring disappear, and another stone bearing an inscription recording the circumstances should take its place. Carefully conducted excavations at this spot could not fail to be rewarded with rich results.

After luncheon, provided by Mr. R. D. Cleasby, of Penoyr, some of the party walked back to Brecon over a hill called Y Crug, at the summit of which is an unusually well-preserved British camp. The earthen wall surrounding the hill, and the other defensive walls and ditches, can be clearly traced. The main body drove to the church of Llandeivaelog fach. The church has been thoroughly restored and modernised. The churchyard contains one of the most interesting of the early Welsh slabs, now built into the wall of a small building on the south side of the church. It has been twice illustrated in *Archæologia Cambrensis*, the vols. for 1858 and 1872. The inscription reads “Briamail Flou,” in letters of early date, preceded by a small cross. Mr. Phillimore observes that an earlier form of the name is “Brigomaglos,” discovered quite recently at Chesterholm on the Roman wall (“Y Cymrnador,” xi., 84).

The party reunited at the Benedictine priory church of St. John in the outskirts of Brecon. This splendid edifice, now restored and well ordered, has been the subject of the late Mr. Freeman’s enthusiastic comments in one of his ablest architectural articles contributed to *Archæologia Cambrensis* for July, 1854. The present church may have been preceded by another and probably more modest structure for soon after the year 1100 a charter was granted by Bernard Newmarch, then safely established at the adjoining castle, conveying *ecclesiam novam apud castrum novum quod est situm in Wals in Brecheniaca quam ego dedici et feci in honorem Sancti Johannis Evangeliste* to Battle Abbey, in Sussex. The existing church, however, cannot date before about 1230. By that year the lordship of Brecon had passed into the hands of the Breos family, and it is probable that the William de Breos who was hanged by Llewelyn ap Iorwerth, Prince of Wales, rebuilt the church of de Newmarch in grander style. The second church in Wales, in point of magnitude, in this respect falling short of St. David’s alone, its exterior strikes the beholder by its massiveness and simplicity of detail, whilst its interior astonishes as much by its perfect proportions as by the beauty of its details. An adequate account of such an edifice is impossible in the space at command; many of the readers of the *Builder* are no doubt well acquainted with it, either from personal visit or from the many accounts of it that exist. The description of the church was undertaken by Miss Philip Morgan, of Brecon, and it is safe to say that never has a large party had a more accomplished cicerone. The original plan provided for two eastern chapels on each side with openings out of the transepts; those on the north side were built, but afterwards altered into one large chapel. Of the two on the south side the exterior was pulled down most probably when much of the conventual buildings were destroyed; the other remains. It is known as “capel y cochiaid,” that is, the red-haired men’s chapel, and it is usually stated that this term is intended to designate the Normans. But such an appellation would have been out of date in 1230, nor is it likely that the builders, whose ancestors were really Normans, would have called one of their chapels by such a name. It is much more probable that such Welsh influence revived, as it certainly did in the neighbourhood of Brecon, this chapel was appropriated by a Welsh family who bore the name of Goch, and was thence called Capel y Gochiaid, the Gough Chapel. Mr. Freeman considered the font to be Late Norman, and it is regularly pointed to as proof of the existence of an earlier edifice; it certainly has all

the look of a Norman font. The bowl has been greatly damaged, but it is still possible to make out the scheme of ornamentation. A double string or fillet moulding, having small dots upon the moulding, runs round the upper part of the bowl in a broad twisted pattern. Below, it is divided into four compartments, within one of which can be clearly discerned an eagle with half-opened wings, symbolic of St. John the Evangelist, to whom the church is dedicated. The design in another compartment is too obliterated to admit of recognition, while the third and fourth are altogether gone. These panels are enclosed within curved double lines ornamented with dots like the moulding above, and terminating on the upper sides in zigzags, which seem to form the headress to a grotesque face that occupies the spaces between the allegorical figures. The lower curves are continued in two straight lines bearing between them the dot ornament, and having a broader line above, this portion of the design being made to represent the mouth of the grotesque, the human character of which is made plain by two depressions forming the eyes, and two vertical lines which stand for the nose. There can be little doubt that the figures within the four compartments were different, and probably represented the prophetic vision of the first chapter of Ezekiel. The coincidence of the eagle being symbolic of St. John as well as one of the figures seen by the prophet in his vision would, doubtless, be the reason for the adoption of the particular design. Below the bowl, and around the upper part of the stem, is a beautiful arcading, the arches being round and passing over to the alternate pillar, thus forming a three-centred pointed arcade. The capitals of the arcading are plain, and in shape are flat. A rounded moulding runs beneath. The lower part of the stem is plain. The base is distinctly Norman. The architectural history of this fine church is pretty clear, and has been well worked out, but its documentary history has been too much neglected. When taken up in earnest, it will probably be found to throw light upon, and to furnish dates for, several puzzles that still await elucidation. On Wednesday, the 20th, the first half of the church of Giraldu, the Church of St. David's.* This is certainly the most interesting parish church seen during the meeting. Its plan is cruciform, and in this respect it rivals the great Church of St. John's, of which we have just spoken. But it is so tiny that the entire structure would almost go into the northern chapel of the Brecon church. Giraldu nowhere mentions a taste for architecture as amongst his numerous virtues, otherwise we might well believe that this miniature cathedral, so unlike every other parochial church in the diocese, was the work of the strenuous and always original Archdeacon. The chancel is Early English in style, and would well fit in with the incumbency of Giraldu, who died, probably in this parish, about the year 1223. The remainder of the church is extremely rude and of the work poor. The east wall of the south transept is out of line. During recent restorations a small pillar piscina was found doing duty as a sort of finial to the eastern gable, and an inscribed stone had been built into one of the walls. There are also fragments of what appear to have been the lintel of a doorway. They long acted as quoins in the eastern gable, and when removed were pronounced by the late Professor Westwood to be parts of a cross. The lintel to a now closed door on the northern side of the nave at Llanvillo Church, which almost certainly occupies its original position, bears precisely the same ornamentation, and explains the purpose of the Llanddew fragments. The pattern is a sort of Norman zigzag, and, together with the rude and massive font—the date of which is altogether conjectural—may represent a tiny Norman structure that Giraldu did not consider commensurate with his dignity or importance. The church stands at the angle of

* An interesting difference of opinion arose respecting the dedication of the church, the Vicar, the Rev. J. Lane Davies, contending for Llanddew, the Church of St. David's. Giraldu gives the spelling "Llandi," and explains the word as meaning "Ecclesia Dei," that is, in modern guise, Llan Ddu, the Church of God. Mr. Lane Davies denies any Welsh dedication, and says the first person in the Trinity. On the other hand, Mr. Edward Owen quoted an extract from the "Survey of the Bishopric of St. David's," made in 1346, where the church is called Llanddew, and referred to other facts which corroborate the form and meaning given by Giraldu.

two roads, and on the opposite side of the road to the west, in the present vicarage grounds, are the ruins of one of the palaces of the Bishop of St. David's, who, in the heyday of mediæval prosperity, possessed no less than seven. A finely proportioned Gothic gateway is said by those intimately acquainted with the noble architectural works of Bishop Henry Gower (1328-1347) at St. David's and Lamphey to bear the quite unmistakable mark of his genius. At some distance off are the remains of what has been supposed to be the private chapel of the palace, but is much more likely to have been the hall; it seems to have had three windows, now too ruined to permit even a guess as to their character. Buck shows the south wall of this building as still standing in the middle of the eighteenth century, but not a trace of it exists at present. The western wall followed the course of the modern road, and built into it, with a fine canopied archway above, is the village well. A little further along the road, at what was the north-western corner of the palace, is a three-quarter round tower, from which, along its northern side, ran the external wall of the chamber already referred to as the hall. So entirely absent are any details which would admit of the dating of the building that it is impossible to assert it to be coeval with the church, or to bring it within the incumbency of Giraldu; certainly the gateway spoken of is a century beyond his time, but the entrance to the palace, as well as the palace itself, may well have been beautified and improved by one of Bishop Gower's tastes and magnificence. The next church visited was the small, retired, and unrestored church of Llanvillo. As most of the churches around Brecon have undergone a more or less—generally more than less—drastic renewal, that of Llanvillo, though possessing, on its own merits, few claims to a visit, is of interest to the ecclesiastical antiquary. It has a rood loft still *in situ*. The loft itself is very deep from front to back, the gradual downward curve from the western front to the top of the screen being clumsily continued upward into the chancel beyond. The front has square panels below a cornice of well-executed vine leaves, and the same device appears on the top rail of the screen. The tracery in the screen has been almost entirely destroyed, with the exception of one panel on each side the centre opening. The whole is Late Decorated. The doorway leading to the loft is at an unusual distance, being not far from the centre of the north side of the nave. The present nave has been shortened for the purpose of transforming the western end into a school, a common procedure in Brecknockshire, where the provision of secular education seems to have lagged behind the thirst for knowledge. The chancel is ceiled, and the church is filled with big square pews. These monstrosities are not to be defended, but we find it in our heart to wish that the church may long resist a modern restoration. Mention has already been made of a closed doorway in the north wall, which is capped by a stone bearing a chevron kind of ornament. Llanvillo is dedicated to St. Milburga, and has its wake on March 1. Can this be an instance where St. David has had to give way to a saint more in favour with the English intruders, but where the ferial day of the disestablished Welshman had become too deeply fixed by custom to admit of change?

At Brynllys (or Bronllys, as it is sometimes spelt) the antiquaries saw the first mediæval military structure in the week's programme. It has been well described by Mr. Clark, and as the rain fell suddenly, Mr. Clark's account was taken upon trust. The only part of the castle visible to the eye is a graceful cylindrical tower, rising to a height of about 60 ft. The interior has been completely gutted. There was no entrance on the ground level, ingress being obtained by means of a ladder to a doorway in the first floor. It is clearly of the early part of the thirteenth century. It stands upon an artificial mound, around which was a moat, now hardly traceable, and had the usual outer defences of earth, or earth and stone, which Mr. Clark ascribed to the Saxons. Bronllys Church, nearly a mile distant, has been much restored; it has the remains of a screen (now moved to the western end of the building) which has lost its carving, except in the spandrels; these and the shaftings proclaim

* St. Milburga, who was Abbess of Wenlock, was commemorated on February 23, according to Mr. Baring-Gould.

to have been Late Perpendicular. Close to the eastern end of the church is a detached tower of the regular Brecknockshire type; it may spare subsequent conjecture and trouble to observe that it is the erection of a nineteenth-century humorist. At Gwernyfed, a magnificent modern residence belonging to Colonel Thomas Wood, the party sat down to luncheon. The old residence of the Woods, who by marriage have inherited the estates of the great Brecknockshire family of the Williamses of Gwernyfed, remains deserted and forlorn about a mile distant. It is the finest specimen of domestic architecture seen during the week. Though not equal to some of the best surviving black-and-white houses of Montgomeryshire, it is none the less a good example of Late Elizabethan work, and deserves a better fate than to be allowed to fall into ruin. The unfortunate Charles I. was a fugitive here in 1645, after one of his unsuccessful fights. After luncheon the party proceeded to Talgarth, the head of a mesne-manor to the lordship of Brecon. The size and importance of the church of a district that must always have been sparsely inhabited, which would otherwise be a puzzle, is thus explained. It consists of nave and chancel, with south aisle extending the length of both, and a transeptal chapel on the north. The arcade consists of five bays; the piers are rude. The tower opens internally into the nave by a good Decorated arch, above which is a single light of considerable size. The original opening into the transept was closed up, probably about the middle or the end of the eighteenth century, and the room thus obtained transformed into a school; entrance to it from the church for the master, who may also have been the vicar, was obtained by opening out a passage from the chancel, thus cutting off the angle where the eastern wall of the transept abutted upon the nave wall. The south porch is Perpendicular, the exterior doorway having a continuous arch, and the interior door being of a little earlier date. The tower is of two stages, crowned by a bold and effective battlement; the belfry stage has apertures of two lights on each of its sides, and the string course of both stages is carried over the windows. The church has been well restored. The top bar of the rood screen has been preserved; the carving of vine leaves and fruit is exceedingly fine. The registers date from the year 1600, and the six bells from 1724. In this parish resided Howel Harris, the father of Welsh Calvinism; a long epitaph on the south wall of the church commemorates his virtues, and a new chapel in the village perpetuates the sect he founded. The tithes of the manor of Talgarth were granted to the Abbey of St. Peter's, Gloucester, by Bernard Newmarch. It is a circumstance worthy of the attention of the local historian that a number of the place—and personal—names given in the charter are Saxon, which would appear to point to the extension of Mercian influence further westward than has been generally suspected. The church of Llangors has many resemblances to that of Talgarth, which has just been described, especially in the tower and its junction with the nave. It is, however, not so well lighted as Talgarth Church, there being only two windows, each with double lights, on either side. On the south side the lights have cinquefoiled heads, but on the north one of the windows is trefoiled. The chancel is dark, though it is lighted from both sides; the northern window is new; that on the south has a very deep splay. The south aisle extends eastwards as far as one bay of the chancel, the opening being now filled up by the organ. The dedication is to Saint Paulinus. A recently discovered stone bearing the conjectural inscription, "Hic iacet Sillero (? Sillerd) filius Vmlmer (for Vulmer)" proved a difficult nut to crack.

One of the most striking natural features of the county of Brecon is the lake of Llangors, known also as Llyn Savadann. It is the scene of the striking incident related by Giraldu, when the birds of the lake flocked around Prince Rhys ap Gruffudd in token of his rightful claim to the chieftainship of South Wales. In 1869 what was called a crannog was discovered on a small island within its area, and, upon excavation, the site yielded animal bones in great number. The oaken piles found in the water are said to have been pointed as though by a metal adze, but as no other traces of the presence of man were met with, it is difficult to be

quite sure that the structure was prehistoric. The examination of a crannog is difficult and dirty work; and, as a rule, it can only be accomplished when the surrounding water is very low. It cannot be truthfully asserted that the visitors were very anxious to recommence excavations; besides, the season has not been a particularly dry one. The great kindness of a lady had provided tea on the banks of the lake at a point somewhat removed from the site. Archaeologists are human; on this occasion they were also thirsty. They chose the primrose path of dalliance, leaving the crannog for a drier and more convenient season.

Thursday, the 21st inst., saw the party at Llanhamlech Church. Though on the old site, the present edifice is an absolutely new church, the former having become so decayed as to admit of no repair. An inscribed stone bearing the words "[Crux] Johannis Moridic surexit hinc lapidem," which formed the lintel to the old rectory, has been removed to the churchyard. Between Llanhamlech and Llansantffraid the carriages ran along the course of the Roman road called the Via Julia Montana, passing near the village of Scethrog an upright stone propped up in the right-hand hedgerow, which formerly did duty as a garden roller. It reads "[Nemni] filius Victorini." Llansantffraid (or more correctly Llansantffraid, the church of St. Bride or Brigid) church has been rebuilt from its foundations by the late Mr. S. W. Williams, F.R.I.B.A., at the cost of a neighbouring landowner. The church is celebrated as the burial place of Henry Vaughan, the religious poet of the Commonwealth period. Near the mouth of the valley called Cwm Du, is an indistinct camp said to be Roman, and as it is on the direct road between the clearly established stations at Abergavenny and Brecon, it has claims upon the attention of the antiquary. Llanfihangel Cwm Du, the church of St. Michael of the dark vale, is an interesting edifice. Internally it consists of one large and nearly square chamber, unbroken by arch or pillar, and with a flat plaster ceiling. It thus presents no very distinct appearance to a Welsh Nonconformist country chapel. Built into the north wall is a Decorated arcading, and at the east end is a shallow chancel. It is evident that the church originally consisted of nave, chancel, and north and south aisles. At some probably not very distant period the nave arcading was removed; the arches and piers on the south side disappeared entirely; those of the north side were placed in the northern wall, which must have been practically rebuilt. The arcading was of great height and breadth, and therefore permitted the retention or restoration between the arches of the Perpendicular windows which had occupied the north side. These windows are of three lights and remarkable for their length. In the south wall is a large Perpendicular window of five lights, with the appearance of having had its tracery cut off at the transom; and nearer the west end is another window of three lights corresponding to those on the north side. The window of the original north aisle at its eastern end is earlier than its southern fellow. The shallow chancel is divided from the nave by an immensely wide obtuse Decorated arch of perfectly plain type. It is partially panelled with the ancient rood screen, which must have been of considerable artistic merit. The tower is of the ordinary Brecknockshire type, and, as usual, occupies the western end of the nave. An early inscribed stone commemorating one Catacus, the son of Tegernacus, supposed to have been St. Catwg, is built into a buttress on the south side of the church.

The next halt was at Tretoer Castle, where is a circular keep, similar to but slightly larger than that at Bronllys. It is of the middle of the thirteenth century, and is built around an earlier, nearly square, tower, which in its turn was constructed upon a large artificial earthen mound. Mr. Clark considered it "a rare, probably a solitary, example of a rectangular Norman keep, which has been gutted and its central part occupied by an Early English round tower." The change of dwelling is probably to be explained by a change of ownership; it is otherwise difficult to account for the abandonment of a more commodious abode for one that must have been less so. At a later period, that is some time in the fifteenth century, the military tower was deserted for a house which was erected within a few yards of it. Mr. J. H. Parker considered the latter to date from the fourteenth century, but th

seems to be a trifle too early. It was standing in all its glory when Leland passed this way, as he terms it "a fair place belonging to Henry Vehan, Esquire." The party were next entertained at luncheon at Glanusk Park, by the President. Under a tree close to the house is a monolith, brought from the hill above Crickhowel, which bears inscriptions in Ogam and Latin. On the return journey Llanthethy Church was visited for the purpose of examining an incised stone bearing a rude cross and the words "Gurdon Sacerdos" in very early minuscules. The church has been restored, and in the process has lost all features of antiquarian interest. The next stoppage was at Pencelli, or Penkelly, Castle, now represented by a few heaps of rubbish. The castle which was the head of the lordship of Penkelly, occupied a strong position on the southern bank of the Usk, which here falls abruptly. Buck's view shows two towers and part of the south wall as standing in his time, but these have now entirely disappeared in favour of a row of farm buildings. A house with a few Tudor features occupies part of the base-court. It is stated that portions of the tower chapel have been discovered in the south aisle of the parish church, which was not visited. Llanfrynach Church was the last place of call. It has been restored. The tower, which is placed at the western end, is a fair specimen of the Brecknockshire type. An interesting stone, bearing a figure and much knot-work ornament, is preserved within the church.

The fourth and final day's excursion was to the district west of Brecon, thus introducing the visitors to a wilder tract of country than they had hitherto traversed. Their objective was the little town of Llywel, at the foot of the high and bleak moorlands that stretch to the vale of Towy, in the neighbouring county of Carmarthen. Norman power may have established itself at Brecon and at Llandovery at an early date, but the rugged district between continued to be held by the Welsh. Hundreds of years before the Normans, the Romans had driven one of their roads across the moor, establishing, *en route*, a little camp that the wildness and barrenness of the land has preserved in an unusually perfect condition. Unfortunately it was found impossible to get so far with so large a party, to the general disappointment. More time was thus afforded for Llywel and Devynog churches. Both churches contain many features of close resemblance, and have an altogether sterner character than the edifices which were protected by their closeness to Brecon. Their towers approach the Pembrokeshire type of military tower; the treatment of the stair turret in both differs from the arrangement in the other churches seen during the meeting, and it would be interesting to know whether it is general in the Welsh districts of the county. Both churches are large, consisting originally only of nave and chancel; at Devynog a south aisle was added in the fourteenth century. The English barons extended their influence into this district not so much by fighting as by the easier and more effective method of marrying the Welsh heiresses. Their presence and higher culture led to modifications of the parish churches. The present font at Devynog appears to be comparatively modern, and is ungraceful in form. Its base consists of the ancient font inverted. At Llywel are the remains of a screen. Between the two villages is that of Treacastle, where there is an excellent example of the moated mound. If the mound at Tretoer, crowned as it is with the remains of a rectangular stone castle, seems to favour the post-Norman theory of its construction, the mound at Treacastle, where there is not a trace of superimposed masonry, and placed in a district to which the Norman had not penetrated until long after he had elsewhere begun to build elaborate defensive castles, makes strongly for the pre-Norman origin of these much-debated structures. A long drive brought the party to luncheon at Ffrwdgrech, where they inspected a quantity of *trouvailles* from the Roman camp of Bannium. Newton, a fine old house of the Games in the outskirts of Brecon, was next visited, after which followed the ancient portions of Christ's College, one of the foundations of Henry VIII., and, still earlier, a house of Dominican friars. The present chapel consists of the eastern end of the friary church. It has a range of eleven Early English lancets in the northern wall and four of similar character at the eastern end of the south side. The town of Brecon was

walled, but the walls have almost entirely disappeared, and the few remains of the castle adjoining the priory church of St. John's have been absorbed into the grounds and out-buildings of a modern hotel. The mound here is natural. St. Mary's Church, in the centre of the town, was hurriedly visited. It deserves a closer examination than it received, for it is impossible to reconcile its present appearance with the account given of it by Mr. Freeman in *Archæologia Cambrensis*. That able writer figures it as a church with a nave and chancel, a south aisle, and a northern transeptal chapel of two bays, which he regarded as the original nave. The church has been very thoroughly restored since Mr. Freeman's visit, but the northern limb, which is now of the same length as the aisle upon the south side, has no appearance of having been lengthened within recent times. The north door, as Mr. Freeman observes, is opposite that on the south side, but his plan of the church shows it as opening directly into the nave, whereas it now gives egress from the north aisle. The tower, which stands at the western end of the building, is Transitional Perpendicular. Mr. Freeman considered it displayed strong Somersetshire influence.

A few general words must be said upon the sepulchral effigies. These, in the district covered by the Association, are extremely few, with the exception of the priory church of Brecon; and, considering the importance and grandeur of that edifice, its monuments cannot be regarded as important. In that church is an interesting double effigy, representing a civilian and his wife, which appears to be of the late fourteenth century. Another, a wooden effigy of a lady of the middle of the sixteenth century, is the latest example Mr. Bloxam had met with of a recumbent figure carved in wood. The tomb of Sir David Williams, one of the King's justices, who died in 1613, bears a fine alabaster effigy of the knight and of his wife. Llanhamlech church contains an undated effigy to Jane, daughter of Humphrey Stanley, Earl of Derby, who does not appear in Burke. On the other hand, the churches, no matter how remote, are crowded with carved sepulchral slabs, many of them of most beautiful design and execution. These range from the sixteenth to the middle of the eighteenth centuries, their number and extent proving that the stone-carver's art had reached a high order of merit and flourished exceedingly. A beautiful example of, perhaps, the sixteenth century is now affixed to the south-western pier of the tower of St. John's Church.

The evening meetings were largely attended. The following papers were read:—"On Bannium," by Mr. Haverfield; "The Early Settlers of Brecon," by Professor Anwyl (a remarkably able essay on the ethnology of the district); "The Exploration of Clegir Voya (Pembroke-shire)," by the Rev. S. Baring-Gould; "Brecon Castle," by Mr. John Lloyd (taken as read); "Ancient Sanctuaries of Brecon," by Miss Philip Morgan; "On Brychan Brycheiniog," by the Rev. John Fisher, B.D. All the above will appear in *Archæologia Cambrensis*.

Portmadoc, in North Wales, was selected as the meeting-place for 1903.

There probably has never been an annual gathering of the Association in which the arrangements for the excursions were so admirably conceived and faultlessly executed as the one that has just closed, and while much of the smoothness was, unquestionably, owing to the hearty co-operation and active work of the local committee, it was in a still larger measure due to Lieut.-Colonel R. D. Garnons-Williams, son of the Preliminary of St. David's, who acted as honorary local secretary.

GREAT COLLEGE-STREET, S.W.—In the suit of Bradford v. The London County Council heard by Mr. John Troutbeck, High Bailiff for the City of Westminster, and a special jury, Miss Mary Bradford, publisher, claimed a sum of 1,227*l.* for compensation in respect of her leasehold interest in No. 9, Great College-street. The site of the house is required for the Millbank improvement scheme. The house rent is 6*l.* per annum and Miss Bradford's claim includes items of 450*l.* for the value of the premises (she having spent that sum, and more upon improvements) and 450*l.* for profit rental. The Ecclesiastical Commissioners are the ground landlords. In the result the jury awarded the claimant 666*l.* The site of Nos. 10, 11, and 12, in the street have been taken for new offices to be erected for the Lancashire and Yorkshire Railway Company. The architects are, we gather, Messrs. Bertie Crewe and A. Sheldermine.



Swanscombe Church, Kent.



Saxon Window, Swanscombe Church.

SWANSCOMBE CHURCH, KENT.

THESE illustrations should have accompanied the short article in our last issue, p. 168, describing the recent fire, caused by lightning, at Swanscombe Church. The view which we give of the church is from a photograph taken since the destruction of the spire. The interesting Saxon window is in the south wall of the tower.

HEALTH CONGRESS AT EXETER.

THE Royal Institute of Public Health held its Congress this year at Exeter, where over 700 delegates, representing Corporations, Municipal and Local Authorities, from all parts of the United Kingdom assembled under the presidency of the Earl of Idesleigh.

On Wednesday last week the members of the Congress were welcomed by the Mayor

and chief members of the Corporation, luncheon being provided for the whole body of delegates at the historic Guildhall of the ancient city. Among those who took part in the proceedings besides the Mayor of Exeter (Mr. E. A. Dunn), who presided, were the President of the Institute (Professor W. R. Smith), Sir Hy. D. Littlejohn, M.O.H. (Edinburgh), Sir Charles Cameron, C.B., M.O.H. (Dublin), the Mayor of Eastbourne, Mr. E. G. Mawbey (Borough Engineer, Leicester), Professor Sims Woodhead, and other Presidents and Vice-Presidents of sections. In the evening an Exhibition of Sanitary Appliances formed in the drill hall of the 1st (Devon) Rifle Corps was opened by the President of the Institute.

The sittings of the Congress began on Thursday with an inaugural meeting attended by nearly all the members of the Congress, and many ladies, the Earl of Idesleigh following the Mayor of Exeter in the Presidential chair after being invested with the insignia of office as President of the Congress by the President of the Royal Institute.

Presidential Address.

Lord Idesleigh subsequently delivered his inaugural address. He heartily welcomed the members of the Congress to their beloved city of Exeter, which seemed to have laid to heart in recent years the wise words of Lord Beaconsfield, who some quarter of a century ago had recognised the importance of the task in which they were engaging in the phrase, now famous, "Sanitas, omnia sanitas." In its recent arrangements for the supply of water and for drainage he thought the visitors would find that Exeter had done its part in regard to the two most important matters with which a municipality could be called upon to deal. The only link he could claim to have with science was his chairmanship of the Sewage Disposal Commission, and in that capacity he had learned something of the ways in which men of science worked and of the enormous difficulties with which they were confronted. He had become acquainted with certain monstrosities which had frightful names, tyrants whom they had all become acquainted with in the last few years—the microbes which dominated us, but did not condescend to become conscious of our existence. Without embarking on any detailed description of the Reports of that Commission, he would venture to indicate one or two particular matters with which the work of the Commission was concerned. A brief record of some interesting experiments made by Mr. Colin Frye as to the oxidation of sterile sewage, contained in the second Report, just published, would be found well worthy of their attention. The papers dealing with the great sewage works at Manchester were admirable, and, in passing, he desired to pay his tribute of respect to the two great communities of Manchester and Leeds, who had shown great public spirit in endeavouring to solve the difficulties attendant upon any satisfactory system of sewage disposal. Three valuable papers had been contributed by Dr. A. C. Houston, and there were many valuable observations and experiments by Professor Boyce and Drs. MacConkey, Grunbaum, and Hill, who had studied minutely the effects produced upon the bacteria contained in sewage by filtration and dilution, and upon the methods used in the bacteriological examination of sewage and effluents.

In the audience he had the honour of addressing, it was unnecessary to urge the importance of this question of sewage disposal. They would all agree that too much attention could not be bestowed upon it by those who were interested in matters of health, but there was a still more vital question, of which this was only a part, and he ventured to suggest that their most serious consideration should be directed to the whole subject of the use and abuse of the water supply. If at that moment he were an emperor, he believed he would appoint a department of Government to deal solely with water administration. They could not exaggerate the vital consequence of exact knowledge about water supply, either in respect to health or wealth. Without exact knowledge, they were in danger from recklessness on the one hand, or from fads on the other, and of the two dangers he did not know which was the more formidable.

A hearty vote of thanks was accorded to Lord Idesleigh on the motion of Sir C. Cameron, Alderman Woodhead (Mayor of Huddersfield) seconding, and Sir H. D. Little-

John (Edinburgh), the Mayor of Margate, and the Mayor of Nelson supporting the motion.

After a brief acknowledgment by the President of the Congress, Dr. Clark, of Liverpool, rose on behalf of the Lord Mayor and the Corporation of Liverpool to invite the Royal Institute of Public Health to hold its next congress at Liverpool, an invitation which Professor Smith at once accepted on behalf of the Council of the Institute.

After the inaugural meeting, which had been held in the Victoria Hall, the proceedings of the sections began in the afternoon at the Royal Albert Memorial College, the Presidents of Sections I. (Preventive Medicine) and III. (Engineering and Architecture) delivering their presidential addresses.

Sir Charles Cameron referred in his address to some of the points in preventive medicine still in controversy between experts, among them being tuberculosis, compulsory notification of consumption, and certain causes of typhoid fever.

Engineering and Architecture Section.

The address of the President of this section was delivered by Mr. E. G. Mawbey, M.Inst.C.E., Borough Engineer of Leicester. It will be found on another page.

Typhoid Fever and Water Supply.

At the close of the address the proceedings of the section were adjourned to Friday morning, when the first paper taken was one on "Typhoid Fever in Relation to Water Supply," by Mr. T. Caink, City Engineer, Worcester. In his paper the author adduced many reasons drawn from his own experience and investigations for doubting the statement, when put as a general truth, that the typhoid case-rate of any town is a fair index of the hygienic quality of the water supply. For some years prior to 1894 the city of Worcester suffered much more from typhoid than the majority of similar towns throughout the country, and had a much higher annual case-rate and death-rate than the average of those towns. Worcester had from time immemorial derived its water supply from the river Severn, which from periods equally remote had also served as the conduit for the drainage of towns and villages along its banks. The town of Shrewsbury, high up the river, and the river Stour, which was considerably polluted with sewage and manufacturers' waste, were the great causes of pollution in the river Severn, the Stour discharging its water into the Severn only sixteen miles above the Worcester Waterworks intake. Since 1890 Shrewsbury had established sewage purification works, and now only the purified effluent entered the stream. The Worcester waterworks, designed in 1857 by Mr. Thomas Hawkesley, M.Inst.C.E., and extended in 1867, had remained without further extension till 1894, prior to which period the question of abandoning the river as a source of supply had been anxiously debated by the City Council. After long discussion and various experiments, the Council decided to make the best of the existing works and materially to increase the area of the filter-beds, rejecting a scheme for securing water from artesian wells. In June of the following year (1895) Mr. Caink reported that the number of cases, which for the winter half of the four years ended March, 1894, averaged fifty-two, fell in the corresponding half-year ending March, 1895, to six. The author, during a long period in which he has been prosecuting inquiries with regard to the incidence of typhoid in towns deriving their water-supply (1) from wells sunk in the new red sandstone, (2) wells sunk in the chalk, (3) from upland sources, (4) from mixed sources, and (5) from rivers, tabulated the results and grouped them on a chart numbered 3. Briefly summarised, the average annual case-rate of Group 1, for the period 1895-1899, was 117; Group 2, 109; Group 3, 119; Group 4, 91; Group 5, 82.

Another diagram showed that London had a higher incidence of typhoid than either Worcester or Reading, both in the river-supply group. The author therefore became anxious to discover what portion, if any, of the London supply was derived from deep wells. The rates shown on Chart 3 for the Middlesex, Chelsea, and Grand Junction group, deriving from the Thames only, was sixty-four; that for the Southwark, Vauxhall, and Lambeth group, which has a small proportion of unfiltered deep-well water mixed with its filtered river supply, was eighty; that for the New River

Co., with a larger proportion of deep-well water, was eighty-two; that for the East London Co., which draws largely on deep-well water, 116; while Kent, with deep-well water exclusively, had a rate of seventy-six. Taking Group A in the chart—river-supplied towns with a low incidence—the average was forty-eight, while Group B—river-supplied towns with a high incidence—the average was 182. "If it can be shown," concluded the author, "that the towns in the latter group of Class 5 (Group B) possessed inadequate provision for efficient filtration, or did not, in fact, efficiently filter their water, these towns will afford additional evidence that the typhoid case-rate is an index of the hygienic purity of the water supply. This was certainly the case with regard to one of the towns in the group,—viz., the city in which it is the privilege of the Institute to hold its Congress this year. The City Council of Exeter, recognising the insufficiency of the filtering area, and acting upon the advice of their Engineer, applied to the Local Government Board for sanction to raise a loan for improving their waterworks. The works, which included an addition of 100 per cent. to the filtering area, were completed, the author believes, about the beginning of 1901."

In the discussion, Mr. McDonald, City Engineer, Glasgow, expressed his admiration at the way in which the paper had been prepared.

Dr. Martin expressed his personal obligations to Mr. Caink for his carefully-prepared paper. The danger of the contamination of deep wells was known long before the existence of the bacillus of typhoid had been demonstrated, but the subject had not been sufficiently investigated. Near the Lake of Geneva there was a brook which ran partly down the two sides of a mountain. A large quantity of chloride of sodium (common salt) was put into the brook at one side of the mountain, and the chloride of sodium was found to be greatly increased in the spring on the other side. Subsequently several hundreds of pounds of barley-meal were put into the brook, but not a trace of the meal was discovered in the spring. That proved, thirteen years before Pasteur had developed his great discoveries, the possibility of deep-well water which seemed absolutely pure being contaminated by matters in solution.

Mr. Caink briefly replied to the observations made in the discussion.

Trade Refuse in Sewers.

Dr. Maclean Wilson, Chief Inspector of the West Riding of Yorkshire Rivers Board, was next called upon to read a paper on "The Admission of Trade Refuse to Sewers." Citing at the outset of his paper certain sections from the Public Health Acts of 1875 and 1890, and the Rivers Pollution Prevention Act, and from a number of local Acts of Parliament, to show the powers and the limitations of local authorities in dealing with trade refuse, he drew the conclusion that the law as to the admission of manufacturers' trade refuse into sewers was not clear, and that the cases so far decided in the High Courts did not carry the matter much further. The prosperity of most districts was bound up with their manufacturing works, and therefore, many sanitary authorities had determined to admit manufacturers' trade refuse into the public sewer to be dealt with along with the ordinary sewage of their districts. But many cases had arisen in recent years in which the increased cost and the formidable difficulties caused by this admission had led local authorities to demand from manufacturers either a preliminary partial purification at their own expense or a contribution towards the extra cost incurred by the authorities in dealing with its purification. In Manchester, Bradford, and certain other great manufacturing towns, manufacturers were required to enter into agreements; some towns, like Leeds and Liverpool, prescribed certain conditions to be fulfilled before granting the privilege; while in others the manufacturers were required to contribute towards the cost of purification. Specimens of agreements entered into and of regulations drawn up by a number of the great corporations were appended to the paper, including one from a Glasgow Act of Parliament of 1898, which gave complete control to the Local Authority in this matter, and others from the Manchester Corporation (General Powers) Bill of the present year. Plans of preliminary purification works and tabulated analyses of various classes of trade

refuse were also appended to the paper, the general conclusion of which is that sanitary authorities are justified in demanding that manufacturers shall partially purify their refuse before discharging it into sewers.

In the discussion which followed, Mr. Clements (Mayor of Henley-on-Thames), said the paper had been of special interest to him because he learned from it that other towns suffered like Henley from the refuse discharged from breweries. They had taken counsel's opinion as to their obligation to admit refuse from breweries into the public sewer. According to that opinion they were bound to take the refuse from old breweries, but in the case of new breweries they might be in a position to impose conditions. They were in doubt as to how far they could proceed unless they obtained certain powers under a new Act of Parliament.

Mr. Thorpe (Ripon) said that in his district they had five large varnish works, the refuse from which rendered nearly useless a sewage-farm and purification works upon which they had expended 20,000, only a few years ago. He agreed with Dr. Wilson's conclusion that manufacturers should either be compelled to adopt some preliminary method of purification or be called upon to contribute to the cost of purification when it was undertaken by the Local Authority.

Mr. A. B. McDonald (City Engineer, Glasgow) said Glasgow, by the Act of 1898, had been given absolute power to exclude from their sewers whatever the Council thought proper to exclude. With its great crowd of manufacturers, Glasgow had experienced great difficulties in dealing with this question until they had obtained more complete control by the Act of 1898. They had a special arrangement with the proprietors of one great chemical works in Glasgow. They found they would be able to use the chemical refuse usefully if the discharge was under their control, but not when discharged intermittently in the manner then customary. In order to meet the Corporation, the proprietors put up works at which the Corporation was given the control over the discharges. While the Glasgow authorities thought it desirable to give all the protection they could to the community, they did not desire to put unnecessary obstacles in the way of manufacturers.

Mr. Reginald Brown, Surveyor, Southall Norwood, said the existence of margarine works in his district had been a great difficulty. They had adopted a system of lamnification, which worked well until the establishment of the margarine works; but since the refuse from these works had been admitted into the sewers, the irrigation had been obstructed by a thick film of fat which floated on the surface.

Councillor Godbold (West Ham) said he was interested to know the position of those municipal bodies who did not treat their own sewage. The Corporation of West Ham had access to the Metropolitan main drainage system, and threw their sewage into the sewers of the London County Council, but they sometimes prosecuted manufacturers. Sometimes they had gas explosions in their sewers.

Dr. Wilson, replying to the various speakers said, in answer to the Mayor of Henley that Tadcaster had experienced the same difficulties with brewery refuse as Henley. The Urban District Council in that case had made an agreement with the brewers to pay a contribution towards the extra cost of purification. The case of Ripon, which was within his own district, was, he thought, unique. A film of varnish formed over the surface of the land on the sewage farm. Here the manufacturers had very little room for purification works, and they should be asked to contribute to the extra cost of treatment by the Local Authority. The Glasgow Act of 1898 seemed to have worked very well, and it should be made general throughout the country. By such a regulation the difficulties everywhere would be enormously reduced. The effluent from margarine works must be similar in character to that from wool-washing which would also deposit a greasy emulsion on land to which it might be applied, but fortunately, in this case, it paid the manufacturer to treat it himself on account of the value of the grease. A manufacturer's preliminary purification works was the only remedy in the case of the margarine deposits. The refuse might be treated with sulphuric acid advantageously where, as at Southall, it was afterwards

allowed to flow over the land; to turn it into the sewer would be deleterious. With regard to the difficulty mentioned by the delegate from West Ham, they ought to be very glad of the privilege of making use of the County Council's sewers. Unless a nuisance was caused, there could be little cause for prosecution.

Refuse Disposal Plant.

The last paper read at the sitting was entitled "Recent Practice in Refuse Disposal and Steam Utilisation Plant," by Mr. F. L. Watson, A.M.Inst.C.E. (of Leeds). The "recent practice" referred to in the paper is an account of recent performances of "destructors" of the Horsfall type which have been recently erected in the Metropolis, at Salisbury, Beckenham (Kent), Moss Side (Manchester), and Accrington, Lancashire. The Metropolitan installations are at Fulham and at the Shot Tower Wharf opposite Somerset House on the Surrey banks of the Thames. The former is described as the most important electric lighting and destructor plant hitherto erected, and the latter as a recent development on account of a direct tipping apparatus which delivered the refuse from the carts into the furnace without any handling. This destructor, built for the Corporation of the City of Westminster, now that initial difficulties have been overcome is said to be giving satisfaction. Some recent applications of destructor plant are indicated rather than described, such as the crushed clinker stuff of which flags, bricks, and mortar are proposed to be made. The Salisbury plant is a combined "refuse destructor" and sewage-pumping installation, and the remainder are employed for the production of the electric light.

In the discussion which followed the reading of the paper,

The Deputy Mayor of Leicester said that at Leicester they had found great difficulty in utilising the clinker. At first they were able to sell it at a fair price, then it fell to sixpence per ton, then they had to give it and even pay for it to be taken away. In all large towns the carriage was a source of enormous expense.

The Mayor of Nelson said at Nelson they had a residuum of 30 per cent. of clinker, and any new scheme could be proposed for utilising it he would be glad to know of it. They had tried brickmaking, but it was not a success. The bricks were fragile and could not be used for many purposes. Could the destructor described by Mr. Watson be seen in operation in slab-making in any town of the United Kingdom?

In replying, Mr. Watson, the reader of the paper, said that clinker mortar was produced at the destructor works of Leeds, Oldham, and Bradford, and clinker slabs could be successfully made. They would be more durable than York stone, but were not so durable as the hardest flags. There was no town in England where the destructor was in operation for slab making. They could be made without pressure, but were not so good as pressed flags. As to the calorific value of town refuse, that necessarily differed according to the district.

The section then adjourned until Monday.

On Saturday, the President (Mr. Mawbey) and a large number of the members of the Section went on a visit of inspection to the Torquay waterworks, situated nearly midway between Exeter and Torquay, on the skirts of Dartmoor. The two reservoirs, the last of which was completed in 1884, have between them a total capacity of 207,000,000 gallons, which, at 38 gallons per head per day, is equal to 160 days' consumption for the present population of Torquay, Newton Abbot, and some smaller towns which are supplied by the Corporation of Torquay. The rapidly-growing population of Newton necessitates a further extension of the works, and it is proposed to apply in the next Session of Parliament for powers to construct a third reservoir to store an additional 200,000,000 gallons.

The sittings of the Section were resumed on Monday, when papers on the following subjects were read and discussed:—"Refuse Destructors," by Mr. W. F. Goodrich, A.I.M.E.; "Design of a Waterworks Undertaking," by Mr. Wm. Ingham, Water Engineer, Torquay; and "Mechanical Power on Tramways," by Mr. E. C. Churchward, A.M.I.C.E. (Edinburgh). Among those taking part in the discussion were the Mayor of Henley, Dr. Willoughby (Eastbourne), Dr. Callen (Edinburgh), Councillor

Pike (Torquay), Mr. Brown (Tottenham U.D.C.), who all referred to the refuse destructor question; the President, Mayor of Henley, and Mr. Clarke (Dawlish), who spoke on Mr. Ingham's paper, and all congratulated Torquay on having an efficient, as well as economical waterworks plant, and Mr. Donald Cameron (City Surveyor, Exeter), Dr. Simpson (Liverpool), and the President, who spoke on the question of tramways and electric traction.

The work of the Section was brought to a close on Tuesday, when a paper was read by Mr. Donald Cameron on "Some Points in Municipal Sanitation," and two papers on "Sanatoria for Consumptives," the first by Dr. Bushnell, and the second by Mr. Harbottle Reed, delegate of the Devon and Exeter Architectural Association. We hope to be able to print Mr. Reed's paper next week.

Municipal and Parliamentary Hygiene Section.

Mr. J. A. Bellamy (Mayor of Plymouth) opened the proceedings of this Section, of which he was appointed President, with an inaugural address on Monday, August 25. The President, taking for the subject of his address "Municipal and Parliamentary Hygiene," said he took municipal hygiene to have for its main objects the healthy prolongation of life and the securing of the health of the people and the happiness of the community. The means by which these objects could be effected were abundance of pure air and water, perfect drainage and personal cleanliness. Of the municipal machinery for effecting these objects a main factor was an Officer of Health devoted to his work, and giving up to it his whole time and all his talents. It was the business of a municipality to provide the poor with healthy dwellings at rentals which they could pay, and it was the business of Parliament to make this possible by extending the term for the repayment of loans, and to lighten as far as possible the financial burdens the municipalities would be compelled to assume. Pure water abundantly supplied and pure air provided by the multiplication of open spaces were of the first necessity. With the object of encouraging to the utmost personal cleanliness, he would like to see municipalities erecting baths in every working-class district.

The work of the Section then commenced, three papers being read in succession bearing upon the question of the "Housing of the Working Classes," the first by Mr. J. W. Spear, M.P. for Tavistock; the second, on "The Treatment of Slum Populations," by Mr. W. P. Swain, F.R.G.S.; and the third by Mr. H. Tozer, Vice-chairman of the Committee for Housing the Working Classes, City of Westminster. We shall probably be able to print Mr. Tozer's paper next week.

The discussion of the three communications was opened by Mr. Councillor Godbold (West Ham), who expressed great dissatisfaction with the slow progress being made towards solving the problem. The London County Council seemed determined to provide for the prosperous artisan rather than the poor labourer. They provided houses at rents of from 7s. to 9s. a week, but the class he desired to see provided with decent homes were the thousands of labouring men in East London whose weekly earnings only averaged from 10s. to 14s. per week. With what face could they ask a man earning 10s. a week to pay 7s. a week for rent? He was almost tired of congresses. He wanted the thing done, whether it paid or did not pay. Municipal representatives should make up their minds that the thing they wanted should come to pass, and agitate until it was done.

Mr. Sandford (Go-port) wanted even more drastic measures to be tried. The prime cause, he said, of the poverty in the country districts, and urban as well, was the fact that the land itself had been wrested from its rightful owner, the nation, and was held by a small minority.

Mr. Austen Taylor (Chairman of Liverpool Housing Committee) declared that the idea of catering for the poorest of the poor without burdening the rates was impossible and might be dismissed at once. He dissociated himself from Mr. Swain's proposal to buy up the slums with a view to improving them. Slums could not be improved. They must be swept away. The truest kindness to such people was not to acquire properties which it would be a disgrace to any municipality to own, but to clear out of every city the properties which had been made insanitary, and by rehousing the people in municipal blocks, give them a chance of start-

ing a new life under new conditions and under the strictest municipal supervision.

Mr. McDonald (City Engineer, Glasgow) related his experiences of the residuum of the population of that city. This class had to be dealt with, and he could see no reason for the hesitation shown in undertaking the task. In Glasgow they had erected a building of three stories, each with an area of 1,200 ft., in which they were able to give, without any burden upon the rates, a proper water supply and decent closet accommodation at a rent charge of one shilling per room per week.

Alderman McGuffie (Liverpool) said that in Liverpool they had no longer a housing question, but a re-housing question. When the Congress met next year at Liverpool they would be able to show them 3,000 houses in which they had re-housed the population displaced from the slums.

The President proposed a resolution calling upon the Local Government Board to extend the term for repayment of loans to eighty years for buildings and to 100 years for land, whereupon Mr. Austen Taylor pointed out that the Select Committee of the House of Commons sitting upon this question had definitely decided to recommend that the term for repayment should be extended to eighty years, both for buildings and land. He therefore proposed an amendment "that this Congress urges the Government to give legislative effect at the earliest possible moment to the recommendation of the Select Committee of the House of Commons to extend the term for the repayment of loans on land and buildings to eighty years." The amendment was carried by a large majority.

On the motion of the President, another resolution was carried asking the Government to give to Local Authorities a free hand to erect such buildings as might be required by local circumstances, provided that the authorities acted in accordance with approved sanitary by-laws. The resolution was unanimously adopted, and the sitting was adjourned.

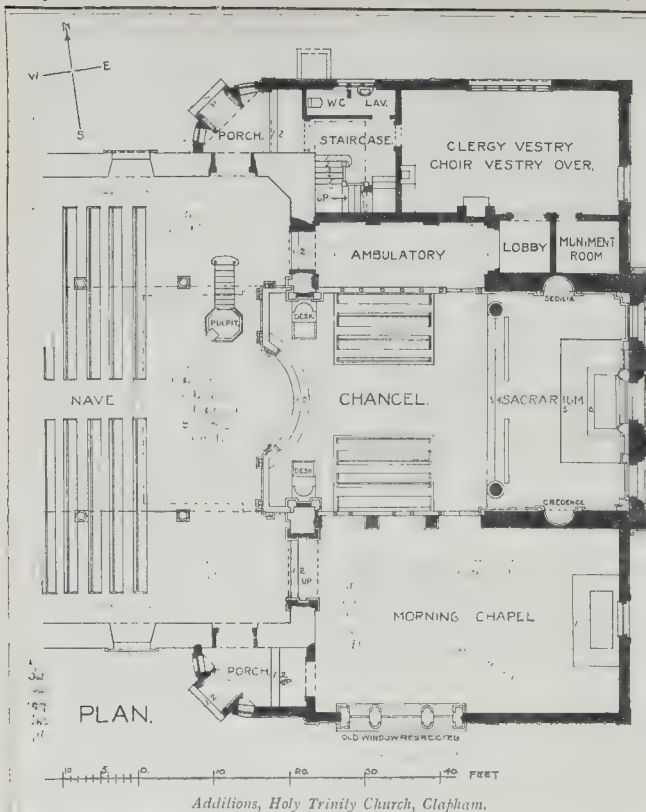
On resuming in the afternoon two papers were read and discussed urging the desirability of appointing a Minister of Public Health, and a resolution in favour of that object was adopted.

The appointment of women as sanitary inspectors was advocated by Dr. Cameron (M. O. H. Leeds). In the course of the discussion, Mr. Vacher said the Liverpool School of Hygiene was open to women as well as men, and that the former were availing themselves of it in increasing numbers.

The last paper read at the sitting was by Mr. Addiscott (Plymouth), in support of the Plumbers' Registration Bill, which had been introduced into Parliament by the Plumbers' Company. The object of the Bill was to prevent fraud and incompetence, and to give the public additional safeguards against bad work, by giving Local Authorities extended powers in supervising the work of plumbers. All plumbers who proved their competence should be registered and hold certificates which could be revoked by the authorities if a plumber was found to have violated the conditions under which his certificate was granted, or habitually doing bad work. A resolution in favour of the measure was adopted. The last sitting of the section took place on Tuesday, and was devoted to a conference on the vaccination question.

ST. ANNE'S ROMAN CATHOLIC CATHEDRAL, LEEDS.—The "first" corner stone of the new Roman Catholic Cathedral at Leeds has been laid by Bishop Brindle, D.S.O., of Nottingham. The cathedral will replace that in James-street, which the Corporation acquired at a cost of 15,000l. together with the new site in Cookridge-street. The plans and designs were prepared by Mr. J. H. Eastwood, of London, in the Early English style, the estimated expenditure being 45,000l. It is proposed to deposit underneath the high altar the body of St. Urban, the martyr, lately removed from a Cistercian convent in the suburbs of Rome.

YORK STREET IMPROVEMENTS.—Mr. R. H. Bicknell, Local Government Board Inspector, held an inquiry at York on the 19th inst. into the application of the City Council for sanction to appropriate 2,630l. for the purposes of their refuse destructor and depot at Foss Islands, and 10,340l. for the purposes of street improvements, and also for sanction under Section 154 of the Public Health Act, 1875, to the purchase of land for the purpose of making a new street between Minster-yard and Goodramgate. The Town Clerk (Mr. W. H. Andrew) were appeared for the Corporation, and there were present Alderman Agar (Chairman of the Streets and Buildings Committee), Mr. S. Hutton (City Engineer's department), and others.



Additions, Holy Trinity Church, Clapham.

Illustrations.

ADDITIONS, HOLY TRINITY CHURCH CLAPHAM.

THE illustration gives a north-east view of new chancel, vestries, and morning chapel, now being added to the old Parish Church, on Clapham Common. The walls are faced with Hemel Hempstead bricks, and Portland and Monk's Park stone are used for the dressings. Messrs. Garrett & Sons, of Balham-hill, are the builders. The contract amount is about 6,000. Professor Beresford Pite is the architect.

VESTIBULE, BROCKLESBY PARK.

THIS vestibule was built in connexion with the new hall and other buildings at Brocklesby Park. It is square on plan, with four columns and a domed skylight over the centre. The columns are monoliths of Cipollino, with caps and bases of statuary marble. The floor is paved with Cipollino and Piastraccia marbles. The doors into the hall are of mahogany, with gilt bronze sash-bars to the upper panels and fanlight.

The architect was Mr. Reginald Blomfield, of New Court, Temple; the contractor Mr. Hunt, of Hoddesdon.

FONT COVERS.

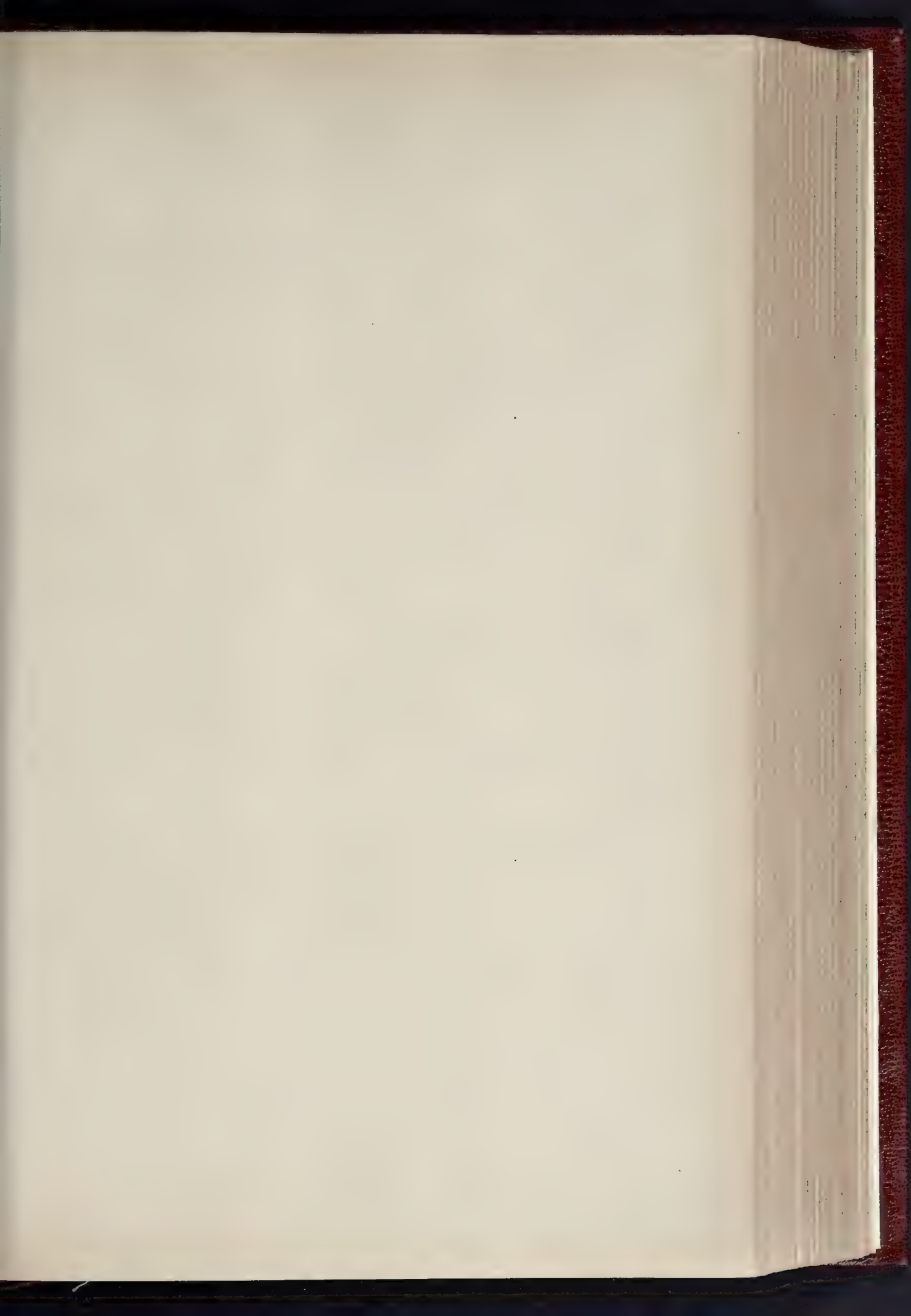
THESE two plates illustrate some of the many examples of font covers to be found in English churches. They are referred to in an article on another page of this issue.

CHRIST CHURCH, GREENWICH.—Mr. Alfred Roberts has been appointed architect for the decorative repair and improvements—to include a new chamber for the organ, by Hill—of Christ Church, in Trafalgar-road, East Greenwich. The church was built, after the Early English style, in 1848-9, and has a capacity for a congregation of 1,300 persons. The district was made a separate parish thirty-five years ago.

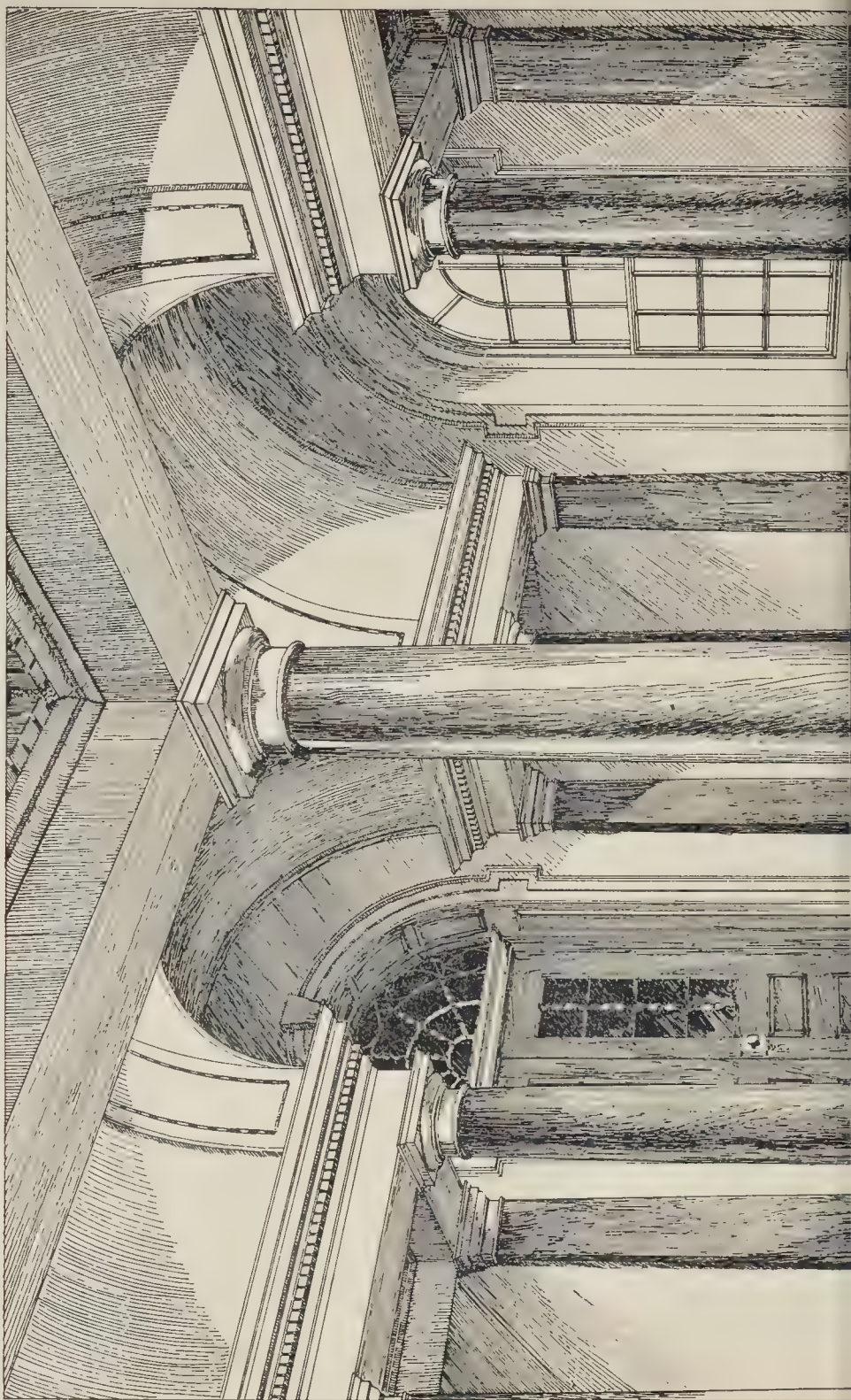
ARCHÆOLOGICAL SOCIETIES.

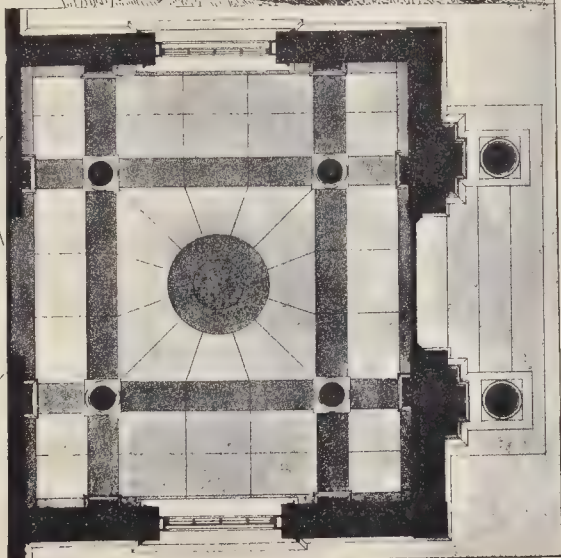
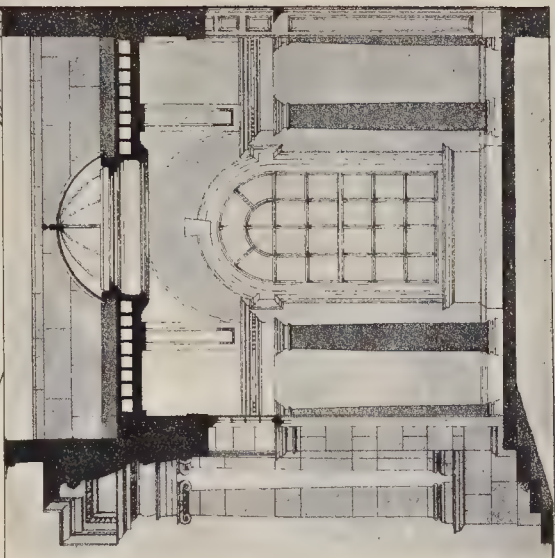
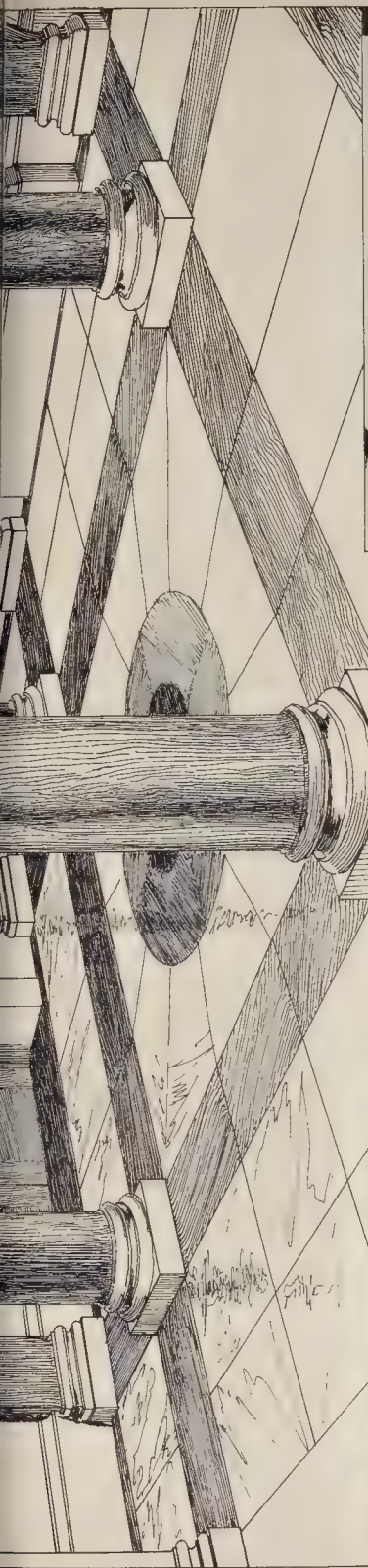
NORFOLK AND NORWICH ARCHÆOLOGICAL SOCIETY.—The summer excursion of the Norfolk and Norwich Archæological Society took place on the 21st inst., when the members from Norwich, reinforced by contingents en route, started from Holt Railway Station in brakes and other vehicles on a tour which took in Salthouse, Cley, Blakeney, and Wiveton, and concluded at Bayfield Hall. The road taken was through Holt town and up the hill by Kelling Church, where the first sight of the North Sea was obtained, and then down to the road skirting the marsh until rein was drawn at Salthouse Church. This building, consisting of nave, aisles, chancel, and embattled tower, stands upon an elevation overlooking the ocean, its peculiarity being the lofty two-light windows in the nave. The Rev. W. B. S. Dalby read some notes descriptive of the church, which was erected by one of the Heydon family, and drew attention to the relics of its sometime grandeur, the remains of a painted screen, with figures, now used as a reredos, the shields of arms at the points of the arches in the nave, the old poppy-heads and quaint stalls, and the beautiful font, which bears the emblems of the Evangelists and those of the Passion. The chalice and paten belonging to the church were shown, and were inspected with interest. Both are the work of Peter Petersen, the Dutch silversmith, and bear his mark. Cley Church was next visited. St. Margaret's fane has often been described, and its history, so far as its architectural features are concerned, was dealt with in 1900, when Mr. J. T. Mickelthwait was invited to report upon its condition prior to an effort for its restoration. From this report Dr. Bensley read several extracts. Considerable interest was taken by the visitors in the south porch, rich in symbolic carving, the tracery of the windows of the roofless transepts, left unfinished after the ravages caused by the Black Death; the font, with its mutilated carvings of the seven sacraments; the fine old pulpit, which bears date 1611; and the ruined west porch. The in-

scriptions on the memorial slabs in the floor and the brasses remaining, also came in for a due share of attention. Lunch, having been partaken of at the Town Hall, a move was made to Wiveton Hall, kindly thrown open by Mr. Spurrell. This old mansion is built of whitish flints, with brick and stone dressings. The front shows two extensive wings, and in the centre there is a projecting porchway of two stories. In the oak-panelled hall within, Mr. R. J. W. Purdy offered a few remarks on the building and the district. He said that Wiveton was undoubtedly the settlement of Weyw mentioned in Domesday. There were two manors, one of which is now in the hands of Lord Calthorpe, while the other is owned by Sir Alfred Jodrell. On the inside of the massive front door are the initials "J.F.G." and the date 1645. He thought this might stand for John and Frances Gifford, and there was a tomb in the church which remembered John Gifford, with the date 16—, perhaps 80, but the figures were in part obliterated. The Bucks had the house for some 200 years, but the name of Gifford was always associated with the place, from the early Earls of Buckingham downwards, and the Bucks had always called themselves Gifford. On the site of the present house the De Roos had a smaller one in the twelfth century, and an old piece of walling outside was probably part of it. There was the usual subterranean passage beneath—certainly there was an opening in the cellar which led to somewhere. As there was a Carmelite monastery on the higher ground it was probable that the passage was part of the great drain which led from thence to the marsh. Commenting on the changes wrought in the course of the river Glaven by the movement of the shingle from Weybourne, Mr. Purdy concluded by expressing the hope that when the new map of Norfolk was issued in connexion with the Victorian history of the country, it would show that fringe of lost historical land between King's Lynn and Great Yarmouth, which contained many parishes wholly or partially swallowed up by the sea. The visitors then proceeded to Blakeney Church, a fine edifice on a lofty hill overlooking the old harbour and quay. Here Mr. J. Oldrid Scott read some notes on the building. The north-east turret, a feature of the church, was probably a sea-mark for vessels coming into the harbour from the North Sea or proceeding along the coast, and it still had a practical value in that respect, while it was also certainly once used as a light-house. At Blakeney, said Mr. Scott, there were only two styles of architecture represented. The beautiful groined chancel was of the thirteenth century, and the stately nave of the fifteenth; most likely the older nave was burnt down. The bases of two early English pillars remain in the aisles, and were probably utilised as pedestals for statues. The font was carved with the Evangelists and their emblems, with symbols of the Passion below. One of these latter is the sword used by St. Peter in the Garden, with the ear of the High Priest's servant still sticking to the blade. Outside, the tower buttresses bore the arms of the see of Norwich, and another shield with a dolphin, which may have had some connexion with St. Nicholas, the patron saint of the church. In a small niche in the tower were some round holes which probably contained the tapers held by mourners at a funeral. Mr. Scott also spoke of the curious arrangement at the east end, where there was once a sacristy behind the high altar. The partition having been removed, the four aumbries or lockers, and a large one in the centre stand revealed. Two staples on the north side mark the place of the veil which was anciently drawn across the chancel in Lent. The chamber leading to the lighthouse turret was further described, and mention was made of the old "Priory Pew," which was supposed to have been brought from the Carmelite monastery, which stood to the southward of the church. Thanks having been given to Mr. Scott for his paper, some of the members strolled through the quaint old street to the quay, and there inspected the old Guild Hall, a vaulted building of three bays with central columns of brick, and entered by a door in a pointed arch of late character. On the far end is an opening which goes into the earth some distance and then turns to the right, believed to be the entrance to a subterranean passage. The scanty ruins of the Carmelite Priory were also inspected, and then a start was made on the homeward journey. Glandford Church had been put in the programme, but time would

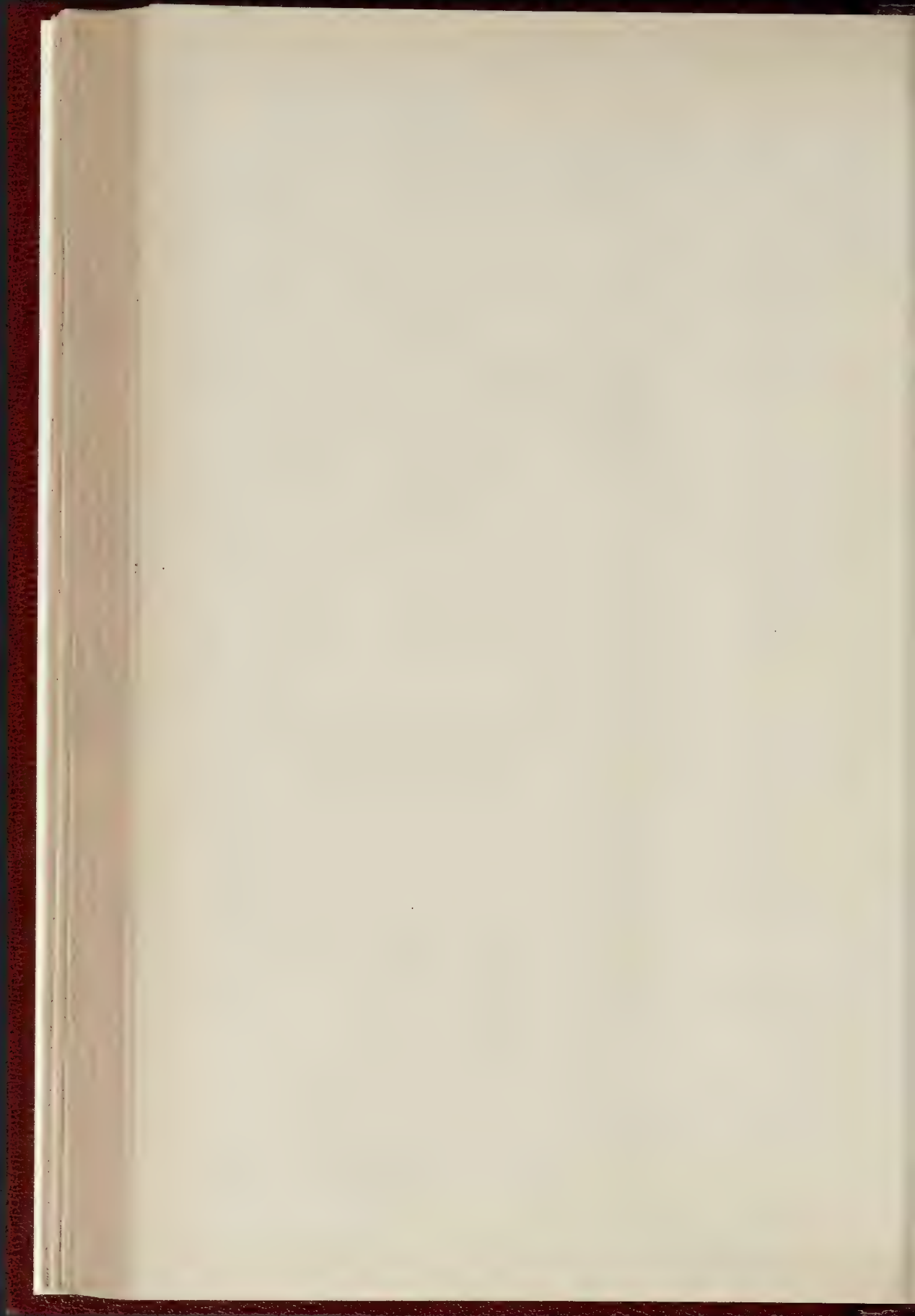


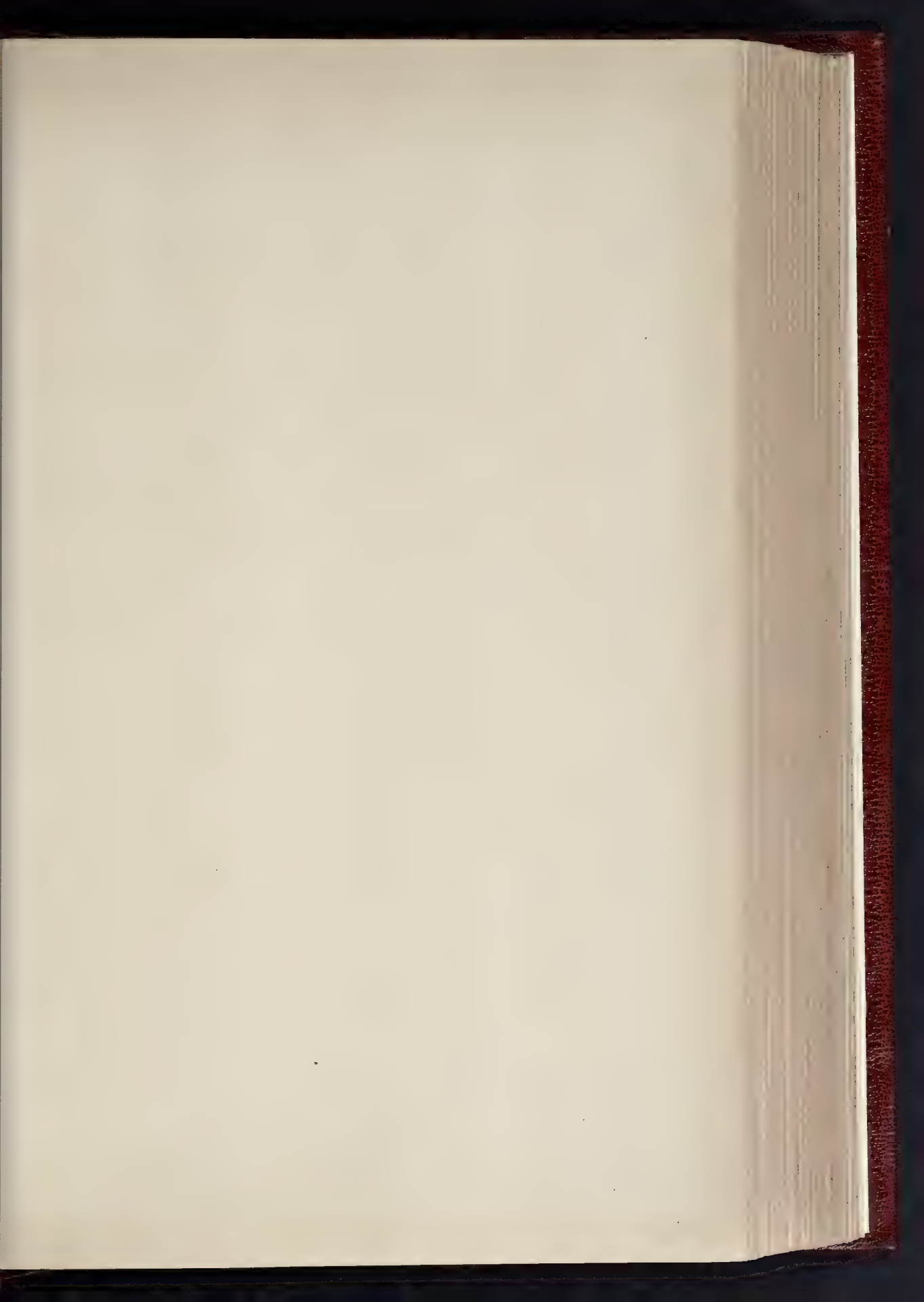
THE BUILDER, AUGUST 30, 1902





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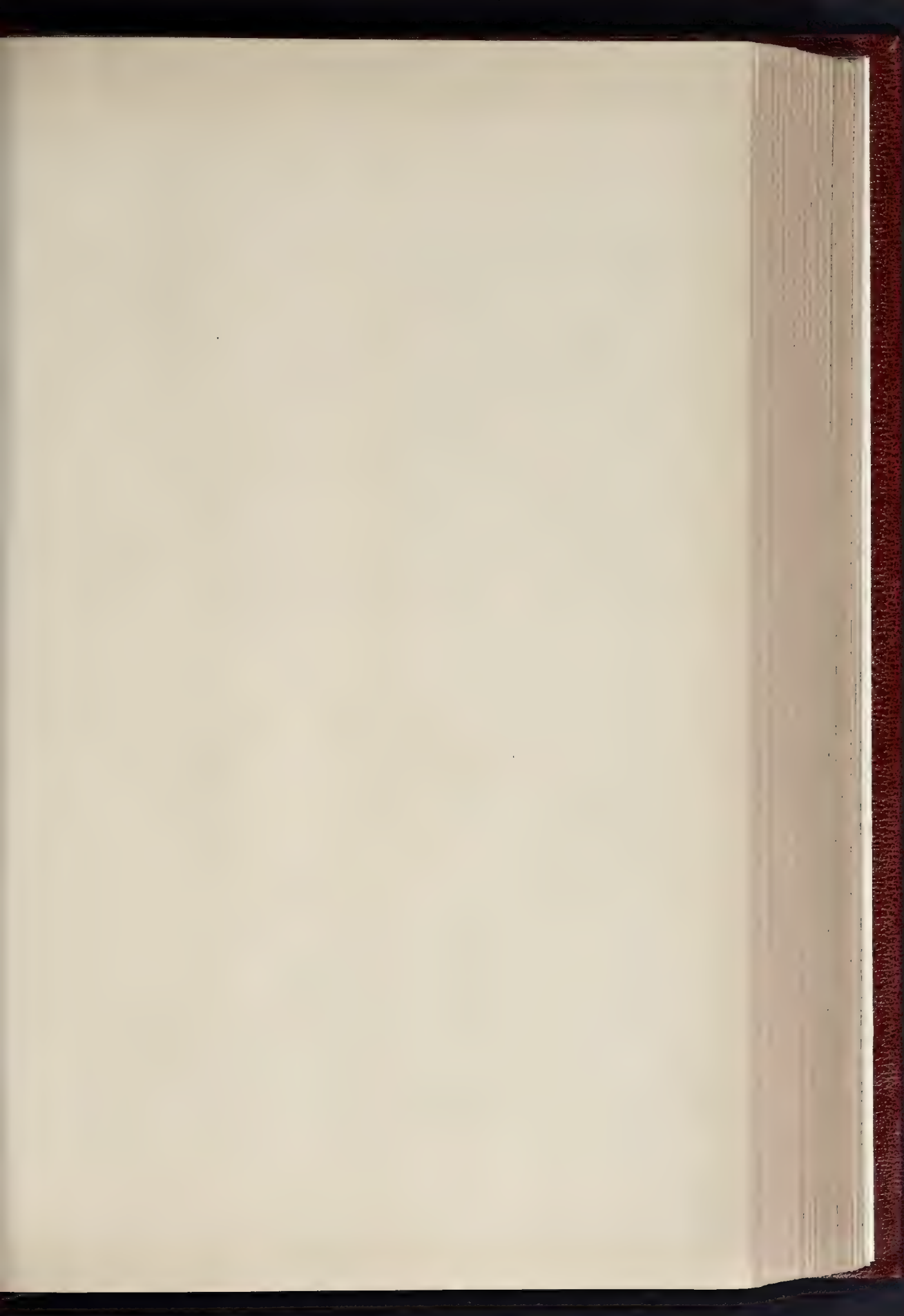




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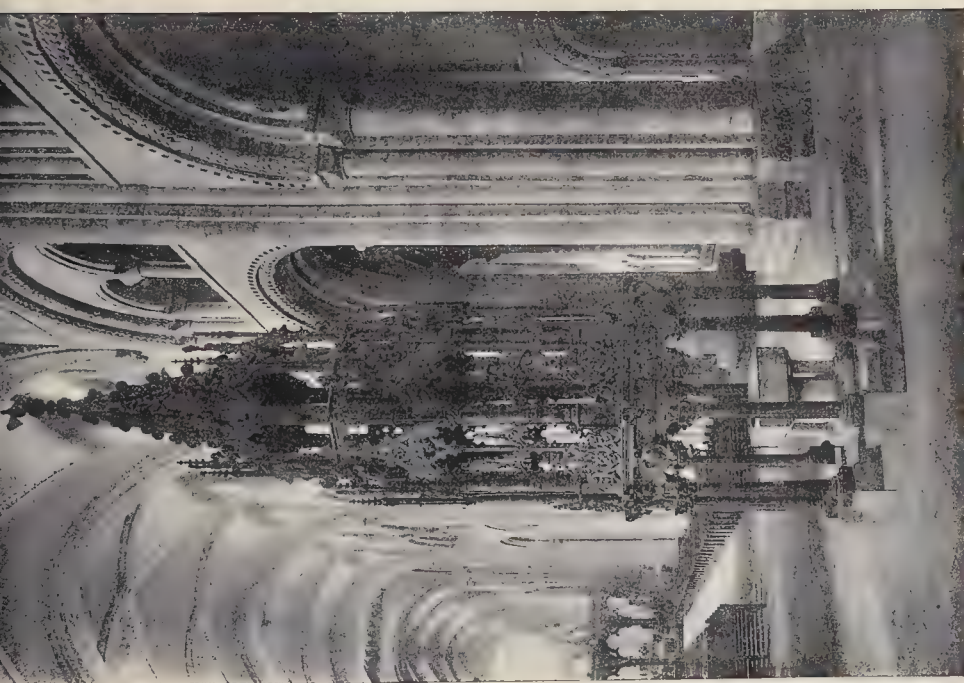




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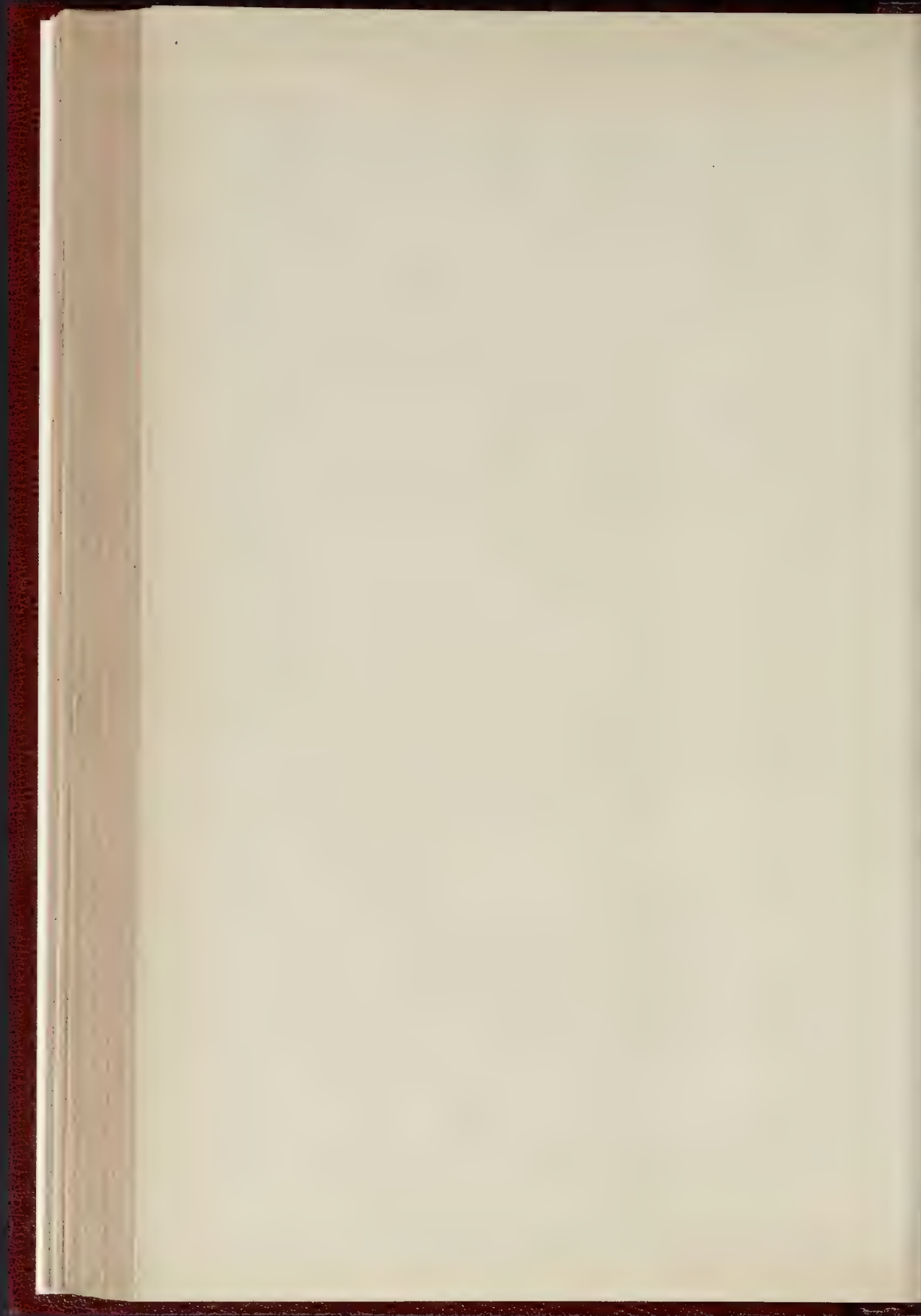


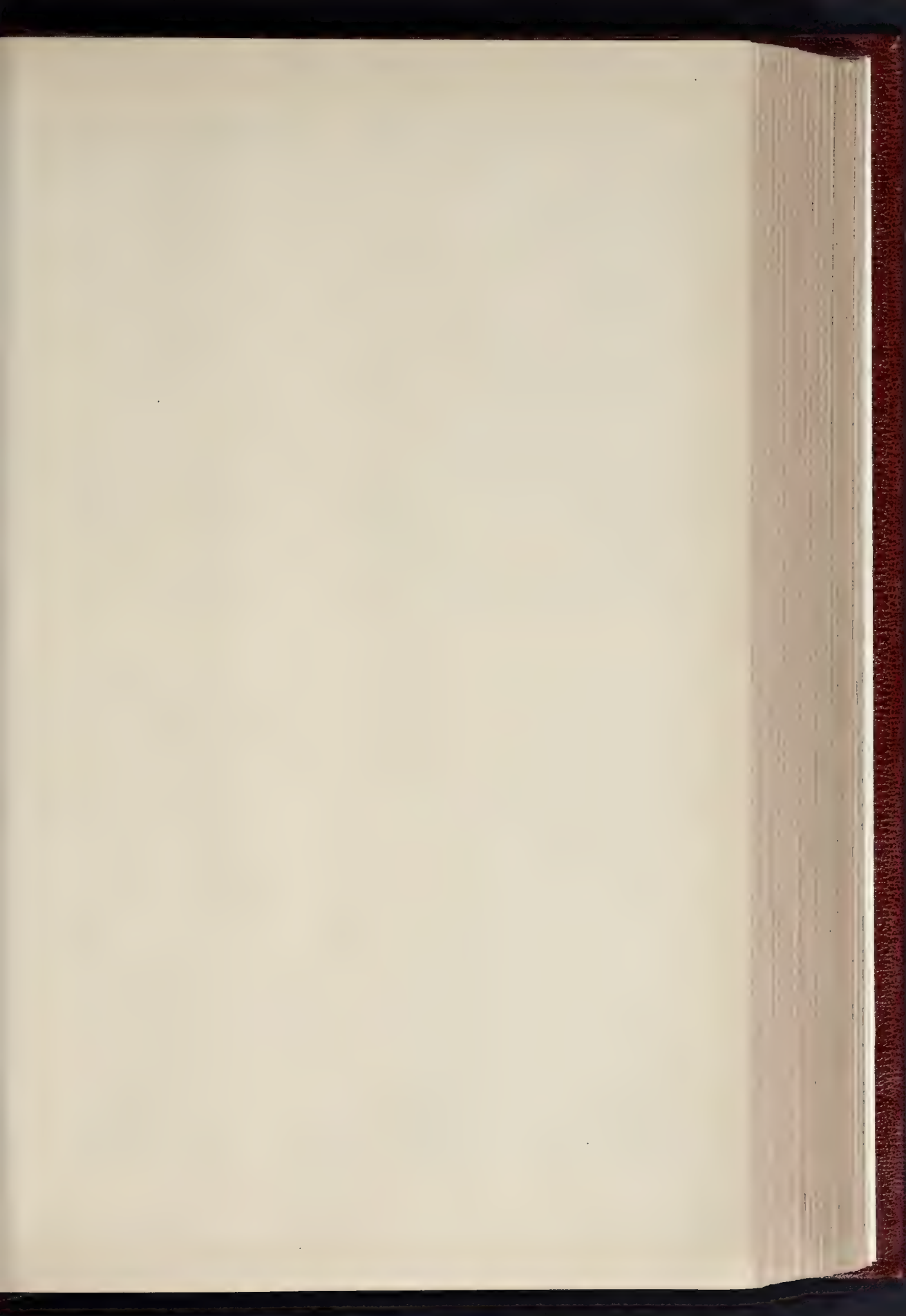
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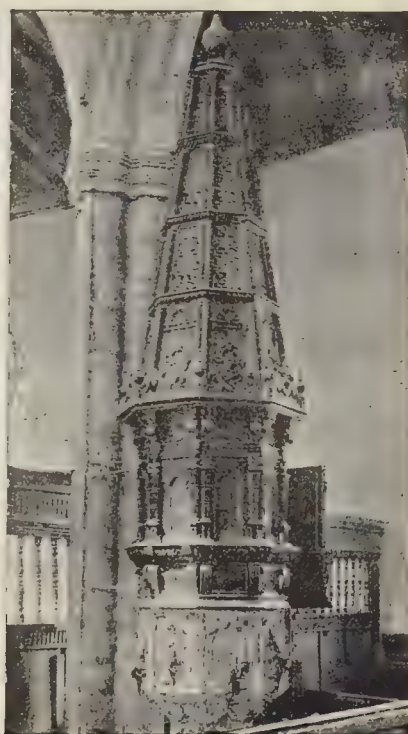
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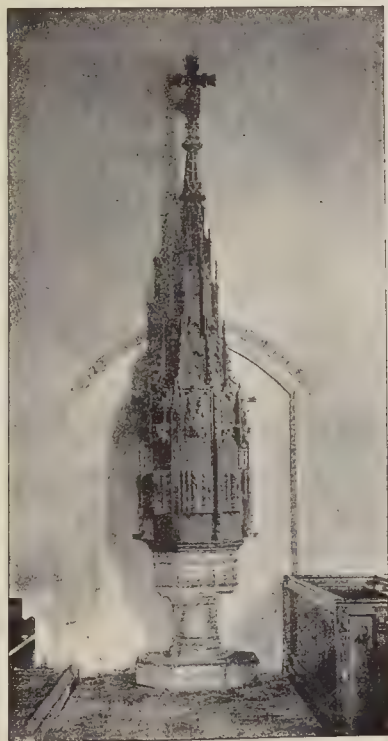
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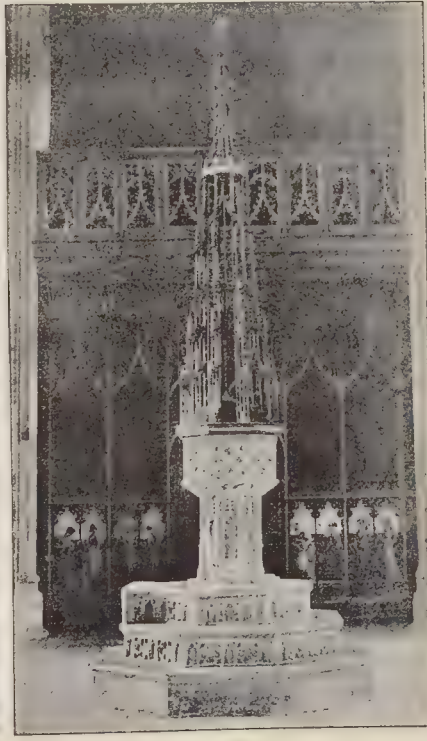
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not permit of a stay there, and reins were not drawn until the party reached Bayfield Hall, the seat of Sir Alfred and Lady Jane Jodrell, where a hearty welcome was extended to the members by host and hostess, who allowed the visitors a free range of their house, and subsequently entertained them at tea. Bayfield Hall, though an unpretending mansion externally, has no rival in the district for beauty of situation. The well-wooded lawns undulate in the most charming way, and the little river Glaven, expanding to the dimensions of a lake, completes the picture when viewed from the rising ground on which stands the ruined church of St. Margaret. Holt was reached by way to Letheringsett, and a very pleasant outing was brought to a close.—*Forfolk Chronicle.*

RUTLAND ARCHEOLOGICAL SOCIETY.—An excursion organised in connexion with this society took place recently, when upwards of forty members and friends paid a visit to Great Casterton. The party was first conducted over Great Casterton Church by Mr. Raylen, architect, who discoursed upon the architectural history of the building. This is one of the most interesting churches in the county of Rutland, showing much evidence of its early character. The building is thirteenth century in style, the tower, which is fifteenth century, having been inserted at the west end of the original thirteenth-century church. It was pointed out that this church was originally of the usual type of Rutland churches with a nave, a chancel, pitched roof, &c. The thirteenth-century tower has been placed upon the thirteenth-century wall, and this has caused the latter to crack on the south-west corner. It is intended to remedy this and other defects, and to preserve the interesting ancient features about the building. The church stands in the south-west corner of the site of the Roman camp, and the party proceeded to another portion of the parish where signs of the existence of such a camp were in evidence. The Rev. M. Barton, the Rev. J. Scott-Ramsay, and Dr. Newman gave some details respecting the formation of the old Roman camps, and opinions were exchanged as to the origin and use of these places. It was stated that the camp at Great Casterton must have covered an area of about 27 acres, and on some future occasion it is hoped that excavating operations will be conducted on the site, permission having been given by the Marquis of Exeter. It is recorded that a great number of old Roman coins have been and still are found in ploughing and digging in the fields in and about the village.

THE PUBLIC HEALTH CONGRESS, EXETER.

The following is part of the Presidential Address in Section III. (Engineering and Architecture), delivered by Mr. E. George Mawbey, M.Inst.C.E., at the Annual Congress of the Royal Institute of Public Health, held last week at Exeter:—

Now what are the chief factors for health laid down by the great medical authorities throughout the world, which come within the province of our section? I venture to say that these are chiefly:—Pure air, pure water, dry and clean subsoil, diminution of noise from the traffic in our streets, exercise and personal cleanliness, with healthy and cheerful houses and surroundings, and plenty of honest and well-directed work.

What are the works in connexion with these natural laws for health that come within our sphere, acting in our respective capacities in advising and serving the different municipalities and local authorities throughout the country? It may be stated that these are briefly:—

For pure air:—Efficient public and private scavenging, and cremation of the refuse; efficient ventilation; wide thoroughfares, with ample intercepting streets; proper construction, cleansing and ventilation of sewers and drains, and other sanitary arrangements; open spaces in centres of population; ample air spaces to dwellings and around our factories and workshops, to ensure light and air; the prevention or abatement of smoke; due restrictions upon noxious trades; electrification of our poisonous underground railways; the drainage and prevention of pollution of our subsoil; the diminution of malarial and other troubles by the reclamation of swamps, improved drainage, and the carrying-out of floods' prevention schemes.

The legislation for the latter is far from what it should be in giving facilities to small local authorities to rid their districts and inhabited areas from disastrous floods.

The supplies of pure water are to be ensured by:—The satisfactory disposal and efficient purification of the sewage of every town, village, and habitation; the prevention of fouling of our rivers, water-courses, and springs; the compulsory provision of a practically pure public water supply, not only to our large towns, but also throughout all rural districts, where large populations are now depending for their supply upon shallow and frequently highly polluted wells in close proximity to their dwellings.

There is great need for a national movement in conjunction with the Local Government Board for the better control and utilisation of our catchment and drainage areas, so as to facilitate and even enforce the joint schemes by groups of municipalities and local authorities for the supply of wholesome water within the various water-sheds of the country. Good work has been of late done by the County Councils and Rivers Conservancy Boards in the protection of the sources of water supply, especially in bringing pressure upon local authorities to deal with their sewage.

The noise in our streets can be much reduced and the sanitary conditions improved by the extended use of asphalt and hard wood pavements, which should be regularly washed as well as swept, and also by the introduction of electric traction and the perfection and development of self-propelled vehicles, with a corresponding diminution of horse traffic, with all its attendant fouling of thoroughfares.

In order to encourage exercise and personal cleanliness, ample provision of recreation grounds, gymnasia, baths and open-air bathing stations, &c., are indispensable in all thickly-populated districts.

It is notable that the architects of the present day are making an earnest study of hygiene, and are taking great pains to adopt up-to-date sanitary arrangements in the designing of dwellings and of the various buildings in which a great portion of time is occupied by people in earning their livelihood, and also in the schools for the young.

The duties of our sanitary and building inspectors are of vital importance in the carrying out, with the utmost vigilance and intelligence, of their work, not only in discovering insanitary conditions and defects in construction, but in reporting and dealing with the neglect, misuses, and mismanagement of even the best sanitary works which can be provided.

In a presidential address I cannot, obviously, undertake to deal exhaustively with these various subjects, but I will touch briefly upon two or three of them which are just now within my personal experience.

The Smoke Nuisance.

It is on such occasions as this Congress, largely attended by delegates from public bodies, that, amongst other questions, the great need should be emphasised for rigorously enforcing the provisions of the Public Health Act, 1875, for the prevention or abatement of smoke nuisance. This is highly necessary in the interests of health alone, but is hardly less so from the aspect of injury to, and disfigurement or defacement of, the beauty of our towns, the destruction of vegetable life, or the gloominess of the atmosphere. The reduction of smoke from domestic fireplaces is a very difficult problem for the future, although much has already been effected by the extended use of gas stoves and smoke-consuming grates; but it is the trade chimney-stacks that do the chief mischief, and I venture, from practical experience, to say that it is readily preventable to a sufficient extent without retarding and injuring trade interests, and further that it pays well to adopt the remedies in the saving effected by the more complete combustion of coal instead of charging the atmosphere with hundreds of tons of imperfectly consumed fuel in suspension.

The chief remedies are: sufficient boiler capacity to avoid being compelled to be almost continuously stoking boilers for all they are worth, resulting in the unavoidable issue of black smoke; the provision of automatic stokers and means for the auxiliary supply of oxygen to the furnaces; chimney-stacks of sufficient capacity and height for the horsepower required; and the employment of duly-qualified and careful men, together with proper supervision. To prevent smoke it is necessary

regularly to maintain a high temperature in the boiler furnaces by careful and economical stoking combined with a uniform and ample supply of air, partly heated by the furnace in its passage thereto, and so admitted as to combine with the hydro-carbons given off. I have frequently seen these desired results brought about in Leicester and other towns, and there is now no lack of knowledge for advice, or of well-tried apparatus available.

Sewer Ventilation.

At the Congress last year I had the honour of dealing with the exhaustive tests in sewer ventilation which I had carried out at Leicester, and of the system there adopted, viz., the abolition of surface ventilating grids and the substitution of pipe shafts. This system is being extended in Leicester. No open grids are put on any newly-constructed public or private sewers, but they are ventilated by shafts alone; and as each well-grounded complaint arises the open grid is, after due investigation, abolished and a shaft provided. We have good reason to believe that this system, with a most thorough, frequent, and regular system of flushing of the sewers, is successful, and, where adopted, it has put an end to the numerous complaints of nuisance. The system now obtains to a more or less extent in many towns and districts throughout the country. It will also be remembered that this subject was considered of so much importance at the last Congress that a joint meeting of sections, at which I had the honour of presiding, was held, and the great consensus of opinion, largely voiced by eminent medical officers, as well as engineers and others, was that these grids were a source of nuisance, contributed to ill-health, and should be abolished.

This brings me to the very able paper which was then read by Mr. I. Shone, C.E., on "House and Town Drainage Systems of the Twentieth Century," in which he dealt with a new system of mechanical sewer ventilation which he had invented. I introduce this partly for the purpose of saying that arrangements are made for a practical test of this on a comparatively small section of sewers at Leicester. It is claimed for the system that it removes, dilutes, and diffuses gases from sewage continuously, without detriment to the health, or offence to the senses of the community, and that it is entirely independent of, and superior in force to, the variations of the outside air and the air inside the drains and sewers.

In the experiments which it is proposed to carry out at Leicester, the inventor estimates that a volume of 2 cubic feet of air per minute will be drawn through the drains and sewers for every house included in the area affected. An electric fan situated in a chamber under the footway will extract the air from the sewers and discharge it through a standard ventilating shaft sufficiently high to expel the air above the level of the houses adjoining, inlets for fresh air being provided on the top of all the private ventilating pipes in place of the ordinary cowls or terminals, giving a constant current of air through the house drains in the direction of the flow of the sewage. This arrangement applies to the system of house drainage adopted at Leicester, viz., that in all cases where drains do not pass under the houses, the intercepting trap is allowed to be dispensed with: but wherever drains do pass under houses, or in any case where the owner prefers it, the intercepting trap is used. In Mr. Shone's system, the intercepting trap arrangement is specially provided for, so as to admit the fresh air to the sewer at the end of the drain on the sewer side of the trap. It is proposed that very exhaustive and complete tests shall be made of this system, the results of which will, I hope, be made known in due course.

Old Branch Sewers.

One of the most necessary but too often neglected sanitary works, in addition to providing new main intercepting sewers of towns, is to clear out all the defective old branch sewers, which, although they may appear to be serving their purpose of carrying the sewage to the main sewers, are, nevertheless, through leakage and defective construction, great sources of danger by constantly polluting with sewage and foul air the subsoil around the habitations of the people. This, having regard to the well-established fact of extensive circulation of ground air, and the induced inward currents caused by the warmer and lighter air within houses, is an important matter. This pollution has been vividly exemplified in

Leicester, where, our system of new main intercepting sewers being completed at a great cost, we are undertaking the abolition of nearly thirty miles of old, defective tributary brick sewers of small diameter, laid about the middle of the last century, replacing them with new sewers constructed of glazed stoneware pipes with patent water-tight joints. We have already completed about nine miles of this work, and in nearly every case have found, not only large deposits of sewage sludge in the old sewers, but also that the ground around and underneath was saturated and highly polluted with sewage matter, which in some cases percolated into the ground for a considerable depth below the old sewer. In all such cases this polluted soil has been removed, in addition to the old sewer itself. Such a condition of subsoil must obviously be prejudicial to health, and it is most desirable that Local Authorities should not rest satisfied with providing new intercepting main sewers only, but should also abolish their old and defective branch sewers, to which the house drains are connected, and which are in such close proximity to the houses and properties they serve.

Purification of Sewage.

There is, perhaps, no more difficult problem to be solved than the successful purification of sewage, and certainly nothing has given so much hope of a satisfactory solution of the difficulty as the recent experiments which have been conducted on bacteriological lines. In the past many methods have been tried with more or less success, but none have been supported by scientific investigation to the extent accorded to this system. Exhaustive experiments have been carried out on bacteriological lines in many towns in this country, especially in Exeter, Manchester, Leeds, and under my own direction at Leicester. The particulars and results of the Leicester experiments were fully set forth in the Report I prepared thereon, and largely embodied also in the evidence I had the honour of giving before Lord Iddeleigh's Royal Commission on Sewage Disposal. The workers in the bacterial purification of sewage have become very numerous, but one may fairly mention broadly such distinguished men as Klein, Houston, Frankland, Roscoe, Woodhead, Parry Lawson and Andrews, Dibdin and Thudicum, Clowes, Dupre, Adney, Rideal, Scott-Moncrieff, Waring, and Ducat, and the well-known eminent officers of Lord Iddeleigh's Commission.

Much credit is also due to Mr. Cameron, the late City Surveyor of Exeter, for the untiring energy and ability with which he has devoted himself to his now famous idea of adapting to modern bacteriological practice the septic action which has for ages past prevailed in the old and familiar cesspool, but with this difference, that, although some advantage was derived from partial liquefaction of solid matters in those cesspools, they were a source of great danger to health from defective design and construction, and from their close proximity to dwellings and sources of drinking water, and the offensive overflowing liquid therefrom dangerously polluted the neighbouring ditches and brooks; whilst Mr. Cameron's septic tanks, with his excellent automatic appliances, are so designed, arranged, and located as to effect a large amount of liquefaction of suspended matters without the drawbacks and dangers peculiar to the old cesspool. The effluent from the septic tanks which is usually then treated on bacteria beds on the intermittent contact system as introduced and developed by Dibdin, is passed through one, two, or three beds successively, according to the strength of the sewage, in order to reach the necessary standard of purity. The continuous process of slow filtration through bacteria beds is now also much advocated by some; it is really the old system of filtration, but adapted to modern practice. It has not yet, however, made such successful headway as the contact or intermittent system.

Broadly speaking, the respective artificial bacterial systems, apart from land treatment, which are now practised, may be grouped as follows:—

Ordinary subsidence tanks of comparatively small capacity, followed either by contact beds or continuous filtration in beds; open or closed septic tanks, followed by contact beds or continuous filtration beds; contact beds or continuous filtration alone.

In some towns where the trade liquids render the sewage very stubborn to treatment, some preliminary chemical precipitation, in conjunc-

tion with subsidence tanks and contact beds, or continuous filtration beds, has been resorted to. These artificial processes are defined and dealt with in detail by the present Royal Commission.

There are several combinations of these systems which cannot be done justice to in the scope of this address; but from my own experiments, extending over a period of thirteen and a half months, treating volumes of 60,000 to 467,000 gallons per day by seventeen different processes, I have been led to certain conclusions, which I will briefly refer to, viz.:

That neither contact beds nor continuous filtration beds, without previous treatment of the sewage, will be permanently successful unless the sewage is extremely weak and largely free from matters in suspension.

That open or closed detritus or subsidence tanks, with a capacity of about one-sixth of the dry-weather flow per day, in conjunction with first and second, and where necessary, third contact beds, effect a thoroughly efficient purification, and in these experiments gave, with two contact beds, an average purification of 83.12 per cent. in albuminoid ammonia, and 90.15 per cent. in oxygen absorbed, at 80 deg. Fahr., in four hours, the average strength of the crude sewage being 1.2481 grains per gallon of albuminoid ammonia, and 7.5020 grains per gallon of oxygen absorbed. The same process, but with the addition of a third contact bed, gave an average purification of 86.74 per cent. in albuminoid ammonia, and 91.32 per cent. in oxygen absorbed, the average strength of the crude sewage being 1.3641 grains per gallon of albuminoid ammonia, and 7.8160 grains per gallon of oxygen absorbed.

The experiments with the use of a closed detritus tank, followed by a closed septic tank, and then double contact beds, gave an average purification of 79.91 per cent. in albuminoid ammonia, and 89.72 per cent. in oxygen absorbed, the average strength of the crude sewage being 1.0094 grains per gallon of albuminoid ammonia and 7.2152 grains per gallon of oxygen absorbed; and this same process, but with the addition of a third contact bed, gave an average purification of 83.68 per cent. in albuminoid ammonia and 86.64 per cent. in oxygen absorbed, the average strength of the crude sewage being .8837 grains per gallon of albuminoid ammonia and 7.2019 grains per gallon of oxygen absorbed. In these two last experiments, the volume treated in the septic tank for each twenty-four hours was equal to one and a quarter times its capacity in addition to the detritus tank.

Other important experiments which were carried out throughout the whole thirteen and a half months included the preliminary bacterial treatment of the sewage, with final purification on old pasture land with a heavy clay subsoil. The most successful of these was an eight months continuous test of treatment with a closed detritus tank, worked at the rate per day of six and three-quarter times its capacity, then through first-contact bacteria beds (three fillings a day), with final purification by broad irrigation on the old pasture. An average of numerous analyses gave a purification effected of 86.76 per cent. in albuminoid ammonia and 91.08 per cent. in oxygen absorbed, the average strength of the crude sewage being 1.1823 grains per gallon of albuminoid ammonia and 7.4419 grains per gallon of oxygen absorbed. It will be seen that this process of detritus tank, first-contact beds, and broad irrigation effects a purification quite equal to closed detritus tanks with triple treatment in contact beds.

For the last eleven years, the bulk of the sewage at Leicester has been efficiently purified by broad irrigation on a farm with a heavy clay subsoil; 1,350 acres have been specially laid out on a newly devised method, so that the effluent from the drains as well as from the surface can be intercepted and treated over and over again until a high standard is reached, and upon this work we expended about 60,000l. Owing, however, to the great increase of the population, and the abolition of a subsidiary sewage farm, it was found necessary to enlarge the system of treatment, and these experiments were carried out with the object of deciding (1) whether it would be better to increase the area of land laid out; (2) or adopt a system of preliminary clarification with subsequent final purification on the land without extension; (3) or even to adopt complete bacterial treatment to supersede the land.

The results of these experiments proved that the second mentioned scheme—viz., bacterial

clarification and land—gave an effluent at least equal to the best system of bacterial treatment on artificial lines, and the utilisation of the land already laid out gives a greater certainty of permanent success than there has yet been time to establish in connexion with complete bacterial treatment.

One very important fact in connexion with this system is that the clarified effluent from the detritus tank and first-contact bed does not when applied to broad irrigation, foul the grass land; in fact, in my opinion, it is a almost ideal process where plenty of land is available. I therefore designed a scheme of deal with our eight million gallons of sewage a day, comprising detritus tanks, with a capacity equal to one-sixth the daily dry weather flow, 12 acres of first-contact bacteria beds, the clarified effluent therefrom to be finally purified by broad irrigation, chiefly on old pasture and rye grass land. This scheme, which included some additional pumping plant and sewerage, estimated to cost about 170,000l., has been adopted by the Corporation, and is now before the Local Government Board. I may add that, so satisfactory has been this combined bacterial and land treatment, the Corporation have on my recommendation purchased an additional 1,260 acres of this sewage farm land which they previously held on a lease expiring in about fifteen years' time.

I will conclude this address by saying that one of the most valuable features of this and of the Sanitary Institute Congresses is the Municipal Section, securing the presence as delegates of the representatives of local government from all parts of the country, and I have found that, the more these gentlemen attend and take part in the proceedings and discussions, and the more knowledge they acquire thereby, the greater is the advance of sanitary science in the respective towns and districts they represent, and the weightier is the support they give to their officials in the furtherance of schemes, works, and movements for the health, convenience, and prosperity of their constituents.

AN APPRECIATIVE ANALYSIS OF MACADAM ROAD CONSTRUCTION.

This short paper is the result of a remark made during the discussion on Mr. Beaumont's paper at Leicester last year. Chemists and engineers have various kinds of analysis, each kind having a particular use, and at meetings of this kind utility should form the chief factor. The chemist deals qualitatively, or quantitatively as the case may be—and the utility of his labour is often found in synthetic work. An engineer determines the function of every detail of his machine, and fashions and shapes accordingly.

Now a road is a machine. Its functions are complex, but here only the broad commonplace uses will be considered. The main function of a road is to allow the traffic to pass over it with the least possible tractive effort—or to put it another way, to allow the carriage of weight per ton with the least expenditure of energy. The class of material used, the amount of friction between the material and the wheel surfaces, and many other factors might be considered, but that is not my purpose at present.

Broadly speaking, there are two parts to be considered in the construction of a road, and there are details in each part requiring attention. In the first place, every road should have a good foundation—in fact, the author looks upon the foundation as the most important part of a road; then, secondly, we have a wearable and renewable surface of varying material and varying thickness. These two parts of road differ in that once the foundation is laid it ought never to be tampered with, or it should be touched as little as possible. Without a perfect foundation it is impossible to obtain a perfect wearing surface. This statement needs no proof, for the proofs are to be seen on every hand. The analysis of foundations the author will pass by and restrict his observations to the "macadam" renewable section. Seventy years ago (in 1832), when Gordon wrote his book upon elemental locomotion, urging the value of mechanical traction on common roads, he said, "The more surface resistance is reduced, the easier certainly will be the draught and the less traction power will be required."

* A paper read by Mr. C. H. W. Biggs before the Incorporated Association of Municipal and County Engineers at the Annual Meeting held at Bristol, July 10, 17, 18, 1902.

"this species of resistance is avoided by using hard and durable surfaces in road-making."

The macadam section of a road consists of two parts: 1. The hard wearing surface which is supposed to directly carry the load, and (2) the matrix or material filling the interstices between the hard material.

The author would like to interpolate here that in his opinion all road construction with a wearing section of the macadam pattern is, from a scientific point of view, very imperfect. Consider each of these parts. The hard wearing surface is of stone broken down to pieces of say not more than 2 in. diameter through the longest section of intermediate shapes, but with many sharp edges. The crude idea is that these stones will by some means get into the form of a mosaic with the angular sides fitting in among each other, and so interlocking the mass that separate motion is impossible. Many engineers also use stones of smaller dimensions, which shall fall into the interstices of the larger material and aid the locking process. The idea embodied in this view is not bad, but the means usually employed to carry out the actual work are bad. The author cannot, however, suggest a more perfect method except to follow the suggestion of Mr. Beaumont in his presidential address to the Society of Engineers, when he said the best way was to have every stone laid by hand. What is really wanted is a machine that will joggle the stones into a natural position, not a steam-roller which pushes the stones into a position which is not the natural interlocking one, and which does further damage in that the sharp edges of the stones are ground off and the interlock obtained is far less perfect. A nice, gentle, and for some minutes more or less continuous, earthquake under a newly installed road would provide the joggle—but then you cannot put a brake upon an earthquake, nor command it when required! At any rate, the result when the stones are in place should be to give an absolutely smooth surface, with the very slightest space between the stones so as not to break continuity of surface of the road metal.

The second part of the macadam section consists of material to fill up the interstices left between the stones, and this detail has had far too little attention paid to it. Usually the material is sand or road detritus, both of which are bad, neither having a single good property to make it acceptable for the use to which it is put. Either of these materials is easily washed in or washed out. Neither conduces to the solidity of the mass sufficient to keep the stones from motion. After the matrix has been got into position, every part of the macadam section should be similar to, and—if the author may say so—have the same specific gravity as every other part. For perfection every cubic foot of macadam should consist of the same percentages of stone and matrix, which should be disposed in similar positions.

The author has referred to a remark in the discussion last year: it was to the effect that automobiles exerted a very damaging "sucker" effect which played havoc with even the best macadam roads. This sucker effect pulls away the loose dusty matrix around the stones, tends to break the lock of the section and generally to make the road, with an insufficiently resisting matrix, merely a heap of stones and not a good road surface. The remedy in this particular is different material to form the matrix, and it would be a libel upon engineers to say or to think they cannot devise some means to overcome this difficulty. Some have seen the importance of this detail, as may be seen in the use of tar macadam, and in the more recent constructions of Mr. Hooley in Nottinghamshire. The author's text, however, is analysis, not synthesis.

In conclusion, what is the result under the present system when re-metalling a road? Submit the process to analysis. Two systems prevail—perhaps it should be said one system with a few exceptions. The old worn surface is picked by manual labour or by means of a scarifier; the new metal is thrown on, and then rolled, with the usual addition of matrix material. Now, unless stones and matrix are equally distributed over equal areas, it is absolutely impossible to so make a road that will not in a very short time wear in holes and become merely a succession of hills and hollows, every one of which accentuates enormously the wear and tear of the road, and, as re-metalling is usually carried out, a good surface is impossible, there being no equality of

distribution over equal areas of either old or new materials—metal or matrix.

Practically, then, the analysis comes to this, that a road consists—

1. Of a foundation which should be permanent and perfect.
2. Of a wearable section replaceable when necessary.
3. In a macadam section it consists—
 - a. Of angular stones of varying size from a minimum to a maximum.
 - b. Of a material forming a matrix for the stones.

The author also asserts that the road when originally made or after repair should be absolutely homogeneous, otherwise its lack of homogeneity leads to more rapid destruction.

Either you agree with this or you do not. If you do, you must agree that generally something needs to be done to better the surface of our macadamised roads. What exactly has to be done, and how, is for you to determine. There is a goal to be reached; there are materials to use in the details of the work in order to reach the goal. If one material is bad, try another.

INTERNATIONAL FIRE EXHIBITION.

The arrangements for the International Fire Exhibition at Earl's Court, 1903, are proceeding, the British Fire Prevention Committee's scheme having met with considerable encouragement. The Duke of Marlborough, K.G., as President of the National Fire Brigades Union, will act as Vice-President of the Advisory Council, and Mr. Edwin O. Sachs, as Chairman of the British Fire Prevention Committee, will act as Chairman of the Executive. Mr. Marsland will perform the duties of Hon. Secretary of the exhibition.

Among those who have consented to act on the Advisory Council, the majority of whom have expressed their intention, we are informed, of taking an active part in the work, are the President of the Royal Society, Sir William Huggins; the Presidents of the Institution of Mechanical Engineers, the Institution of Electrical Engineers, the Chemical Society, and the Institute of Chemistry; also Sir Douglas Fox, Past President of the Institution of Civil Engineers; and Professor Aitchison, Past President of the Royal Institute of British Architects. Among Government officials, we are informed, who will take part are Sir John Taylor, K.C.B., Consulting Architect, and Mr. Tanner, Principal Architect, to H.M. Office of Works; Colonel Bainbridge, C.B., Chief Superintendent of H.M. Ordnance Factories; Captain Thomson, Chief Inspector of Explosives; Dr. Thorpe, F.R.S., Principal of the Government Laboratories; Dr. Whitelegge, C.B., Chief Inspector of Factories; Sir James Williamson, C.B., Director of H.M. Dockyards; Mr. Gavey, Engineer-in-Chief of the General Post Office, and Sir W. H. Preece, K.C.B., Consulting Engineer of the same Department.

The historical side of the exhibition will be represented by Sir Edward Maunde Thompson, K.C.B., Director of the British Museum; Sir Henry Maxwell Lyte, K.C.B., Deputy Keeper of the Public Records. Other gentlemen whose names are included are Sir Henry Trueman Wood; Mr. Dredge, C.M.G.; Mr. Isidore Spielmann; Sir Henry Lockyer, F.R.S.; Major-General Festing, F.R.S.; Professor Ray Lankester, F.R.S.; Commandatore Marconi; Sir Wyke Bayliss, President of the Royal Society of British Artists; Mr. Lionel Cust; Sir Henry Irving and Mr. Moss (of the Hippodrome). Members of the fire, salvage, and ambulance services include Major Fox, Chief of the Salvage Corps; Lieutenant-Colonel Seabroke, Chairman of the National Fire Brigades Union; Lieutenant-Colonel Dixon, and Mr. J. H. Dyer, Vice-Presidents.

Correspondence.

OSCILLATION IN SPINNING MILLS.

SIR,—Referring to the letter of "W." in your issue of the 9th inst., the oscillation of the looms themselves cannot, of course, be greatly reduced, but its effects on the floors and walls of the building may be almost entirely obviated by placing the looms on properly constructed platform supports which

receive the oscillation and vibration, and destroy their further effects. These elastic platforms as employed at Paris are easily constructed either on the ground floor or the upper floors of existing buildings. They consist of a surface of armoured brick and cement construction, designed so as to properly distribute the weight of the machine or loom over a certain portion of the floor surface directly under the loom, and on this surface are arranged a certain number of india-rubber isolating blocks somewhat in the style of a railway buffer, these in their turn supporting a thin platform of steel-cored brick and armoured cement, arranged to carry the bed-plate or the supports of the machine or loom. This system, after considerable research, and experiments made with the combination of two systems, that of the Cottancin armoured platforms and the Anthoni isolating blocks, permitted the two engineers to arrive at an almost perfect result. Amongst the many applications to which these platforms have been adapted, may be mentioned that of destroying the effect of the oscillation and vibration of the Marionni printing-machines, the rapid rotary action of which is known to be disastrous in its effects on buildings containing these machines. They have also been applied as platforms for rapid steam-hammers, and an interesting instance is that of the application of the system to the dynamo connected with the motors of the frigorific engines—with the motors of English make—employed by the Société Générale d'Alimentation for the cold storage of food-stuffs coming from the Halles Centrales at Paris, and established in the basement of the Bourse de Commerce, where all vibration from machines is absolutely prohibited.

I should be pleased to give any information in my power to your correspondent or any interested in these platforms. Of course, each special case demands studying according to its requirements. ARTHUR VYE-PARMINTER.

Paris.

BILLS OF QUANTITIES.

SIR,—On p. 169 *ante*, "R. O. D." asks a question which I will attempt to answer.

It appears that certain items shown on the contract drawings and described in the specification were omitted from the bills of quantities by the surveyor. It is usually assumed that any person performing professional work for remuneration is responsible for the accuracy of such work, and many a builder has been paid by a surveyor for errors in quantities, although such errors are very few.

It has, I think, always been assumed that a surveyor was liable for the mistakes made by him or his clerks, unless the quantities formed part of the contract. In practice, any little errors discovered during the execution of the works are adjusted in the settlement of the variations.

Great was the surprise of the profession in July, 1888, when the case of Priestley v. Stone, which had been decided in favour of the defendant, came before the Court of Appeal, the Master of the Rolls and Lord Justices Lindley and Bowen. It was then decided that, where an architect employs a quantity surveyor whose bills of quantities are sent out to the builders wishing to tender, there is no privity of contract between the quantity surveyor and the builder.

The custom as between surveyors and builders was not proved, so that if the builder has any remedy it is clearly not against the surveyor, according to this important decision. The qualifications of the quantity surveyor, therefore, become a matter of interest to builders.

HENRY LOVEGROVE.

BUILDINGS IN HOLLAND.

SIR,—Can any of your readers give the names of books dealing with the churches and public buildings of Holland before the last century? ANSTEL.

WATERPROOFING CEMENT FOR ROOFS.

SIR,—Will any reader kindly say if there is a material which may be mixed with the finishing coat of sand and cement on a concrete roof which would render the cement waterproof in lieu of asphaltising the top? A SUBSCRIBER.

STAIN FOR WOOD.

SIR,—I notice in your issue of August 16 an inquiry from "H. W. R." re Peter Bratch's "Carbolium." I think he must mean Messrs. Peters, Bartsch, & Co.'s preparation, known as "Carbolium avarianus," which answers to the description he gives of the stain. Their address is, Peters, Bartsch, & Co., Derby. H. W. DOLLING.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

9.—CONCRETE—TAR CONCRETE—ASPHALT—ROMAN CEMENT—PLASTER OF PARIS—INTERNAL PLASTERING.

CONCRETE is a substitute for stone, produced by mixing hydraulic lime or cement with broken brick, broken stone, coke breeze, ballast, or other hard, insoluble, and undecomposable substance and a suitable quantity of water. Sand is also an ingredient of some classes of concrete.

The lime or cement is known technically as the *matrix*, and the inert material as the *aggregate*. The aggregate should be wetted before being mixed with the matrix, as a stronger concrete is then obtained than when water is added to the matrix mixed with a dry aggregate. Portland cement is now nearly always used as the matrix, as it is comparatively uniform in composition, and superior to any natural hydraulic lime.

Concrete and the London Building Act.—The by-laws of the London Building Act, 1894, require concrete for foundations to be composed of "clean gravel, broken hard brick, properly burnt ballast, or other hard material to be approved by the District Surveyor, well mixed with freshly-burnt lime or cement in the proportions of 1 of lime to 6, and 1 of cement to 8 of the other material."

For Walls the concrete must be "composed of Portland cement and of clean Thames or pit ballast or gravel, or broken brick or stone or furnace clinkers, with clean sand, in the following proportions, viz.:—1 part of Portland cement, 2 parts of clean sand, and 3 parts of the coarse material, which is to be broken up sufficiently small to pass through a 2-in. ring."

Concrete has been used for almost every conceivable purpose in building—foundations, floors, roofs, walls, stairs, tanks, and conduits being commonly constructed with it. The composition of the concrete varies with the nature of the work for which it is to be employed, heavy concretes being used for engineering works and light concretes for floors and roofs.

For massive structures, such as sea walls, the concrete is frequently first made into blocks in suitable moulds, and these blocks are then cemented together like blocks of stone. For walls of buildings a double-walled frame is sometimes erected in timber on the site the concrete wall is to occupy, and wet concrete is rammed between the walls of the frame. When the concrete is dry the frame is removed.

Coke-breeze Concrete.—Coke-breeze differs from most of the aggregates commonly used for concrete in being combustible. For its combustion, however, it requires a free supply of air, and when mixed with lime or cement and made into concrete, so little air can obtain contact with it that the concrete is practically incombustible.

Coke-breeze concrete should not, however, be used under hearths as it has been known to become red hot and cause ignition of adjacent woodwork.

Coke-breeze is very largely used for building in London because it can be readily obtained and produces a very light concrete to which wood can be nailed. Coke-breeze concrete is, however, inferior in strength to concrete in which broken brick or stone is used as the aggregate, and the coke-breeze contains impurities which may prejudicially affect the durability of the concrete.

Quick-setting Concrete.—When it is necessary that the concrete should set very rapidly, as, for example, on sites which become covered with water at high tide, Roman or Medina cement is used, partly or wholly, as the matrix.

Chemical Composition of Concrete.—The chemical composition of ordinary lime or cement concrete is somewhat similar to that of lime or cement mortar. The siliceous matter (or carbonaceous matter in breeze concrete) insoluble in acid is, of course, higher than in good mortar, but the proportions of lime, silica soluble in hydrochloric acid, and silica soluble in caustic soda afford an indication, as in the case of mortar, of the quality of the concrete.

Tar Concrete.—Tar concrete is a concrete in which tar is used as a matrix instead of hydraulic lime or Portland cement. The

aggregate consists of broken stones, shingle, or any of the aggregates used for cement concrete. About twelve gallons of tar are used for every cubic yard of concrete manufactured. The tar should be heated in open boilers at about 194 deg. Fahr. for from four to twelve hours before being mixed with the aggregate, in order to expel all water, volatile vapours, and light oils. Coal tar so treated consists largely of free carbon in a finely divided condition held in suspension in a mixture of creosote, naphthalene, and anthracene oils.

Asphalt.—A natural asphalt as found in Europe is a limestone containing a considerable proportion of bitumen, to which latter is due the deep brown colour of the natural rock. The asphalt found at Pyramont Seyssel, in the Jura mountains of France, consists of about 90 per cent. of carbonate of lime with 10 per cent. of bitumen. The asphalt found in the Val de Travers at Neuchâtel, in Switzerland, contains rather more bitumen (10 to 20 per cent.) than that found at Seyssel. Asphaltic rock is found in many parts of the world, but varies largely in its composition in different localities.

The bitumen found in asphalt consists of a complex mixture of liquid, semi-solid, and solid hydrocarbons. The ultimate composition of natural bitumen is variable, but the approximate proportions of the elements in a normal sample of bitumen are 84 per cent. carbon, 11 per cent. hydrogen, 4 per cent. sulphur, and 1 per cent. nitrogen.

Until recently very little was known regarding the chemical composition of asphalt, but the results of an exhaustive investigation into the nature and origin of asphalt were communicated to the Society of Chemical Industry in 1898 by Mr. Clifford Richardson, and those interested in the subject will find much interesting information in his communication. Incidentally Mr. Richardson points out that oxygen is very rarely present in bitumen, although that element has hitherto been commonly regarded as a normal constituent of natural bitumen.

The natural asphalt of Trinidad contains practically no lime, but a large proportion of clay and free silica. Trinidad Lake pitch or asphalt consists of about 54 per cent. bitumen, 36 per cent. clay and silica, and 10 per cent. organic matter other than bitumen. Trinidad asphalt as used in England is a mixture of this natural deposit with crushed stone, chalk, or other aggregate.

In certain parts of America deposits are found which consist of almost pure bitumen. This bitumen is there commonly known as asphalt, but in this country the term "asphalt" is now usually applied to a concrete formed by mixing bitumen with an aggregate, or to any natural concrete or cement in which bitumen forms the matrix.

Methods of Using Asphalt.—For road paving, Val de Travers or Seyssel asphalt rock is ground to powder and subjected to heat in a revolving boiler, and then transferred in closed iron carts to the spot where it is to be laid. The hot powder is spread over the cement-concrete foundation of the road, and is compressed by heated iron hammers until a smooth, even surface, without cracks, and impervious to water, has been produced.

Another method of paving with asphalt consists in mixing the powdered asphalt with grit and heating the mixture in large cauldrons together with a little bitumen. The material in the cauldron is kept in a state of agitation by machinery for several hours until the mixture has been converted into homogeneous mastic. This mastic may be transferred direct in ladles from the cauldrons to the concrete road foundation and worked into position while liquid or plastic; but it is a more common practice to run the mixture into moulds capable of containing about 125 lbs., and allow it to cool and harden. The blocks of mastic are taken to the spot where the paving is being constructed, and are there broken up and remelted in cauldrons. Mastic blocks are manufactured in three grades: (1) asphalt without grit, (2) asphalt with fine grit, and (3) asphalt with coarse grit.

Artificial Asphalts are sometimes manufactured by boiling a mixture of coal-tar pitch with ground chalk, sand, or other aggregate. They are inferior in quality to the best grades of natural asphalt. *Coal-tar pitch* is the residue obtained when tar is subjected to distillation, and is semi-liquid while hot, but solidifies in cooling. It contains a large proportion of free carbon. Coal-tar pitch is sometimes called

bitumen, but is more brittle and more readily softened by heat than mineral bitumen, and is in every respect inferior to mineral pitch or bitumen for paving.

Roman Cement is a calcareous cement prepared by carefully calcining nodules of argillaceous limestone found in the London clay. These nodules are known as "septaria," and consist of limestone mixed with 30 to 40 per cent. of clay. They are of a bluish-green colour, and are calcined at the lowest temperature which will suffice to expel the carbon dioxide from the limestone. Upon calcination the material assumes a brown colour.

Roman cement has about one-third the cementing strength of Portland cement and should not be mixed with more than its own volume of sand, for a larger addition of sand renders the cement dangerously weak. Roman cement sets very rapidly and is therefore sometimes used for work which must set between the periods of low and high tide, but Portland cement is now usually employed for work for which Roman cement was formerly used.

Other forms of Roman cement made from septaria found in widely distant localities are known respectively as *Medina*, *Calderswood*, *Harwich*, *Sheppey*, *Whitby*, *Mulgrave's*, and *Atkinson's* cement. They all approximate in composition more or less closely to the Roman cement made from the septaria of the London clay.

Plaster of Paris.—Gypsum, alabaster, and selenite are three minerals having the same chemical composition. Each consists of calcium sulphate combined with two molecules of water, and is represented by the formula $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. Plaster of Paris is made by exposing gypsum to a temperature of about 110 deg. C., which causes the expulsion of most of the water and converts the $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (gypsum) into $2\text{CaSO}_4 \cdot \text{H}_2\text{O}$ (plaster of Paris).

When the gypsum is heated to a temperature of over 200 deg. C., all the water is expelled, and the sulphate of lime which remains is "dead burnt," takes up water very slowly, and refuses to set.

When properly prepared plaster of Paris is ground to a fine powder and mixed into a paste with water it combines with part of the water to again form $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, and rapidly sets to a hard mass. As the liquid paste of plaster of Paris solidifies, it evolves heat and expands.

In order to produce a plaster which sets harder and less rapidly than plaster of Paris, the gypsum before calcination may be mixed with alum, borax, or carbonate of potash.

Keene's Cement is made by soaking gypsum with a solution of alum, drying the mixture, then calcining it as in the manufacture of ordinary plaster of Paris, and finally grinding the calcined residue.

Parian Cement is manufactured by calcining a mixture of gypsum and borax.

Martin's Cement is produced by calcining a mixture of gypsum and carbonate of potash.

Stucco is a name applied to any calcareous plaster or cement used for covering walls. The hydraulic lime or cement at one time largely employed for covering external walls is called stucco, and the same term is applied to the mixtures of lime and plaster used for producing smooth surfaces on internal walls.

Internal Plastering.—Materials of widely different composition are used for internal plastering, and it would be difficult to give a better description of the composition of plaster of a satisfactory character than is contained in the following extracts relating to plastering from the By-laws of the London Building Act, 1894.

"Plastering or coarse stuff shall be composed of lime and sand in the proportion of 1 of lime to 3 of sand mixed with water and hair, but Portland cement, Keene's cement, Parian cement, Martin's cement, Selenitic cement, or other approved cement or plaster of Paris may also be used for plastering."

The lime to be used to be freshly burned lime.

The sand to be used must be clean sharp sand free from loam or earthy matter.

The hair to be used must be good and sound and free from grease or dirt: 1 lb. of hair to be used to every 3 cubic ft. of coarse stuff. Fibrous material to the satisfaction of the District Surveyor may be used instead of hair, and ground brick or furnace slag to the satisfaction of the District Surveyor may be used instead of sand.

The setting coat shall be composed of lime

AUSTRALIA.—Extensive additions are to be made at the Prince Alfred Hospital, Sydney, at a cost of about 42,000,000. The work of the superstructure of the new central railway offices in Melbourne has now been commenced. A gigantic bridge, which is estimated to cost 1,500,000, is to be constructed across Sydney harbour to connect that city with North Shore. The designs are for a bridge 3,000 ft. long without approaches; the latter are to come under separate consideration.—The work of widening and deepening the Hopetoun channel at Geelong has almost been completed by the Public Works Department. The channel has been deepened to 23 ft. and widened to 150 ft.

MISCELLANEOUS.

THE SANITARY INSTITUTE.—The nineteenth congress of the Sanitary Institute will open at Manchester on September 9. Nearly 350 sanitary authorities, including ten metropolitan boroughs and the London School Board, have appointed delegates to attend, and the principal meetings are to be held in the chemical, history, and physics theatres of Owens College, conferences being also arranged in the large hall and other portions of the Municipal School of Technology. Lord Egerton of Tatton will be the President of the conference, and the Lord Mayor of Manchester, Dr. James Hov, is the chairman of the local committee which has been formed for the reception and entertainment of the delegates. Sir James Crichton Browne, Sir Alexander Binnie, Professor A. Sheridan Delepine, Mr. Alderman McDougall, J.P., Mr. Alderman W. Smith, Mr. James Niven, Mr. C. Jones, M.Inst.C.E., Mr. W. A. Taylor, F.R.C.V.S., Mr. W. Bland, Mrs. W. O. Meek, and Professor Sherrington are the presidents of sections and conferences. The delegates will be received at the Town Hall by the Lord Mayor, who will also open the Health Exhibition, which is to be held in connexion with the congress. Garden parties have been arranged at Tatton Park and Peel Park, and there is to be a conversation in the Town Hall on the evening of the 11th. The popular lecture will be given by Sir William J. Collins, M.D., L.C.C., on "The Man versus the Germ."

ELECTRIC LIGHT, NANTWICH.—On the 20th inst., Colonel Langton Coke, C.E., held an inquiry at Nantwich with regard to an application by the Urban Council to borrow £2,505*l.* for electric lighting purposes and £2,75*l.* for the erection of a refuse destructor in support of the application was given by the Clerk and Surveyor to the Urban Council, and by Mr. Peers, electrical engineer, of Manchester. The scheme provides for the erection of generating works and a refuse destructor on the Council's sewage farm close to the town, and for the same motive power to be used for both purposes. A memorial from manufacturers and tradesmen complaining that they were unable to compete with manufacturers and tradesmen in other towns owing to the excessive price charged for gas was read in favour of the scheme. The annual payments were estimated at £1,932*l.*, and the income at £2,440*l.*, this sum including £2,505*l.*, which it was anticipated would be recovered from the sale of electricity to the public at a charge of 6*d.* per unit.

SHADWELL FISH MARKET.—The Corporation of London have completed their purchase of the market at Shadwell from the London Rivers Fish Market Co. at a price of £75,000*l.*, payable in Corporation Two and a Half per Cent. stock at par. The rental of property at the market amounts at present to £4,458*l.* per annum. Some of the premises, however, are untenantable, and building sites are available for a development of the undertaking. The area covered by the purchase extends over 351,700 ft. superficial. The market was established by a company under an Act of Parliament obtained in 1882. In their Act of last year the Corporation took powers for a ratification, the sale to them, and for the widening, of the High-street, Shadwell, the improvement and extension of the market, and the erection of houses to be let at moderate rents to members of the labouring classes. Negotiations for the acquisition of the property were opened by the Corporation in April, 1899.

ELECTRIC LIGHT, "WESTINGHOUSE BUILDINGS," STRAND.—Electric light works have been carried out at "Westinghouse Buildings" and its annexe, at the corner of Norfolk-street and the Strand. The building, comprising part of the Law Land Company's estate, consists of seven floors and a basement, each floor being designed for about fourteen rooms. The wire service mains are brought into the building by the Charing Cross and Strand Electricity Supply Corporation, the supply being by continuous current at a pressure of 200 volts at the lamps. The main distribution board is of enamelled slate mounted in a massive oak frame, and provides for a separate circuit to each floor of the building, each circuit being controlled by D.P. fuses and a S.P. chopper type switch. From this main board a separate circuit is run to each of the local distribution boards for supplying the various floors through the D.P. bridge type fuses. All lamp circuits are run back direct to distribution board, no fuses being employed locally. The maximum number of incandescent lamps supplied from any sub-circuit is eight, and with few exceptions every lamp is furnished with a separate switch. The wiring is carried out in Simplex braided tube, all the tubes being fixed in position as the building work proceeded, and the wires drawn in afterwards. "Westinghouse" building contains upwards of 700 lights, together with a system of electric bells for the tenants and service, gas, fire points, speaking tubes, &c. The work is under the supervision of Mr. Frederic H. Taylor, C.E., of Victoria-street, S.W., the consulting engineer to the Company, and is carried out by the electrical staff of the Law Land building department.

"THE FORMAL GARDENS OF ENGLAND AND SCOTLAND."—Her Majesty the Queen has accepted the dedication of Mr. H. Inigo Trigg's work on the Formal Gardens of England and Scotland, the

concluding part of which will be shortly issued to the subscribers by Mr. B. T. Eatsford.

THE TRADES UNION CONGRESS.—The programme of the Trades Union Congress, which will be opened in London on Monday, contains resolutions dealing with the Education Bill, compulsory arbitration in labour disputes, the housing question, labour representation, and old-age pensions. The Dockers' Union will propose that "in view of the colossal growth of trusts and combines of speculative capitalists and consequent concentration of capital and monopoly of industry, this Congress foresees the grave danger to the nation and the toilers of dislocation of trade, stoppage of work, and distress of wage earners. To avert such a calamity this Congress calls upon the Legislature to pass an Act creating a supreme Court of Arbitration, the Court to be presided over by a Lord Justice, and to be constituted by an equal number of workmen's and employers' representatives, who shall take evidence from the party aggrieved, or their representatives; legal experts to be in all cases debarred from acting as representatives; the power of the Court to be compulsory; conciliation courts for the various industrial centres to be formed, to act in conjunction with the supreme court, and to be termed district courts; in all cases workmen's representatives to be selected by trade unions as commissioners or members of the supreme court; for the effective dealing with disputes, commissioners to be constituted for the great staple trades, viz. mining, textile, transport, engineering, and agriculture, with a Crown judge over each; failing the courts settling disputes, cases to be submitted to the Supreme Court. Only unions registered under the Trade Union Act and firms covered by registration under an Act identical with the Trade Union Act to be eligible for consideration of Courts or Supreme Court of Arbitration. We therefore instruct the Parliamentary Committee to draft a Bill for the purposes aforesaid."

LEGAL.

DISPUTE AS TO THE ERECTION OF A WALL.

THE case of Townsend v. Brickwood & Co., Ltd., was mentioned to Mr. Justice Swinfen Eady in the Vacation Court on Wednesday last, the 27th inst., on a motion by the plaintiff for an interim injunction to restrain the erection of a wall, &c., until the trial of the action or further order.

Learned counsel said that the parties had come to terms, and he asked that on the defendants undertaking not to build except in accordance with a certain plan, and the plaintiff giving the usual undertaking in damages, the motion might be ordered to stand till the trial, the costs of the motion being made costs in the action.

His Lordship said that the proper course in the circumstances was for him to make no order on the motion, the costs being made costs in the action. Order accordingly.

A BUILDING CASE SETTLED.

THE case of the Mansions Proprietary, Ltd., v. Queen Anne's Chambers, Ltd., was mentioned to Mr. Justice Swinfen Eady in the Vacation Court on Wednesday last, the 27th inst., on a motion by the plaintiffs for an interim injunction to restrain the defendants from the alleged interference with a party wall, &c.

Mr. Bramwell Davis, K.C., for the plaintiffs, stated that the parties had been able to come to terms, which were, in effect, that the plaintiffs should have the benefit of an award already taken between the freeholders and the building owners. His application accordingly was that his Lordship would make an order by consent, the minutes to be signed by the learned junior counsel on both sides.

His Lordship: I will put it in this way. I will order a stay of all further proceedings in the action on the terms agreed, the minutes as to which will be signed by the junior counsel on both sides. Order accordingly.

PROBABLE SETTLEMENT OF AN ANCIENT LIGHT CASE.

THE case of Ellis v. Skillington was before Mr. Justice Swinfen Eady in the Vacation Court on Wednesday last, the 27th inst., on a motion by the plaintiff for an interim injunction to restrain the defendant until trial or further order from erecting buildings so as to obstruct the plaintiff's ancient light.

Dr. Napier, for the plaintiff, said that the parties were negotiating as to a settlement, and asked that the motion might stand over for a week on the defendant giving an undertaking in the terms of the notice of motion.

His Lordship: How high is the defendant's new building—above or below the old building?

Dr. Napier: I am afraid I cannot tell your lordship that.

His Lordship: Have you filed all your evidence in support of your motion?

Dr. Napier replied in the negative. The plaintiff wished to file further evidence by surveyors and architects.

His Lordship: Have you come to an agreement yet?

Dr. Napier: No, not yet.

His Lordship: I do not object to the motion standing over till next week, but must be available for determination then—either settle it or contest it. The evidence on behalf of the plaintiff must be complete by this day week.

Order accordingly.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

8,387.—**ATMOSPHERICAL GAS BURNERS.** R. T. Glover and F. G. Glover.—For effecting more perfect combustion, and to prevent "lighting-back," in annular and other burners, the inventors devise an air-supply tube, together with concentric mixing and burner tubes of which the several wire-gauze outlets are disposed in such a manner that they will cause the mixed air and gas to follow a circuitous course.

8,427.—**A CREMATORY FURNACE.** F. Millward.—A current of air, through inlets above the furnace-doors, mixes with the hot gases that flow into the combustion-chamber, and short air-tubes, made in one piece with the movable front fire-bars, project to the fuel. The bars are cooled, and gas is thereby generated by the spraying of water from nozzles at the sides of the fire-bars. Side-flues convey the hot gases into the cremation chambers, whence down-take flues conduct them to the chimney. A lower chamber serves for the final process, and the ashes are removed with an asbestos brush through a chute into an urn. Waste heat from the furnace warms the chapel or mortuary chamber by means of air-heating flues or water-tanks arranged upon each side of the furnace.

8,428.—**A DOUBLY-ACTING SPRING HINGE FOR DOORS.** F. Currie.—A pivot on the casing engages with a recess in the housing in which it is fastened (for a ready fixing or removal of the door), with a recessed plate secured with screws. A spring in the housing regulates a tension-plate which is worked by rollers carried by the door. The door is fitted with shanks and fastened horizontally with set-screws. The spring is adjusted with a screw and a nut to which it is affixed.

8,432.—**IMPROVEMENTS IN SECTION-LADDERS.** J. Daniel.—A locking-bar which is pivoted upon the upper section of a telescopic ladder engages with the rungs of the lower section. A stud takes a slotted lug of the bar, which is forced over the rung by a spring, and is pressed aside by the rungs as one lifts the section by means of a cord and pulley. For lowering the section the bar can be forced clear from the rungs by means of a deflecting arm that is pivoted underneath it. A spring keeps the arm in play, but it can be turned downwards out of the way or the lifting of the upper section.

8,454.—**AN APPLIANCE FOR USE WITH GAS-METERS.** G. Dittmar.—To enable measurement of a high-pressure gas with an ordinary meter, the meter is surrounded with a casing that holds gas having the same or about the same pressure as that of the gas which is to be measured; the inlet or the outlet, or either of them, may be connected directly to the meter; if both of them are so connected a high-pressure gas is admitted independently into the outer casing.

8,456.—**A GRAB FOR DREDGING AND EXCAVATING OPERATIONS.** W. J. C. Beckett.—Four segmental spear-head shaped blades pivoted on to the frame and linked to the lower half of the lower block constitute the bucket; both the lower and upper parts of the block slide upon a pair of tubular rods which project parallel-wise from the bucket-frame; the blades are locked in position for digging by an engagement between projections from the rods and catches on the lower block; the upper ends of the catch-levers are set over the surface of the lower half of the lower block in order that they may become unlocked and the blades be closed by the fall of the upper half on to the lower half of the lower block on the slackening of the pulley of the lower half, the pulley being passed under the lower half of the block; in the closed position hooks hang the upper block to the bell, but as the bucket and rods rise the lower half of the upper block will be lifted through the contact of stops upon the rods; the grab can then be lowered with its blades opened, as the weight of the upper half, exerted upon fingers, liberates the hooks; when the chain is hauled in, the bucket being closed, the upper end of the grab enters the bell, where it is retained by the hooks as a spring moves them outwards; the lower block falls with a further slackening until its upper part impinges against projections from bars; then the lower part falls a little more, and engagement of the catches with pins open the bucket for discharge.

8,480.—**A HOLDER FOR LAMP-GLOBES, CHIMNEYS, SHADES, &c.** C. W. Kemp.—When the globe or chimney is put into its place, the pivoted arms of the holder will firstly move upwards and will then

rop beneath to engage with the rim. One raises by hand one of the arms for removal of the globe. The movement downwards of the arms is restricted with stops, and counterbalancing weights or springs supplement the action, through gravity, of the catches.

8,503.—VIBRATING JAW-CRUSHERS AND SCREENS OR STONE CRUSHING AND SCREENING MACHINERY: *V. H. Baxter.*—One end of a lever which is pivoted at its middle is joined to the draw-back of the swivelling jaw, and the other end is joined with a rod to the rocking-lever over its middle point. The former lever has notches that take V-shaped blocks upon the rods. For the bedding end of the lower screen, which receives material from the crusher, a conical mouthpiece and a flange for the cylindrical screen are fashioned in a disc, and the tailings are carried up to the per screen. The flange constitutes a pulley for the elevator-belt, and the supporting arms of the flange are set in a plane distant to some extent from the face of the disc, the screen being fastened against the arm-ends.

8,518.—ELECTRICITY METERS: *V. A. Arcioni.*—For measuring quantity, energy, and current. A spring, whereof the pull is varied automatically with a motor and is indicated with either a marker and recording-cylinder, or a pointer and scale, returns the pivoted coil of an electro-dynamometer to its zero position in opposition to the deflecting action of the current. For the dynamometer may be employed a pair of attracted coils, or a core and solenoid. The field magnet of the motor is connected between conductors through a divided resistance of which the ends are connected to two contacts, an insulated arm between the contacts is mounted upon a movable coil; the middle of the divided resistance and the arm as well are connected to the motor-brushes. Thus the motor will turn in either direction as the contact or the other is touched by the movable arm. A screw, driven by the motor, drives a worm-wheel upon which a pointer is mounted, the screw carries a non-rotatable nut that is secured to one end of a spring whereof the other end is fastened to an arm of the movable coil. A marker is mounted upon the nut.

8,519.—APPARATUS FOR OPENING AND CLOSING WINDOWS, DOORS, VENTILATORS, AND SO ON: *R. Adams.*—In one form a three-armed lever is pivoted to a fan-light and to a link that is pivoted on to the window-frame, the third arm of the lever is also pivoted to a link worked with a crank and worm-gearing; for working a set of fan-lights in one line, at one and the same time, a triple lever is mounted at the top and bottom windows, and the levers are joined to a rod which thus takes a parallel movement, the windows being linked to the rod.

8,550.—MANUFACTURE OF IMITATION MARBLE AND STONE: *G. Weber.*—The goods, intended for facing walls and floors, for columns, fountains, and similar uses, are cast in "sops" or magnesite and cement, and so on, in metallic moulds having a lining or coating of hard lac or enamel that will resist the heat engendered in the course of setting. In one adaptation is employed a flat plate fitted with a skeleton of wood, cement, or glazed board, which is placed in the mass before it has become set.

8,619.—A REGULATOR VALVE FOR DOMESTIC WATER SUPPLY: *E. G. Watrous.*—A hollow stem carries a valve that regulates communication between the inlet and outlet chambers, a flanged collar is screwed to the stem beneath the valve; a piston at the upper end of the stem works in a retarding-chamber, which communicates with a cushioning-chamber by means of a time-screw, and with an outlet through the hollowed stem; a valve upon a rod normally closes the outlet, and the working lever engages with the lower end of the rod. Pressure upon the seat lifts the valve stem, and so opens the valve for escape of water from the space above, whereupon the supply will flow into a chamber below, and the main valve opening will be shut. As the seat again rises, the return flow of water upwards through a time-port slowly closes the main valve.

8,653.—OPENING-DEVICES FOR MOTOR STARTING-SPINDLES: *W. R. Ridings and Verity, Limited.*—For no-load and over-load opening-devices, the inventors mount an arm that closes the main circuit at a rheostat arm upon a spindle, and provide each arm with a spring. The former arm is retained by a pin, or its own pivoted pawl, that engages with a catch upon the pivoted armature, a fixed core is placed in the shunt winding of the magnet, and beneath an adjustable core. The armature will not be held down, and the arm is thereby free, in the absence of current; but if an excess of current flows through the series winding of the magnet, the adjustable core is lifted and an arm raises the armature to liberate the arm on the spindle.

8,686.—A WATER BOILER OR GEYSER: *H. Fackel.*—For purposes of renewal or cleansing, and in order to furnish water ways having a large amount of surface, the inventor forms the interior of the geyser or boiler in three parts, joined to one another. Above, and outside the boiler, is the supply cock. To the water-inlet has a regulating float valve. On to the outer casing are joined the parts to which the air or escape tubes are screwed. Confer also No. 11,927 of 1894.

8,688.—WATER SUPPLY (DOMESTIC): *E. O. Richter.*—To prevent the bursting of pipes through frost, and for thawing ice in pipes, they are fitted with a jacket in the form of a D-shaped chamber, having a funnel-shaped top. At the lowest point of the system the chamber is closed and has a draw-off cock. Ice in the service pipes may be thawed by the pouring of boiling water into the jacketing chamber at the top, then (after the cock to the main has been shut) the water may be drawn off from the pipes.

8,691.—BUILDERS' BLOCKS OF ARTIFICIAL STONE: *F. Doenke.*—The blocks and tiles are moulded from a composition which is made up of dried fire sawdust, impregnated with hot carbolium and finely-sifted wood-ash, pulverised heavy spar, and magnesium chloride, with, it may be, soft water. Inside each block is placed a fabric of laced pieces of bamboo. The blocks are specified as being particularly suitable for use in tropical buildings, bath-houses, hospitals, and so on.

8,700.—FASTENINGS FOR DOORS OF COLD STORES: *T. Taylor and P. F. Kensell.*—The forked end of the sliding bolt engages with a nut set between collars and working upon a fixed screw which has flats that engage with a hole in a plate upon the door-jamb. The bolt is tightened or loosened by the turning of a handle which works the nut and causes either one of the collars to impinge against the end of the bolt. The withdrawal of the nut is prevented by a collar upon the screw. The appliance can be utilised as a locking-bolt by means of a hole in the bolt for a padlock.

8,707.—JOINTING FOR FLUSHING-PIPES: *H. L. Doulton.*—The joint is contrived for connecting a flushing-pipe to the horn of a closet-basin. A screw secures a band to the horn, on to which a flange is then affixed with screws, which at the same time press the packing together.

8,774.—FASTENINGS FOR WINDOWS: *E. G. Kendall.*—Middle pivots join the sashes to sliding slides, and flat springs on the latter press against vertical wires or rods that are attached to the pulley styles. The meeting surfaces of the pivot plates and the sash and sliding styles are rounded, and T-shaped slots in the pivot-plates enable the pivots to take their proper places, wherein they are retained with keys put into recesses in the frame.

8,850.—SAFETY APPARATUS FOR LIFTS: *W. Gering.*—Arms are pivoted on to the lower end of a spring bar to which the lifting rope is fastened. In the event of the rope breaking the spring presses the inner end of the arms downwards, and so causes them to jam with the guides. Moreover, there are provided arms, of which the inner ends have teeth underneath, and which are pivoted upon shafts mounted upon springs. Under normal conditions the latter arms are sustained horizontally with ropes from the spring bar, but they will be turned into a vertical direction when the rope breaks, and their teeth will then become engaged with the guide.

SOME RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

August 14.—By *HARDY & HARDY* (at Uttoxeter). Doveridge, Derby.—The Doveridge Estate (part of), 109 a. f. £7,180

By *WINCH & SONS* (at Maidstone). High Halden, Kent.—Old Place Farm, 107 a. o. f. 4 p., y. r. 6d. 10s. 1,130
Bethersden, Kent.—Potters Farm and Holmes Wood, 83 a. 3 p. 2 p. f., y. r. 7d. 4s. 10d. 1,150
Staplehurst, Kent.—Great Wadd Farm, 141 a. 3 p. 5 p. f. 1,700
Stone-cum-Ebony, Kent.—Stone Corner Farm, 130 a. 2 p. 10 p. f., y. r. 7d. 1,450

August 15.—By *HUGH SWORDEN* (at Epping). Theydon Bois, Essex.—Theydon Lodge, f. y. r. 7d. 1,220
Loughton-lane, freehold building land, 8 a. 2 r. 25 p. 940
High Laver, Essex.—Herbert's Cottage and 2 a., f. y. 8d. 200
North Weald, Essex.—Main-rod, three freehold cottages, y. r. 1d. 6s. 240

August 16.—By *BENTLEY & SONS* (at Doncaster). Hendby, Yorks.—Freehold farm, 141 a. 1 r. 28 p., y. r. 21d. 4,150

August 19.—By *DEBENHAM, TEWSON, & CO.* Chelsea.—34, Bramington-st., n. l. 38 y. r. 6d. 430
Finchley.—Park-rod, The Chestnuts and 1 a. f., y. r. 7d. 1,400
1, 2, 3, 4, 5, 6, 7, 8, 9, and 10, Park-rod, f. y. r. 20d. 13s. 2,500
High-rod, freehold building site, area 0 a. o. r. p. 1,475

By *FLEURET, SONS, & ADAMS* and *VINTEN & SON* (at Mason's Hall Tavern). Margate, Kent.—The Royal York Hotel, f. a. p. 9,000
August 20.—By *JAMES ELEY* (at Boston). Wrangle, Lincs.—High Toft Farm, 167 a. 1 r. 37 p., f. 5,700

By *DICKINSON & RIGGALL* (at Louth). Theddlethorpe St. Helen's, Lincs.—Freehold farm and enclosures, 69 a. 3 p. 30 p. 2,600

August 21.—By *CHESTERTON & SONS.* Notting Hill.—40 and 42, High-st. (S), u. l. 19 y. r. 6d. 10s. 1,620

By *NEWBON, EDWARDS, & SHEPHERD.* Dalston.—35 to 40, Regent's-row, u. l. 41 y. r., g. r. 15d. w. r. 22d. 15s. 1,360
Barnsbury.—33, Half Moon-cres., u. l. 16 y. r., g. r. 5d. 5s. y. r. 3d. 130

By *SALTER, REX, & CO.* Kentish Town.—128, Prince of Wales-rod, f., y. r. 4d. 750
Hampstead.—7, Maitland Park-rod, u. l. 50 y. r., g. r. 1d. y. r. 55d. 500
Camden Town.—21, Marquis-rod, u. l. 59 y. r., g. r. 3d. y. r. 3d. 480
Mill Hill.—Flower-lane, two plots of land, f. 185
Birkbeck-rod, three plots of land, f. 100

Contractions used in these lists.—F. g. r. for freehold ground-rent; l. g. r. for leasehold ground-rent; i. g. r. for improved ground-rent; g. r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. r. for estimated rental; w. r. for weekly rental; y. r. for yearly rental; u. l. for unexpired term; p. a. for per annum; y. r. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdn. for gardens; yd. for yard.

PRICES CURRENT OF MATERIALS.

. Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.	
£ s. d.	
Hard Stocks	13 0 per 1,000 alongside, in river
Rough Stocks	12 0 " " " "
Crutches	12 0 " " " "
Facing Stocks	12 0 " " " "
Shippers	12 0 " " " "
Flattons	12 0 " " " "
Red Wire Cuts	12 0 " " " "
Best Fareham Red	12 0 " " " "
Best Red Pressed	12 0 " " " "
Best Blue Pressed	12 0 " " " "
Staffordshire	12 0 " " " "
Do., Bullnose	12 0 " " " "
Best Stourbridge	12 0 " " " "
Fire Bricks	12 0 " " " "
GLAZED BRICKS	
Best White and	
Avory Glazed	
Stretchers	13 0 " " " "
Headers	12 0 " " " "
Quoins, Bullnose,	
and Flats	12 0 " " " "
Double Stretchers	12 0 " " " "
Double Headers	12 0 " " " "
One side and two	
Ends	12 0 " " " "
Two sides and one	
End	12 0 " " " "
Spalls, Chamfered,	
Squints	12 0 " " " "
Best Dipped Salt	
Glazed Stretchers	12 0 " " " "
Quoins, Bullnose,	
and Flats	12 0 " " " "
Double Stretchers	12 0 " " " "
Double Headers	12 0 " " " "
One side and two	
Ends	12 0 " " " "
Two sides and one	
End	12 0 " " " "
Spalls, Chamfered,	
Squints	12 0 " " " "
Seconds Quality	
White and Dipped	
Salt Glazed	12 0 " " " "
Thames and Pit Sand	7 3 per yard, delivered.
Thames Ballast	6 0 " " " "
Best Portland Cement	3 0 per 100, delivered.
Best Ground Blue Lias Lime	25 0 " " " "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ros. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 6s. 6d. per ton at rly. dpt.

STONE.

s. d.	
Ancaster in blocks	11 per ft. cubo, deld. rly. depot
Bath	7 " " " "
Farleigh Down Bath	8 " " " "
Beer in blocks	6 " " " "
Grimshill	10 " " " "
Brown Portland in blocks	2 " " " "
Durley Dale in blocks	4 " " " "
Red Corsehill	5 " " " "
Clooseburn Red Freestone	3 " " " "
Red Mansfield	4 " " " "
Hard York in blocks	20 " " " "
" " 6 in. sawn both sides	
landings, to sides	
(under 40 ft. sup.)	8 per ft. super. at rly. depot.
" " 6 in. Rubbed Ditto	3 0 " " " "
" " 3 in. sawn both sides	
slabs (random sizes)	1 3 " " " "
" " 2 in. self-faced Ditto	0 9 " " " "
Hopton Wood (Hard Bed) in blocks	3 per ft. cubo. deld. rly. depot.
" " 6 in. sawn both	
sides landings	7 per ft. super. deld. rly. depot.
" " 3 in. do.	2 " " " "

[See also page 199.]

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiuns.	Designs to be delivered.
Municipal Offices	Bideford Town Council	30l, 162l, 10l.	Sep. 1
Free Library	Maidenhead Town Council	20l, 20l, 10l.	Oct. 1

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Sewerage Works, Ynyabwl, Glam.	Mountain Ash U.D.C.	J. Williams, Surveyor, Town Hall, Mountain Ash	Sep. 2
Engine House, North Side Mills, Bradford	Messrs. D. Illingworth & Son	J. Ledingham, Architect, District Bank Chambers, Bradford	do.
Nurses' Home	Yarmouth Guardians	A. S. Bewick, Architect, Bank Chambers, Yarmouth	do.
Alterations to Electricity Works, Broad-street	Brighton Town Council	T. J. Tiltstone, Town Hall, Brighton	do.
Wall	Bangor (Ireland) U.D.C.	R. L. Woods, Civil Engineer, Town Hall, Bangor	do.
Road Works, Rosebery-avenue, Preston	Tynemouth Corporation	J. F. Smillie, Borough Surveyor, North Shields	do.
Sewer Pipes	Cockermouth U.D.C.	J. Fearon, Council Offices, Cockermouth	do.
Street Works, Queen-street, Pontefract	Burton-on-Trent Corporation	A. Oddy, Borough Surveyor, Pontefract	Sep. 3
Sewerage Works, Stapenhill, &c.	Kinsale (Ireland) R.D.C.	G. T. Lyman, Engineer, Town Hall, Burton	do.
Fourteen Cottages	Castelford (York) U.D.C.	R. Evans, Engineer, 63, South Mall, Cork	do.
Builder's Work at Hospital	Hadleigh School Board	H. F. Scott, Surveyor, Castelford	do.
School Buildings	Glam. County Council	Eade & Johns, Architects, Cornhill Chambers, Ipswich	do.
Widening Road, Aberafon	Hetton (Durham) U.D.C.	T. M. Franklin, Westgate-street, Cardiff	do.
Asphalt Works	Lowestoft Town Council	J. Harding, Surveyor, Council Offices, Houghton-le-Sprung	do.
Sewers, London-road	Ramey School Board	G. H. Hamby, Civil Engineer, Town Hall, Lowestoft	do.
Bridge Abutments, Ilkley	Landover U.D.C.	J. B. Fraser, Architect, 3, Park-square, Leeds	do.
Schools, Parkenton, Essex	Landover R.D.C.	Shark & Rowell, Architects, Colchester	do.
Construction of Tramway Route	Southend Corporation	D. T. M. Jones, Council Offices, Landover	Sep. 4
Steel Bridge, Pontnewnyn, Gwynedd	Salford Corporation	A. Fidler, Civil Engineer, Southend	do.
Road Works, St. Mary's-avenue East	Castelford (York) U.D.C.	W. W. Woodward, Engineer, Bloom-street, Salford	do.
Root at Gasworks, Regent-road	Willington U.D.C.	W. Green, Surveyor, Castelford	do.
Sewer, Duke-street	Southold Corporation	J. Cooke, Surveyor, 2, West End-terrace, Willington	Sep. 5
Footpath Works	Southill (Yorks) U.D.C.	Borough Surveyor, Town Hall, Southold	do.
Pilling Work	Fenny Stratford U.D.C.	J. Blackburn, Surveyor, Shaw Cross, near Dewsbury	do.
Kerbing, Setts, &c.	The Proprietor	W. Cooke, Surveyor, West-street, Cromer	do.
Chapel, &c., Holt-road		Edgington & Summerbell, 7, Park-street, Windsor	do.
Seven Houses, near Slough		City Engineer, Town Hall, Leeds	do.
Boundary Wall, Armlay		T. C. Parkinson, Architect, Armlay	Sep. 6
Rebuilding Pavilion, Armagh	Bradford School Board	A. D. H. & Son, Architects, 23, Bank-street, Bradford	do.
Market Extensions	Redruth Brewery Co.	Adkin & Hill, Architects, Prudential Buildings, Bradford	do.
School, Wyke	Blackpool Corporation	H. W. Collins, Architect, Walredon, Redruth	do.
Rebuilding Fendearns Arms Hotel, Gwithian	Rammarsh (Yorks) U.D.C.	J. W. Bellamy, Council Offices, Rammarsh	do.
Ornamental Iron Railings	Londonerry R.D.C.	M. A. Robinson, Civil Engineer, Londonerry	do.
Sewers, Parkgate	Winney (Oxon) R.D.C.	G. Winship, Engineer, Borough Buildings, Abingdon	do.
Well, Shantallow	Leeds Corporation	R. H. Hale, Surveyor, 33, Old Queen-street, S.W.	Sep. 7
Waterworks	Landover U.D.C.	E. T. Hall, Architect, 54, Bedford-square, W.C.	do.
Hospital	Landover Corporation	J. Thomas, Town Hall, Landover	do.
Foundations of Hospital, Killbeg	Margate Corporation	A. Latham, Civil Engineer, Municipal Buildings, Margate	do.
Market Buildings	Mensal Bridge U.D.C.	J. C. Webster, Civil Engineer, 30, Victoria-street, S.W.	do.
Well Sinking, Wingham	Linsely Harbour Commissioners	J. V. Stewart, Engineer, Harbour Office, Linsely	do.
Bridge Improvements	Margate Corporation	A. Latham, Civil Engineer, Municipal Buildings, Margate	do.
Bridge	Abercrombie (Mon.) U.D.C.	G. Stevens, Engineer, Council Offices, Abercrombie	do.
Water Main (24,272 yards)	Ashdon-under-Lyne Waterworks Co.	G. H. Hill & Son, Civil Engineers, 3, Victoria-street, S.W.	do.
Cast Iron Pipes	Stockton-on-Tees Corporation	M. H. Sykes, Engineer, Town Hall, Stockton	do.
Cat Iron Pipes (416 tons)	Great Northern Ry. Co. (Ireland)	T. Morrison, Engineer, Amiens-street Terminus, Dublin	do.
Road Works, Ewbank-street		R. H. F. Curwen, Architect, 20, Highgate, Kendal	do.
Electric Power Station, Belfast		J. A. Clarke, Architect, Briton Ferry	do.
Rectory, St. Mary's, Truro		Beesley & Co., Engineers, 11, Victoria-street, S.W.	Sep. 8
Schools, Beetham, Westmoreland	Highworth R.D.C.	H. E. Sligo, Civil Engineer, Biggin-street, Dover	do.
Club Premises, Briton Ferry	Biggleswade R.D.C.	Taylor & Co., Civil Engineers, 27, Great George-street, S.W.	do.
Sewerage Works, Stratton	Edmonton U.D.C.	Council's Engineer, Town Hall, Edmonton	do.
Turkish Baths	do.	do.	do.
Drainage Works, Potton	Bromley U.D.C.	Council's Engineer, Bromley, Kent	do.
Supply of Broken Granite	Startforth R.D.C.	J. E. Parker, Civil Engineer, Post Office Chambers, Newcastle	Sep. 10
Supply of Stoneware Pipes	Woolwich Union	Church, Quick, & Vincom, Willan-street, Woolwich	do.
Supply of Portland Cement	Commissioners of E.M. Works &c.	J. Wager, H.N. Office of Works, Storey's Gate, S.W.	Sep. 11
Road Making and Paving Works	Southgate U.D.C.	Council's Surveyor, Palmer's Green, N.	Sep. 13
Water Supply, Bowes	Hanwell U.D.C.	Council's Surveyor, Hanwell, W.	Sep. 15
Additions, Drainage, &c., to Old Park House, Goldil Leigh	Northallerton R.D.C.	J. Rees, Architect, Hillside Cottage, Centre, Glam.	do.
New Sorting Office, Walthamstow	Hanwell U.D.C.	W. Fowle, Council Offices, Northallerton, W.C.	do.
Making-up Streets	Kenington Borough Council	Council's Engineer, Hanwell, W.	do.
Road Making Works	Woolwich Guardians	Borough Engineer, Town Hall, Kenington	do.
School Buildings, Llynwneyn, Porth	Southwark Union	A. B. Thomas, Architect, 15, York-buildings, Adelphi, W.C.	Sep. 17
Drainage Works, Brompton	Burnley R.D.C.	G. D. Stevenson, Architect, 13 and 14, King-street, E.C.	Sep. 18
Supply of Broken Granite	Sneyre Borough Council	S. Edmondson, Surveyor, 18, Nicholas-street, Burnley	Sep. 20
Construction of Above-ground Conveyance	Hornsey U.D.C.	Council's Engineer, 15, Great Aisle-street, E.	Sep. 22
New Bath Rooms, &c., Renfrew-road Workhouse	Hammersmith Guardians	J. H. Richardson, Architect, 87, Finsbury-pavement, E.C.	Sep. 23
New Municipal Buildings	West Hartlepool Corporation	J. W. Brown, Borough Engineer, West Hartlepool	Sep. 25
New Operating Room at Infirmary	London County Council	Architect's Department, 13, Pall Mall East, S.W.	Oct. 7
Sewer		Clayton & Black, Architects, 152, North-street, Brighton	No date
Stores, Carr & Van Sheds, Lodge, & Public Urinals	Wombwell (Yorks) U.D.C.	H. Thomson & Co., Newry	do.
Taking Down Fencing, Tottenham-lane	Mr. F. J. Hance	J. Robinson, Surveyor, Wombwell	do.
Board Room, Offices, Receiving Home for Children, &c.	Agricultural Organising Agency, Ltd.	Swirewell & Gregson, Architects, Newports, Glam.	do.
Sewer, Bridge-street (Contract No. 4)	Wombwell (Yorks) U.D.C.	Surveyor, 32 store, Millwall Dock, E.	do.
New Cart Shed, Bothy, &c., Sydenham Wells Park		J. Robinson, Town Hall, Wombwell	do.
House, Palmeira-avenue, Hove		Dove & Co., 20, York-place, Edinburgh	do.
Turbine House, &c., Newry, Ireland		W. Pickels, Architect, Thornton	do.
Chimney at Gasworks			do.
Six Houses, Griffithstown, Mon.			do.
Foundations to Ground Lines and Concrete Flooring			do.
Gas Main (3 in.)			do.
Road Works, Dunung, N.B.			do.
Road Works, Dunung, N.B.			do.
Five Houses, Ashfield-road, Thornton, Yorks			do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Foreman for Cliff Protection Works	Clifton U.D.C.	Not stated	Sep. 3
*Teacher of Building Construction	Norwood Technical Institute	Not stated	Sep. 8

Those marked with an asterisk (*) are advertised in this Number.

Competitions, p. 1.

Contracts, pp. iv, vi, viii, & x.

Public Appointments, xvii.

PRICES CURRENT (Continued).

Table with 2 columns: Item description and Price. Includes slates like '10 best blue Bangor', '8 best blue Portman', etc.

Table with 2 columns: Item description and Price. Includes tiles like 'plain red roofing tiles', 'hip and valley tiles', etc.

Table with 2 columns: Item description and Price. Includes wood like 'Building Wood—Yellow', 'deal: best 3 in. by 11 in.', etc.

Table with 2 columns: Item description and Price. Includes various types of deal and timber.

Table with 2 columns: Item description and Price. Includes various types of deal and timber.

Table with 2 columns: Item description and Price. Includes flooring like 'Prepared Flooring', 'x in. by 7 in. yellow, planed and shot', etc.

PRICES CURRENT (Continued).

Table with 2 columns: Item description and Price. Includes joists and girders like 'Rolled Steel Joists, ordinary sections', etc.

Table with 2 columns: Item description and Price. Includes metals like 'Common Bars', 'Staffordshire Crown Bars', etc.

Table with 2 columns: Item description and Price. Includes lead and zinc like 'Lead—Sheet, English, 3 lbs. & up.', etc.

Table with 2 columns: Item description and Price. Includes English sheet glass in crates like '15 oz. thirds', '21 oz. thirds', etc.

Table with 2 columns: Item description and Price. Includes oils like 'Raw Linseed Oil in pipes or barrels', etc.

Table with 2 columns: Item description and Price. Includes varnishes like 'Fine Pale Oak Varnish', 'Pale Copal Oil', etc.

TO CORRESPONDENTS.

J. P. (Amounts below our limit.) J. F. W.—J. D. (Amount should have been stated.) NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors. We cannot undertake to return rejected communications. Letters or communications (beyond news items) which have been duplicated for other journals are NOT DESIRED. All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications. We are compelled to decline pointing out books and giving addresses. Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

(Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursday, N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tenders is given, nor any list in which the lowest Tender is under 100, unless in some exceptional cases and for special reasons.) * Denotes accepted. † Denotes provisionally accepted. ABINGDON.—For the construction of about 1,430 yards of stoneware pipe sewers for the Corporation. Mr. George Winship, C.E., Abingdon:— Hinkins.....£2,572 15 6 Craig.....£1,772 12 9 Hayward.....2,430 8 6 Wheeler.....1,666 0 0 Roberts.....2,095 0 0 Swaker.....1,690 4 0 Mann.....1,915 10 0 Randall, Abingdon.....1,854 0 0 Fenton.....1,598 7 10

ARMAGH.—For the erection of a house at the sewage disposal works, for the Urban District Council. Mr. J. Finlay Peddie, C.E., 36, Scottish Provident-building, Belfast:— J. Kidd, Belfast.....£395

BISHOP'S STORTFORD.—For the supply of broken granite, &c., for the Urban District Council. Mr. R. S. Scott, Surveyor. Quantities by the Surveyor to the Council:— Mountsorrel Mountsorrel Granite. Chippings. Per Ton. Per Ton. s. d. s. d. Grimley & Son.....13 8 10 11

BRIDGWATER.—For the construction of sewer and bacteria beds, Weston-super-Mare, for the Rural District Council. Mr. W. A. Collins, engineer, 120, West-street, Bridgewater:— E. H. Page.....£215 7 8 R. Ashton, Palmer & Sons 175 10 0 Bridgewater.....£154 0 0 C. Bryer, jun., 161 1 3

CARLTON COLVILLE.—For gardener's cottage Carlton Colville, Suffolk, for the Rev. L. W. H. Andrews. Mr. Herbert J. Green, architect and Diocesan Surveyor, Norwich:— G. Elsey.....£338 0 0 W. J. Searle, con- A. C. Beckett.....489 6 tractor Carlton C. R. Cole.....460 8 Colville.....£418 10

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HASTINGS.—For the completion of western break-water, &c., for the Harbour Commissioners, Sir Douglas Fox & partners, 28, Victoria-street, S.W., and Mr. T. W. Barber, 17 and 18, Tothill-street, Westminster, engineers:— Messrs. Dowell & Co., 46, Queen Vic-toria-street, London.....£210,000

KIRRIEMUIR.—For shops in Kirriemuir for Messrs. Charles Tosh & Son. Mr. Lake Falconer, architect, Blairgowrie:—

Table with 2 columns: Item description and Price. Includes masonry like 'Crabbe & Bal-lentine', 'W. McDonald', etc.

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Watson & Son, Kirriemuir* 336 0 0

Joinery.
Davidson & Herald, Kirriemuir* 258 0 0

Plumbing.
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A. Fyfe 205 0 0
Stewart & Son, Kirriemuir* 103 0 0

Slating.
J. Mills 56 10 0
Stewart & Son, Kirriemuir* 52 8 6

Plastering.
G. Monro 36 0 0
D. Mills 34 0 0
John Thoms, Kirriemuir* 33 0 0

LANGLEY MOOR (Durham).—For the erection of St. Patrick's Schools, for the Rev. Jas. Thorman, Mr. H. T. Cradon, architect, 22, Market-place, Durham:—
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Simpson & Son 1,100 300
Buckridge 1,082 290
Stimpson & Co. 1,060 320
Mitchell & Son 980 249

MILLOM (Cumberland).—For the erection of banking premises for the Bank of Liverpool, Limited.—Mr. J. F. Curwen, architect, 26, Highgate, Kendal:—

Whole Estimates.
D. Mackereith £3,960 | W. Richardson £3,490
R. G. W. Bradley 3,700 | W. Tomlinson 3,695

Separate Estimates.—Waller, Mason, and Bricklayer.
A. J. Blair £2,095 0 | R. Pennington, Kendal* £1,705 10
W. Richardson 1,722 10 | W. Tomlinson 1,600 0

† This includes granite base and steps supplied by the Shap Granite Co., Limited.

Slating.
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W. Richardson 73 16 0 | Wm. J. Cross 65 4 0
Thos. Mandie 70 10 0 | R. Pennington, Kendal 64 10 0

Plastering.
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Plumbing.
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Wm. Tomlinson 275 0 0 | Mills & Son 246 0 6
J. M. Clark 263 0 0 | MilloM* 246 0 6

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Welch & Son £253 | P. Heard, Middleton Partington & Son 236 | Junction* £223

MORLEY (Yorks).—For the erection of eight houses, Station-lane, Ardsley. Messrs. Newton & Asquith, architects, Ackroyd-street, Morley:—
Plastering.—Ed. Wilson, Morley* £54 0
Slating.—J. May, Morley* 25 10
Plumbing.—J. E. Richardson, Ardsley 25 10

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J. Durrant £6,700 10 | Davis £6,245 0
W. Larnmouth 5,427 0 | Clark & Sons 5,156 0
Corke 6,420 0 | Crockerell 6,700 0
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Mee-ton 237 0 0 | Anderson 197 6 8
Wm. Border, W. Co. 214 5 0 | sons 185 0 0
D. J. Jackson 210 0 0 | W. Manders 181 13 0
French 206 9 0 | Leyton* 181 13 0

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The Builder.

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SEPTEMBER 6, 1902.

ILLUSTRATIONS.

The Piazza, Venice: Before the fall of the Campanile..... From a Photograph.
 "Hill End," Wendover..... Mr. Leonard Stokes, F.R.I.B.A., Architect.
 Decorative Panels at "Broadlands," Ascot..... Designed by Mr. H. C. Brewer.

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The Sea Coast.



EW subjects present more interest to the Briton than the sea. The dreams of youth may be outlived, but the sea remains a source of pleasure and profit for some, of toil and sorrow for others, a royal highway for commerce, and a bond connecting the scattered states of the Empire. Perhaps a feeling of proprietorship in the waters that flow around our shores may be natural, yet the land itself claims regard and protection. So when slice after slice is swallowed up by the waves, a bit of cliff here, a field or two there, and a general nibbling along miles of coastline, it is high time to suggest that the sea, old friend and trusty ally though it be, should keep in its proper place. Many suggestions of the kind have been made in past years and are still being made, their practical application being attended with varying degrees of success. Those of our readers who are interested in the subject of sea coast protection will find much valuable information in a recently-published volume* from the pen of Mr. W. H. Wheeler, M.Inst.C.E., for many years Harbour Engineer to the port of Boston, in Lincolnshire. The treatise now under consideration may be said to consist of two parts, the first dealing with the phenomena calling for the construction of defensive works and gradually leading up to a discussion of sea walls and dykes, while the second part contains an exceedingly complete description of the sea coasts of England.

In the particular branch of marine engineering with which we are for the moment concerned, there is much difference of opinion among experts on questions of theory and practice. This is not to be wondered at, for physical conditions are never precisely the same in any two places, and it is not infrequently the case that a local engineer, who has studied the peculiarities of some particular portion of the coast, is in a position to offer better advice than a committee of experts having wider experience but less local knowledge. The author does not advocate any special methods of protection for general adoption, but devotes himself to giving such information as may be of service to all who may be interested in the preservation of land bordering on the sea. All land above the level of the sea is continually being worn away by waves caused by wind and tide on the one hand, and by the agency of rain and frost on the other. In each case the material brought down to the shore is added to the beach, and so forms a natural protection to the coast. But the value of the material for this purpose depends entirely upon its character, and in many places the destruction of cliffs is unaccompanied by any appreciable compensation. Along such portions of the coast the need of artificial protection is clearly indicated. Chalk cliffs such as those at the eastern end of the English Channel are easy prey for the waves; and as popular seaside resorts exist there in an almost unbroken line, protective works are very much in evidence. Continual waste also goes on along the Hampshire and Dorsetshire coasts, but the infrequency of towns on the seaboard renders protection less necessary. Incidentally, this adds to the charm of such districts for lovers of Nature, who can there escape from the disfiguring, if useful, handiwork of man. Along much of the East Coast, from the Thames to Flamborough Head, the cliffs suffer from constant erosion, which must be vigorously resisted in the interests of numerous watering-places. In some parts low-lying land requires protection, and earthen embankments or sea-walls then become necessary. Those parts of the coast mentioned above serve to exemplify every variety of coast protection as practised in this country, while very little aid of the same kind is needed on the shores north of Flamborough Head and on the western side of the island, owing to the harder and more durable character of their geological formation.

In chap. ii. of Mr. Wheeler's book attention is given to the laws governing the action of shore waves, and to the manner in which such waves act on a beach or sea wall. Even in the calmest weather the waves or wavelets derived from the swelling of the tide are never absent from the shore, and their influence on the movement of beach material can never be neglected, for upon the breaking of each wave the particles assume a horizontal position and serve to transmit mechanical force, capable of transporting material. Then the tidal wave of the ocean moves with greater velocity in the open sea than in shallow water, and so an oblique lateral motion is caused along the shore, the effect of which must be considered. In addition to the effect produced by the direct stroke of a wind wave on the shore, similar destructive action is due to translatory movement of the water below the wave itself, and the long waves due to a ground swell exert a greater power of transmission near the bottom than ordinary wind waves, while their destructive effect is generally far greater. The effects of breaking waves, the movement of material at great depths, and the power of waves occupy the remainder of the chapter, wherein many instructive and very interesting facts are recorded. Amongst other illustrations of the power exerted by the sea, the author mentions that during a heavy gale 4,500,000 tons of shingle were torn down from the Chesil Bank, the greater portion being restored after the gale had ceased; and that during the construction of the Plymouth breakwater no less than 200,000 tons of stone blocks, weighing from 7 tons to 9 tons each, were removed in a single night from the sea slope of the breakwater at low-water level, carried over the top, a distance of 138 ft., and piled up on the inside.

Littoral drift, forming the subject-matter of the next chapter, is the movement of the material constantly taking place along the shores of a tidal coast owing to the action of the waves, and is a most important factor for consideration. Apart from large accumulations that have taken place during past ages under conditions essentially different from those now prevailing, the shingle drifting along the coasts of this country is

* "The Sea Coast." By W. H. Wheeler, M.Inst.C.E. London: Longmans, Green, & Co. 1902.

strictly limited in quantity. As Mr. Wheeler says, "the wear and tear of the sea cliffs does little more now than supply the waste which is always going on from the perpetual action of the waves." There is no other source of supply, and the caution that a limit ought to be placed on the removal of material for commercial purposes is one we entirely endorse. The area of the country is being gradually but surely reduced, and every ton of material taken away from the

may be diverted, blocked by bars, or entirely closed; or, again, the drift may be pushed out across an estuary in the form of a promontory.

Having disposed of preliminary considerations, the author enters upon the subject of sea walls, and it may be remarked at the outset that some divergence of opinion exists among experts as to the relative advantages of upright and sloping walls. In this country the upright wall is

cause weakness. One important advantage possessed by upright walls is mentioned by the author, namely, that the materials used are placed to the greatest advantage, so that the weight of the superincumbent mass assists in keeping the lower stones in their places. It is also true that vertical surfaces tend more to reflect waves than to break them, and that they offer no resistance to the upward stroke of the waves. The concave form of section has frequently been adopted, with the hope of neutralising the effect of an incoming wave by the water of the previous wave thrown off from the wall. As the author remarks, this result is not attained in practice, and, moreover, a concave wall does not prevent erosion of the beach by falling water. The concave form is also open to the objections that a large quantity of material is placed at the upper part of the wall where little horizontal force has to be resisted, and that the upper part of the curve offers a large surface to the up-

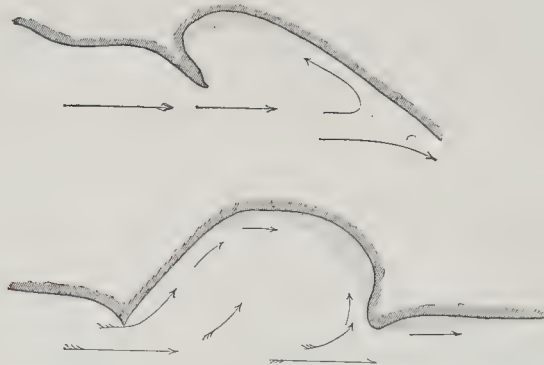


Fig. 1.—Plan Showing Direction of Drift in a Bay.

shingle and sand of the beach aids the process, and brings nearer the time when towns and villages will join those already swallowed up by the sea. It is worthy of remark that while shingle is banked up on the beach and carried along the shore, sand is generally stationary. On the Lincolnshire coast there is no appreciable littoral drift or alteration of form. Sand does not accumulate against the piers or groynes which extend across the shore, and the general outline of the beach remains as it has always been, so far as any record exists.

A most important matter is the direction of travel exhibited by beach material, this being influenced by the direction of the flood tide, and the configuration of the coast. On a straight line of coast, littoral drift takes place in the direction of the main flood tide, but where bays and indentations exist there is no continuous drift along the shore, as the characteristic shingle of each bay is retained by headlands acting as natural groynes. Action of this kind is shown by the following diagrams taken from Mr. Wheeler's work (fig. 1). In the first of these, the tide passing the projecting headland strikes the shore opposite, and forms a counter-tide, drifting material towards the sheltered part of the bay; in the second illustration, the tide in the offing moves faster than that in the bay, and, reaching the farther headland before the bay tide, curls round to form a reverse current. The drift of shingle is then in opposite directions, and, according to the shape of the bay, it collects in the lower end or in the centre. Still more important than the influence of headlands is the outcome of the struggle between littoral drift and water flowing and ebbing in estuaries and rivers. In some cases the drift is unable to cross the tidal currents, and, turning round the coast line, may drift up the shores of the estuary, and in others, where the movement is stronger than the force of the current, rivers,

generally in favour, while in Holland and Belgium the sloping form is preferred.

Although walls for harbour purposes can hardly be compared with those intended for coast protection, yet it is worthy of note that when the relative merits of sloping and upright walls were investigated by the Commission appointed to inquire into the proposal to construct a harbour of refuge at Dover in 1846, most of the engineers and other experts consulted were strongly in favour of the upright form. Mr. Wheeler gives an excellent *résumé* of the conditions that should attach to walls for cliff or shore

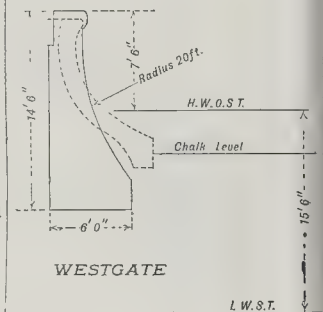
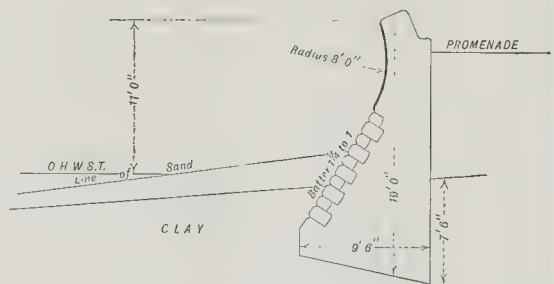


Fig. 2.—Sea Walls at Westgate.

ward force exerted. From some examples of sea walls contained in the succeeding chapters we have selected the diagrams following, to illustrate the absence of advantage in connexion with the concave form of construction. Fig. 2 shows the old and new walls at S-



CLACTON ON SEA
OLD WALL

Fig. 3.

protection, and at the same time points out how difficult it is to meet the specified requirements. When a vertical wall, situated above the level of low water, is struck by a wave in a more or less broken state, the projection of water upwards concentrates its action at that part of the wall where the consequences are most serious. Thus, the effect of the water, whether falling at the back of the wall or upon the beach, is to cut out material, and so to

Mildred's Bay, Westgate. The former wall, indicated by dotted lines, and was destroyed in consequence of water, thrown upon the roadway, having washed out the tar pavement and chalk filling at the back of the wall. The new wall, as will be seen by the continuous lines in the diagram, has no concavity and appears to answer its purpose satisfactorily. Fig. 3 represents the wall built some twenty years ago at Clacton-on-Sea. Here, the effect of the waves thrown

back by the concave upper portion tends to pull away the beach, and the danger of failure was so imminent at one time that the addition of a concrete apron became neces-

weight, and from the fact that they necessarily extend further seaward than upright walls. Consequently, wave effects are experienced earlier and for longer periods,

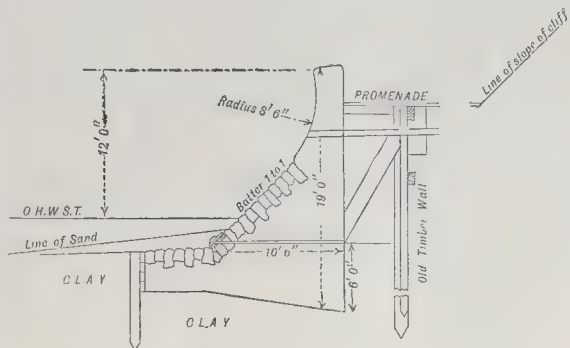
sheet piling. In either case the object is to lead water from the wall and back to the beach with the least element of disturbance, and without cutting out material at the toe. The elliptical form, corresponding to the natural curve of a shore wave, is well calculated to change the direction of the particles of water from the horizontal to the vertical in the easiest possible manner, and the vertical portion of the wall does not tend to lead the water over the top to the roadway. The sea wall at Scarborough (fig. 7) somewhat resembles the author's design at first sight. It will be seen, however, that the curve is not elliptical, and that the vertical portion has less height, while in its original state the wall was without the apron shown in the diagram. Mr. Wheeler makes no direct remarks upon the suitability of the section, but in the chapter dealing with examples of sea walls we read that "in heavy gales the waves break with great force on the wall, the water being thrown over the top and falling on the roadway." Soon after the completion of the Scarborough wall the beach was scoured out, and within a year the shale in places was scooped out to a depth of 3 ft., so that an apron 15 ft. wide was added to protect the toe. Thus it becomes evident how *great* may be the

the conformation of sea walls, and how unsatisfactory may be the operation of a wall that is apparently of correct design.

So far as the question of strength is concerned, it is well known that mathematical rules cannot be absolutely relied upon even in the case of ordinary retaining walls, while they are still less useful as applying to sea walls. The author wisely relies on experience as the best guide for the proportions of sea walls, and says that the mean width of section should not be less

water is forced into all the interstices, stones are loosened by oscillation, and when loosened they are easily sucked out.

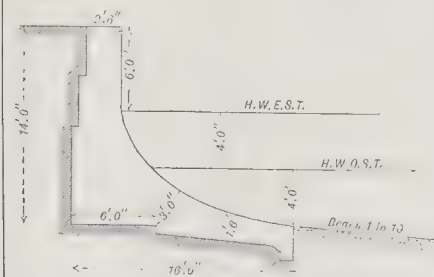
The most effective form of wall, according



CLACTON ON SEA
NEW WALL

Fig. 4.

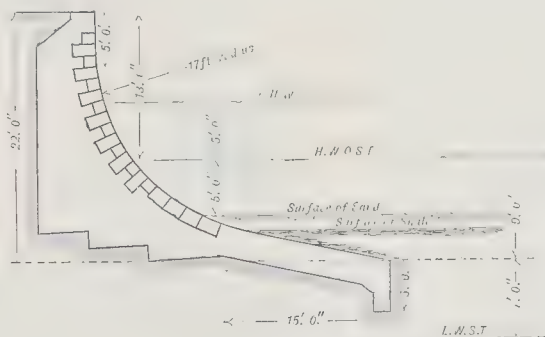
ary. On reference to fig. 4, it will be seen that a more recent wall at Clacton has been designed with a curve of greater radius, and that precautions have been taken for the preservation of the foot of the structure. A projecting nosing is even more undesirable than concavity, and numerous instances could be cited where such projections on sea walls have had to be removed. In some cases the masonry has been severely shaken, in others heavy copings have been lifted by the sea; and at Ramsgate a nosing built with the object of throwing off water caused disintegration of the chalk, and so denuded the beach that the wall had to be underpinned for the greater part of its length. Some engineers advocate the construction of walls having steps in front, as fig. 5, the idea being to



Scale 1 inch=10 feet.

Fig. 6.—Section of Sea Wall.

to the author, is shown by fig. 6, and there is much to be said in favour of this section. It will be observed that the curve dies out at the bottom into a slope natural to a

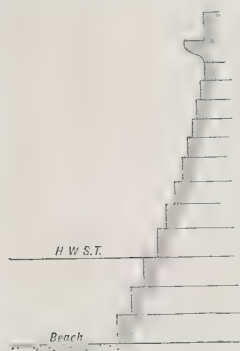


SCARBOROUGH

Fig. 7.—Sea Wall.

break up the force of the waves and to minimise the effect of return water upon the beach. The chief objections entertained by the author to a wall of this form are that a broken surface is offered to the waves, and that the successive courses of stones have not the advantage of superincumbent weight as in a vertical wall. This criticism is clearly justified, but it does not appear that the section is otherwise disadvantageous. Sloping walls suffer even more than concave walls from the absence of superincumbent

beach composed of shingle, but when the beach is formed of sand the toe may be extended further seaward by an apron of flatter gradient, protected at the end by



BRIDLINGTON.

Fig. 5.—Sea Wall.

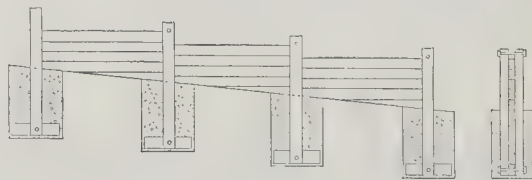
should be impossible for any wave to break directly over the top. It is naturally desirable that the material for facing upright walls and for pitching sloping banks should be of hard and durable character. The author points out the suitable nature of concrete for the former purpose, owing to the absence of joints and the smooth surface presented, and directs attention to the growing popularity of columnar basalt for facing slopes. The advantages of the latter material have been fully proved at several places both on the Continent and in this country, where it is found that the hexagonal shape of the blocks facilitates keying of the stones in a satisfactory manner.

Groynes are considered in chap. vi., which is the last of the explanatory portion of Mr. Wheeler's book. Although groynes do not in themselves act as protections to a coast, yet they conduce to the preservation of the land by aiding the collection of shingle banks. Little advantage is to be expected from the application of such structures where there is no material to be collected, or where wasting cliffs afford no fresh supplies; but where favourable conditions exist the effect of suitable groynes is to diminish littoral drift, and so to prevent denudation of the beach. On sandy shores, as we have already mentioned, there is little movement of the sand, except during the flood tide, and especially during heavy gales. The value of groynes in such places is chiefly exemplified in the prevention of "lows," and low groynes formed across sandy beaches tend to fill up the hollows converting wet soft surfaces into firm sands.

It is on shores where shingle is to be found that groynes are most useful, but, as Mr. Wheeler clearly demonstrates in a paragraph on the effect of groynes upon wave-action, their value must not be overestimated. He shows that the destructive force of the waves is increased rather than diminished by high groynes, for the water is projected upwards, and in falling cuts out and erodes the beach. Again, if the groynes project much above the beach and are placed at short intervals, water thrown into the bays must be of increased height, and in retiring will have proportionately greater power for mischief, this influence being intensified when eddies are caused by waves driven into the bays by the action of wind, and when water pours from the heaped-up shingle on the windward side of the groyne. While the author takes care to define the limitations of groyning, he fully admits the advantages to be derived from such work, if properly designed and executed. Some useful information may be derived from his remarks upon the construction of groynes. On the question of spacing, he expresses the very sensible opinion that experience of local circumstances must be the chief guide for determining the intervals that should exist. If placed too near together, groynes may constitute a source of danger to boatmen, and completely spoil the appearance of a beach, besides altering the long easy slope into a series of short, steep banks, bringing antagonistic forces into play. The opinion expressed that groynes should not be multiplied

more than is absolutely necessary is confirmed by experience in several well-known watering-places. Amongst these may be instanced Folkestone, Littlehampton, Hastings, Southwold, and Yarmouth, places where single piers, jetties, or groynes have led to the accumulation of beach material for considerable distances, and to such depths that old and unsightly groynes have in some cases been completely covered by shingle or sand. So far as height is concerned, the author is right in stating that "the less the height of the planking of groynes rises above the beach, the less the effect of the waves in disturbing and eroding the beach." High groynes are naturally costly to construct and to maintain, while less effective in collecting material than low groynes raised from time to time as the

of the stone-faced slope about 40 acres. During the past century the wall has been a constant source of expense and worry to the authorities. In 1859, 18,000 sq. yds. of pitching was destroyed, and between 1870-90 no less than 68,296 $\frac{1}{2}$ was expended in defence works. In 1891, 40,000 sq. yds. of pitching was washed away, and in 1893 so much damage was done that Sir J. Wolfe Barry and Mr. Matthews were called in to advise the Commissioners. These eminent engineers proposed the restoration of the wall and the construction of forty-three heavy groynes, at a cost of 41,000 $\frac{1}{2}$, but their recommendations were opposed by the late Mr. Case, the Engineer to the Board, who possessed the singularly appropriate title of "expeditor" of the bank. Mr. Case showed that in 1892 there were holes in the face of



CASE GROYPNE

Fig. 9.

beach is built up. Sometimes, indeed, a beach may be accumulated to a sufficient degree by the use of temporary structures, and afterwards maintained without artificial aid. Thus we see how important it is to the ratepayers of seaside districts that reliable advice should be secured before heavy expenditure is decided upon for protective works. That the most appropriate treatment is not always proposed by eminent engineers is proved by the experience of Dymchurch. The famous old earthen bank, made by the Romans for the protection of Romney Marsh, was formerly supplemented by huge groynes, formed of stone blocks secured between timber piles. These were not effectual in protecting the bank, and in 1803 Mr. Rennie was consulted on the subject. Under his advice the sum of

the bank, below the pitching, from 4 ft. to 5 ft. deep, that the foreshore had been wasting away ever since the bank had been paved, and that the pitching had worked its own destruction by scour at the base. His advice was that the expensive scheme advocated by the Westminster experts should be deferred, and that a system of low timber groynes should be placed along the beach at right angles to the bank, commencing with a rake of 1 in 12, and ultimately assuming the natural inclination of the beach at low water. The construction of the groynes is illustrated in fig. 9, and their effect has been to build up the foreshore to the natural inclination of repose, so that it is now undisturbed by gales, and to convert the beach from an expanse of mud and sand with pools of water to a well-consolidated mixture of shingle and sand. The total cost of repairing the bank and constructing the groynes between 1894-1899 was 19,000 $\frac{1}{2}$, and although this sum does not represent the end of the expenditure, it is manifest that the Commissioners were well advised in accepting the proposals made by their own engineer. In commenting upon the Case system, Mr. Wheeler says the principles involved are correct, except one which dictates the stopping of the groynes at the mean high-water line. He adopts the reasonable opinion that the waves running round the ends of groynes so designed will tend to scour out the beach and to form lows parallel with the coast. As we pointed out a year or two ago, the system adopted by Mr. Case does not differ essentially from well-known methods of groyning, and the patents which were taken out by Mr. Case referred chiefly to constructional details.

With the expression of some general conclusions as to the proper design of groynes, the first part of Mr. Wheeler's work draws to a finish. To the general reader the second part will appear more interesting than the first part, and to the engineer it will certainly be not less useful. We cannot

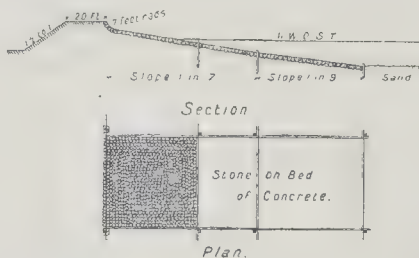


Fig. 8.—Sea Wall, Dymchurch.

56,000 $\frac{1}{2}$ was expended in "arming" the wall west of Dymchurch with brushwood, and the result was that shingle soon began to disappear from the beach. About 1837 the bank was pitched with stone (as shown by fig. 8, which is reproduced from Mr. Wheeler's book). As shingle and sand still continued to recede, the pitching and piling were carried forward until the slope had attained the length of 150 ft. at the east end, and 80 ft. at the west end, the total length so protected being three miles, and the area

attempt to deal in any comprehensive manner with the mass of facts presented by the author, but brief reference to a few points will serve to show the value of his records. The detailed account of Lyme Bay, extending from Start Point to Portland Bill, is well worth reading. Here the cliffs have been worn back some twenty-five miles from the straight line. There are numerous bays each with its distinctive quality of shingle. At the east end is that remarkable natural breakwater known as the Chesil Bank, and at Portland Bill, Hopes Nose, near Torquay, and at Brixham are still to be found the remaining portions of a beach formerly existing ten miles further seaward than the present shore line. The alteration of natural conditions that may be caused by the construction of harbour works is evidenced by the fact that since the completion of the Portland breakwater the tendency of shingle has been to leave the beach protecting the northern part of Weymouth and to drift southwards. Consequently the sea threatened to force its way across the low-lying land to the backwater and so to convert the town into an island; while on the other hand, the sea-wall erected to protect the front of the town, before the breakwater was built, became almost covered with shingle. The suicidal policy of assisting encroachment by removing material from the beach for building purposes is illustrated by the case of Swanage, where the sea has encroached 60 ft. in sixty years, buildings on the shore have been destroyed, and the waves at ordinary high tides break against the road running parallel with the shore for nearly a mile. An example showing the permanence of sand and shingle banks, when natural or artificial changes have not been made in the coast line, is afforded by the author's description of the Hurst Castle shingle bank, which has retained the same general outline and position for centuries. At Selsey and Pagham the vagaries of the sea are illustrated. The ancient cathedral once to be found at Selsey is covered by the sea, and the deer park belonging to the Bishop of Chichester in the time of Henry VIII. is now in an anchorage with three fathoms of water, marked on the charts as "The Park." Pagham Harbour, on the contrary, is now completely closed, the land having been reclaimed under an Act passed in 1875, and the channel, which once had a depth of 40 ft., is filled up with shingle. The harbour is still shown on published maps, though its site has long been covered with green fields. In describing the extraordinary precautions taken for the protection of Brighton, the author says the beach is provided with the most elaborate and expensive system of groyning to be found on the South Coast, the average expenditure on groynes being stated at 2,500l. per annum. Unfortunately, the only result has been the collection of several triangular spits of shingle, while the natural features of the beach have been entirely destroyed. Mr. Wheeler justly criticises the methods of groyning adopted, pointing out that the groynes impede the use of the beach by visitors, rendering it dangerous for children, while affording inadequate protection to the sea wall. He suggests that the present unsightly structures are not likely to attain the end to be sought by groynes erected on a proper system. The

authorities at Brighton would do well to study the contents of Mr. Wheeler's book, and they might then understand that huge masses of concrete and vast expenditure do not necessarily bring success. As the beach at Brighton has suffered from the lengthening of the pier at Shoreham, so has Seaford suffered from the construction of groynes at Brighton; but by the building of a sea wall and groynes shingle is being accumulated along the beach of Seaford Bay. The towns of Eastbourne, St. Leonards, and Hastings suffer from the adoption of short, high groynes, which have the effect of collecting shingle in a very uneven manner over the beach. Mr. Wheeler cites facts showing that the high groynes favoured in these places are as useless for preventing denudation as in moderating the force of the waves. At Bexhill, where low timber groynes have been adopted, the shingle is maintained in a manner affording complete protection to the sea wall, even, as Mr. Wheeler says, after exceptionally heavy gales. Hythe and Seabrooke afford two contrasting examples of protective work. At Hythe the beach became much denuded owing to the neglect of the groynes, and a few years ago a concrete wall was built, nearly a mile long and 15 ft. high. At the east end of the wall a single groyne was constructed of timber and concrete, and this structure has resulted in the accumulation of a shingle beach reaching nearly to the top of the sea wall, the shingle tailing out almost to the west end of the wall, burying all the old groynes and leaving a fine level beach. At Seabrooke a number of high groynes have been erected, with the result that shingle has accumulated at the west, but not at the east, end. Shingle accumulates on the windward side of these groynes, leaving the other side bare; and the absence of beach material at the east end of the shore led, in 1898, to the cutting out of the roadway and the breaking down of the sea wall.

Leaving the South Coast, the author turns his attention to the Eastern shores of England, and gives detailed consideration to the Yorkshire coast, where towns, villages, and lands have been carried away by what our forefathers quaintly and somewhat plaintively termed "the wrongdoing of the sea." On the Lincolnshire coast, below the mouth of the Humber, the beach has extended seawards for a distance of two miles, and fifty years ago a large tract of land was enclosed by two earthen banks which needed no special protection and are now buried under blown sand. This constitutes one of the rare examples along the English coast where the shore is growing owing to the deposit of alluvial matter. Much destruction has been caused at Sheringham, largely in consequence of a high groyne erected by a local landowner on the westward side of the town. It was stated at a recent inquiry that several houses had gone into the sea, that one landowner had lost 30 acres, and that 2 acres were swept away during a single storm in 1897. Moreover, the beach has become denuded of shingle and sand to a considerable extent, so that the waves strike against the sea wall. The groyne which has caused all this injury was duly sanctioned by the Board of Trade in 1894, and it is to be feared that the District Council neglected to oppose its construction at the proper time, as the Board of Trade is generally ready to give every consideration to objections of a

reasonable nature. Cromer, once an inland hamlet in the parish of Shipden, has taken its place on the sea coast since the "biting sea ate up Shipden," the parish church of which was swept away in the reign of Henry VIII. The author's account of the groynes constructed at Cromer and Overstrand is well worth reading. Down the coast to Waxham, near Yarmouth, there has been great loss of land, but to counterbalance this the tract of land known as the Broads, covering an area of 250 square miles, has been recovered from the sea, which formerly extended an arm up to the "fishing town" of Norwich. A few miles further south of Yarmouth are the remains of Dunwich, the former capital of Sigebert, King of the East Angles, and the seat of a bishopric. In the time of Elizabeth four out of six churches were eaten up, and the remains of the last one now stand but 10 yards from the edge of the cliff.

An instance of the care necessary to avoid injudicious interference with the natural drift of beach material is furnished by the case of Landguard Point. Before the beginning of last century a rocky ledge acted as a groyne, preventing the excessive southward movement of shingle across the mouth of Harwich Harbour. Then cement makers came, and by the year 1844 some 200,000 tons of stone had been removed by them for the manufacture of Roman cement. A preliminary incident in 1808 was the destruction of two Martello towers and a small battery. Then the shingle ridge on which Landguard Fort stands began to extend until the high-water line receded to a distance of 2,650 ft. from the fort, and the depth of water in the channel became reduced from 7 fathoms to 7 ft. A massive groyne was then formed round the point and the further progress of the shingle was arrested, but the complete stoppage of the drift prevented the gradual working of a portion of the shingle round the point into the harbour. Consequently, the beach inside the harbour became so denuded that the destruction of the fort appeared to be probable, and with the object of guarding against this danger some planks of the groyne were removed to allow a portion of the material to escape. The effect of this treatment was satisfactory so far as concerned the fort, but a shoal afterwards collected across the mouth of Felixstowe Dock, necessitating the construction of other groynes. All this trouble was clearly due to the removal of stone for commercial purposes by persons who were in no way legally responsible for the injury done. Another instance of the mischief worked by the removal of material from the coast is to be found in connexion with the Beacon Cliff, at Harwich. The beating of the waves on the promontory caused the denudation of septaria stones, which, falling on the beach, formed a natural groyne. At the beginning of the eighteenth century Roman cement makers coveted these stones, so that at one time from 100 to 200 boats and 500 men were engaged in taking them away. Presently the cliff began to waste. By 1800 120 ft. was washed away, the vicar's field and glebe and 40 acres of land, part of a battery, and several houses vanished; and in 1824 a house, mill, granary, and stables followed. By 1841 nearly 250 ft. of the cliff had disappeared, the harbour was deprived of a natural breakwater from south-west gales, so in 1847 an artificial break-

water had to be constructed by the Government. Careful readers of Mr. Wheeler's book may be able to pick out other examples showing that disregard of the national estate has not yet wholly disappeared, as well as others demonstrating the regrettable effects following neglect of protective measures, and the dangers accompanying ill-advised action on the part of public bodies. On the West Coast Southport is a remarkable example of a town built on sandhills, extending two miles out from the original coast line. South of Southport many farms lie buried beneath the sandhills, one, known as the "Lost Farm," having been visible in 1826. The Western shores of England and Wales need comparatively little protection owing to the durable nature of the cliffs, but the account of these coasts given in the work before us is very well worthy of perusal, and the same remark applies to the concluding chapter, devoted to the seaboard of Northern France, Belgium, and Holland.

In expressing a general opinion on the volume, we are in the somewhat unusual position of being able to say that Mr. Wheeler has written a book which will probably be appreciated by the intelligent public as much as by those professionally interested in the subject of coast protection. It contains a wonderful collection of facts, forming most interesting matter for the general reader, and an invaluable series of records for the guidance of the engineer.

NOTES.

The Sonning Bridges. THE reports which have been made public as to the proposed proceedings of the Oxfordshire County Council with regard to the three small bridges within their county, near Sonning, mark the commencement of what, if it is not strenuously opposed, will prove another step in the progressive disfigurement of the scenery of the upper Thames. It appears that by a majority of one vote (17 to 16), the Council decided that it was necessary to rebuild the bridges in question, and (so far as at present appears) left the work to the discretion of the County Surveyor, who wished to proceed at once with the work, without even requiring from him any drawing of the proposed new bridges. Of course one knows what that will probably mean—the erection of iron girder bridges of the usual type. We do not, in saying this, necessarily discredit the opinion that the bridges require rebuilding. We have not had the opportunity of examining them recently; but the statement as to their dilapidated condition is very likely quite correct; and we are certainly not in favour of keeping up dilapidated bridges on account of their picturesque character. In such a utilitarian class of structure, stability comes before picturesque character. But there is not the slightest reason why new bridges over the Thames should be ugly or should spoil the scenery. There is no necessity that they should be iron girder bridges at all, in the first instance; on a small scale very good and durable bridges may be built of stone and timber; and there is no necessity that their design should be left to an official surveyor whose education has probably never led him to consider the question of beauty in structures. Appoint an independent architect to act with the Surveyor, and to put into a pleasing form

the Surveyor's structural demands, and there is no reason why the three bridges should not be rebuilt in such a manner as to give no ground of complaint to the lovers of Thames scenery. The difficulty is to induce County Councils and other official bodies to give any attention to this side of the subject. [Since the above remarks were written we have had Mr. Holman Hunt's eloquent protest in the *Times* of Tuesday, and beneath it the letter from a member of the Oxfordshire County Council, assuring us that the new bridges will be lattice girders, and therefore "light and elegant in appearance." After that, of course, there is no more to be said.]

County Council Tramways. THE practical completion this week of the first section of the London County Council's slotted conduit system of electric tramways is an event of considerable importance to the public. Although the Council has obtained the ablest expert advice, yet their scheme has been criticised very severely in several of the electrical papers. In one respect, however, the critics are proved to be wrong, as the work of reconstructing the line between Tooting and the Plough, Clapham, has not been nearly so difficult as they prophesied. This has partly been due to the way in which the local authorities helped the contractors by giving them permission at various places to divert the course of the tracks so as to avoid the necessity of removing large water-pipes, &c. The main point on which critics lay emphasis is that the conductors inside the conduit are supported from the bottom of the conduit instead of from the top or from the sides. They must therefore be a hindrance to effective drainage, and one would expect that the accumulation of dirt round them would lead to very considerable leakage of the current, especially on damp days. In several towns in America where, owing to the fact that overhead systems are absolutely prohibited, conduit systems are universal great difficulties have arisen from this cause. The American critics also suggest that trouble will arise from the closing of the $\frac{3}{4}$ -in. slot, as the yokes have in their opinion not been subjected to a sufficiently rigid test. The Westinghouse Company proposed to put in yokes which would only close $\frac{1}{8}$ -in. when subjected to a pressure of 43,000 lbs. The County Council were satisfied with yokes which did not close more than $\frac{1}{16}$ in. when subjected to a pressure of 6,000 lbs. There certainly is a great discrepancy between the American and the English tests. The results of the actual working of the line will soon settle these points, and prove whether Dr. Kennedy or his critics are in the right.

Wages. To those who seriously consider the effect the high wages demanded and paid in this country must have on our foreign trade, with the competition now prevailing in foreign markets, the recent Board of Trade Return will be read with the greatest interest, and it is somewhat gratifying to observe that the continued increase in the rate of wages seems to have reached its height, and that, for the first time since 1895, a slight decrease can be recorded. It is true the net weekly decrease of 77,000*l.* is very small when the total amount of wages paid

in this country is considered, especially in view of the enormous increases of late years, the weekly increase for 1900 alone being some 209,000*l.*; and, moreover, the present decrease is limited to certain industries, the mining and metal trades, wages in which, no doubt, have been inflated by the pressure of strikes. In all other industries the increase appears to continue, but it is curious that any decrease at all should have occurred at a time when many of the wage-earning population were absent from this country at the war, and when competition was consequently lessened. A satisfactory feature in the Report is the fact that despite the decrease, such as it is, strikes have not been prevalent, and the tendency to resort to arbitration and Boards of Conciliation is very apparent. It is obvious that if this country is to retain her foreign trade there must be a limit to the continued increase in wages, which is almost entirely due to greater luxury in the standard of living, and it is a point gained if our people have at last recognised a fact which goes to the root of their very existence.

Housing of the Whitehaven Poor. In his report upon an outbreak of enteric fever in the Borough of Whitehaven, Dr. H. T. Bulstrode makes the following remarks as to the housing of the Whitehaven poor:—

"Wherever one turns, whether out of the small or the large thoroughfares, one finds deplorable courts and alleys where the direct rays of the sun are but rarely seen, and where even its diffused light is often difficult of attainment. The alleys all too frequently consist of narrow channels often not more than 3 ft. to 3½ ft. across, on either side of which the houses face one another. The alleys are approached by narrow passages which pass either through or by the side of the houses facing the streets, and it is immediately behind this front row of houses that the alleys are found. At the further end of the alley there is commonly another house; and hence it comes about that these alleys are practically closed at both ends, while the sides are composed of the two and of the three-storied houses, which are separated from one another by only an interval of some 3 ft. to 3½ ft. Any odd nook or corner has to serve for the water-closet, or where no such space is available the convenience is situated at some distance from the alley. The houses situated in these alleys are frequently either back to back or they have no back light, and hence the amount of light which is to be obtained on the ground floor of these dwellings is extremely small. The 'overlooking' which is a consequence of this overcrowding of dwellings upon area necessitates the drawing down of blinds when anything approaching domestic privacy is desired. The demand for dwelling-houses which obtained at the time of Whitehaven's greater prosperity is apparently responsible for the present overcrowding of houses. It was then—there being at that time no proper building by-laws in force—that the gardens and backyards belonging to the houses then existing were given over to the enterprising builder, who soon converted every available patch of ground into a court or alley. The overcrowding which has resulted is almost unique in my experience."

We are afraid that this description would apply to the houses of the poor in many other towns. There is, it appears, great difficulty in procuring freehold land in the vicinity of Whitehaven. Houses are also difficult to procure, and for an empty abode there is much competition. In Dr. Bulstrode's opinion, it is difficult to imagine a place better fitted for the application of Part II. of the Housing of the Working Classes Acts than Whitehaven. The removal here and there of the most insanitary and obstructive buildings would effect an enormous improvement as regards light and air, and he

suggests that a small sub-committee of the Corporation, with their officers, should inspect the town with the view of ascertaining whether Part II. of the Housing of the Working Classes Act, 1890, might not be applied in certain cases.

It is stated that Hartlebury Castle, near Stourport, appertaining to the See of Worcester is about to be sold, and that a part of the proceeds will be given to the endowment of the proposed new See of Birmingham. The Castle has been a residence of the Bishops of Worcester during a very long period. Burthred, King of Mercia, granted the manor to them in the year 853. In or about 1253, Bishop Walter de Cantelupe began to erect the fortified Episcopal residence which his successor, Bishop Gifford, completed and surrounded with a moat, the gatehouse was added by Bishop Carpenter. Having been captured from the Royalists, under Lord Windsor, by Colonel Morgan in the course of the Civil War, the castle was dismantled and for the greater part demolished—the keep excepted—and sold for 3,000*l*. Bishop Hough erected a large portion of the present residence in the reigns of George I. and George II., and Bishop Hurd demolished the keep to make way for his alterations, 1781, which include the library, wherein he stored the books of Warburton and of Pope. Some years previously Bishop Maddox had refitted the chapel, filling the windows with stained glass. The grounds are tastefully laid out, and contain some fine old timber. Bishop Stillingfleet planted, two hundred years ago, the avenue, chiefly of limes, which forms the approach to the castle. The Ecclesiastical Commissioners have purchased Lansdowne House, Worcester, as an episcopal palace. Rickman, of Birmingham, rebuilt, in 1836-7, the body of the parish church of St. James at Hartlebury, which Bishop Gifford had erected in 1269; the tower added by Bishop Sandys, 1575, and the modern chancel were left. We may mention that the sale by the Ecclesiastical Commissioners will perhaps be forestalled, as some residents in the diocese contemplate the collection of a fund which would in effect preserve the castle for uses of the diocese whilst relieving the occupant of the see from the heavy cost of its maintenance.

DURING the past twelve months the amount of work carried out by the engineering department of the Mersey Docks and Harbour Board has been greater than in any previous year. A large proportion of the work is due to the comprehensive scheme of dock extension sanctioned by Parliament a few years ago, but a very considerable amount of money has been expended in dredging operations at the bar and in the river. Some idea of the struggle against the forces of nature may be gathered from the statement that nearly five million tons of sand were removed from the bar, and the shoals in the Queen's and Crosby channels, within the last year. Since the commencement of dredging in 1890, the total quantities removed amount to more than sixty-two million tons, about twenty-eight million tons being taken from the bar, and the remainder from the channels mentioned. The engineer to the Board states that the satisfactory condition of the bar has been fairly main-

tained during the year, the average depth in the dredged cut being about 27 ft. at low water spring tides. These figures enable one to realise how heavy is the tax imposed upon the Port of Liverpool by the natural conditions of the estuary.

The Architectural Association for the coming session will be carried on by the lecturers and instructors of last year, except that the subjects previously taken by Mr. F. R. Farrow have been divided between Mr. Banister F. Fletcher, Mr. C. E. Varndell, and Mr. A. M. Watson. The annual meeting of the Association (the opening meeting of the session), will be held on the 3rd prox., when the President (Mr. H. T. Hare) will deliver an address and distribute prizes; and the conversazione, to be held at the Royal Institute of Painters in Water Colours, will take place on October 31. The following is the programme of ordinary meetings:—October 17, Mr. T. R. Spence on "Homer and Architecture"; November 7, Mr. F. C. Eden, "Roof Coverings"; November 21, Mr. C. C. Brewer, "Sanatoria for Consumptives"; December 5, Mr. J. S. Gibson, "Architectural Practice, Real and Ideal"; December 19, Mr. W. H. Bidlake, "The Study and Delineation of Old Buildings." January 9 (subject to be announced); January 23, Mr. J. Dudley Forsyth, "The Attitude of the Young Architect towards the Crafts"; February 6, Professor G. Baldwin Brown, M.A., on "What is the Real Value of Greek Work to the Modern Artist?"; February 20, Mr. H. H. Statham, "The Aesthetic Treatment of Modern Bridges"; March 6, Messrs. H. B. Creswell and A. W. S. Cross, on "Competitions"; March 20, Mr. W. Henry White, "Ancient and Modern Town Houses"; April 2, Mr. Banister F. Fletcher on "Palladio"; and May 1, Mr. A. Needham Wilson on "Architecture and the Public." Many of the subjects are of considerable interest and the papers should give rise to valuable discussion.

By the death of Mr. J. T. Nettleship we have lost not only an artist of much power and originality, but a man of general intellectual culture, whose death will be deeply regretted beyond the circle of the artistic world. Mr. Nettleship was, in fact, one of those men who might have taken up one out of several different lines of work in the world and been successful in any one of them. He made his first reputation as a literary man by his critical and analytical studies of some of the works of Browning, with whom he was on terms of affectionate intimacy, and whose fine but (to many readers) bewildering poem, "Sordello," he did much to explain and lighten up. Subsequently he made animal painting the chief object of his life, and his paintings of this class have been familiar and prominent in many exhibitions. He treated animal subjects not from the merely realistic point of view, but with the obvious endeavour to render them a medium of poetic expression; to give through them the impression of power, picturesqueness, and even of pathos. In the latter respect his striking picture of the blinded lion feeling his way along the edge of a cliff, with a troop of jackals waiting behind for their

prospective prey (exhibited at the Grosvenor Gallery a good many years ago), was perhaps his most remarkable production, and will be remembered by all who saw it. Occasionally, no doubt, his aim at dramatic effect in animal painting carried him a little too far; painters will perhaps also be of opinion that his animals were not so well studied and finished in detail as they might have been; and it is possible that had he been a man of less general culture he would have been a more completely successful painter, concentrating his study more on the technique of painting. But he was a man of genius, and if not exactly a great animal painter he was always an interesting and original one.

LETTER FROM PARIS.

THE Commission of Paris Hospitals has decided to reconstruct the hospitals of La Pitié, Cochin, and Saint Louis. Some new pavilions from plans by M. Paul Renaud, Architect of the Assistance Publique, were inaugurated last month by M. Mourier, the late Director of the Assistance Publique, and these new buildings are said to be as far as is possible perfect in arrangement and sanitation. It has now been decided, after much delay and discussion, to demolish the incomplete monumental staircase commenced by Lefuel in the vestibule of the Pavillon de Marsan at the Louvre, and thus devote the whole of the large hall to the exhibits of the new Museum of Decorative Arts.

Out of the sum of 8,000,000*l*. voted for the execution of various important work at Paris and its suburbs, it has been decided to devote an amount of 400,000*l*. to the work of completing and prolonging the Boulevard Haussmann.

A large quantity of interesting and very creditable work sent in by the winners of the Prix de Rome now studying in Italy has been exhibited at the Ecole des Beaux-Arts at Paris. M. Vermare exhibited a very characteristic and vigorously modelled figure of an aged tramp, which he entitled "L'Épave." M. Segoffin sent in a figure entitled "Man and Human Misery," a piece of work full of energy; and M. Landowski exhibited a figure of a young Italian which he entitled "A Young Hercules." Amongst the works in painting were a "Job and His Friends" by M. Leparra, and a patriotic picture, entitled "History," by M. Roger. The drawings of architecture were especially interesting; some detail drawings of the present state of the Arch of Titus at Rome, excellently drawn and coloured, were sent in by M. Tony Garnier, who this year has returned to his strictly classical studies after his "practical" outbreak of last year. The present drawings will be followed next year by a restoration of the Arch of Titus. M. Duquesne exhibited a restoration of the Thermæ of Caracalla at Rome.

The Minister of Public Works has authorised the construction of the two viaducts required at Passy and at Austerlitz for the passage of the new metropolitan railway across the Seine. The viaduct at Passy will be entirely constructed of light steelwork. It will be composed of a central passage for the railway, and two side passages for pedestrians and rolling traffic respectively. The decoration of this bridge is entrusted to M. Formigé, Architect to the city of Paris, and the estimated cost is 340,000*l*.

The Prix Bailly, awarded each year by the Académie des Beaux-Arts to the author of the best work on Architecture, has been given to M. J. Guadet, Professor of Architecture at the Ecole des Beaux-Arts, for his work entitled "Cours d'Architecture." The value of the prize is 60*l*.

The fine mansion once belonging to Queen Marie Christine of Spain, and more recently to the Duchesse d'Uzès, one of the most sumptuous properties in the Avenue des Champs Élysées, is now being demolished to give place to the usual street buildings. The decorations of the interior are remarkable, and all care will be taken in removing some of the most valuable for future depositing in one of the museums.

The Municipality of Paris has just placed the sum of 6,000*l*. at the disposal of the authorities of the Mairie of the Tenth Arrondissement for the purpose of putting into execution the

various proposed works of painting and sculpture in the interior and on the exterior of the building. Amongst the artists designated for the work are the painters, MM. Henri Martin, Delacroix, Danger, Beaudouin, and Michel Levy, and in sculpture, MM. G. Michel, Hyppolyte Lefèvre, Person, and Larch. On the façades will be placed allegorical figures representing the various trades practised most largely in this busy quarter—such as perfumery, artificial flowers, goldsmiths' work, blacksmiths' work, joinery, printing, embroidery, &c., and "Transport by Water," as a tribute to the canal of St. Martin close by.

The Municipality of Marseilles has opened a competition between architects and house-owners, similar to that of the "Concours de Façades" at Paris. Four new houses will be premiated each year, a gold medal will be awarded to each of the architects, a bronze medal to the contractors, and the house-owners will be freed from half of the municipal street taxes.

The Directors of the National Museums have installed in the Hôtel Chimay, which forms a portion of the Ecole des Beaux-Arts, an interesting and valuable collection of models of the various important monuments of the world, and some of more recent buildings. These models come from several private collections which have been purchased by the State. One of these, the Cassas collection, comprising seventy-three models, was purchased for the sum of 5,000*l.* in 1813. Amongst the models are reproductions of the Parthenon, the Tower of Pisa, the Temple of Antoninus and Faustina at Rome, the Pantheon at Rome, the Coliseum, and the Amphitheatres of Nîmes and Arles. The above, together with a very fine reproduction of Notre Dame at Paris, will remain at the Ecole; the others will be distributed to the various museums.

M. Cain, the Curator of the Carnavalet Museum, is putting into execution an idea which will prove of considerable interest in the future—viz., the collection of a series of plans in relief of Paris as it exists. M. Gaston Renaud has been entrusted with the first portion of the work, which will reproduce the interesting quarter of St. Julien le Pauvre, with its remarkable little church of St. Julien and the picturesque old houses in the surrounding streets. The scale will be 1 in 100, and will permit the reproduction of the smallest details of the various buildings, some of which belong to the sixteenth century.

The new competition suggested by M. Edouard Detaille, for designs of street signs for Paris, is now opened between all artists and art workers, who have until November 15 for sending in their work. This special competition is for designs or executed work of artistic signs for hotels, cafés, and restaurants, shops, workshops, &c., to be placed either flat or in projection on the fronts of the houses at Paris. All latitude is allowed to the competitors, who may submit finished designs ready for fixing, or full-size models made of some temporary materials, or large sketches and details. The authors of all the premiated designs will receive a silver medal, and the authors of those designs specially accepted by the jury for execution will receive a sum of 320*l.* to be divided up into fourteen prizes, ranging from 10*l.* to 80*l.* in value. The Prefect announces that special liberty will be allowed as regards size and projection for all designs premiated by the jury, and that these signs shall be free from the usual taxes on signboards and similar objects.

The Prefect of the Seine has made a new appeal to inventors in France and abroad to submit practical apparatus for the suppression of the inconveniences of smoke coming from factory and domestic chimneys. All who have any apparatus to submit may send in particulars, with sketches, &c., to the Prefect of the Seine at the Hôtel de Ville at Paris, and the Prefect will make practical trials, free of all cost to the inventors, of such apparatus as appear really interesting and practical.

At the suggestion of M. Henri Roujon, Director of Fine Arts, the Minister of Public Instruction and Fine Arts has entrusted M. Emile Bertone, architect and late Prix de Rome, with a mission to Berlin for the purpose of studying the Palmyrian remains existing in the Asiatic Museum of that town.

A number of young French architects have been hoping that a general competition would be opened for plans and designs for the reconstruction of the Imprimerie Nationale. But it has been decided to entrust the work to M.

Didot, the present Architect to the Imprimerie Nationale, and he is now studying his plans for submitting to the Minister of Justice, on whom this establishment depends. M. Didot intends to employ armoured cement for the general construction of this building. The Committee of the Imprimerie will meet frequently for the purpose of examining the plans of each portion of the establishment and making corrections and suggestions. It has been stated that it is impossible to satisfy the desire of many architects that this work should be put to competition, as it would be difficult to obtain in this way any plans which would be satisfactory as regards the special requirements and necessities of such a building as a National Printing-house. It is possible, however, that the principal façade will be put up for competition.

The Museum of Compared Sculpture at the Trocadéro is being enriched by a magnificent plaster cast of part of the Cathedral of Chartres, taken direct from the monument itself. It represents the portion of the choir commenced in the sixteenth century and terminated in the eighteenth century, the sculpture of which depicts the principal scenes of the New Testament.

The mission of M. Eugène Guillaume, Director of the Académie de France at Rome, will expire at the end of this year. The candidates for the post were M. Guillaume, M. Bonnat, the well-known painter, and M. Herbert, a late Director of the Académie at Rome. The Académie has decided to maintain M. Guillaume, and this will be the third time of his re-nomination for a period of six years. The old members of the Prix de Rome have asked M. Vernon, a well-known engraver, to design and execute a "plaque" to commemorate the centenary of the transfer of the Académie de France to the Villa Medici at Rome; this transfer took place in 1803, the centenary will therefore take place next year.

The Salon du Mobilier, at the Grand Palais du Champs Elysées, is enjoying considerable success. One of the most interesting portions of the exhibition is the collection of ceramic and porcelain exhibited by the National Manufactory of Sèvres. The objects consist of a number of large vases placed in the central avenue, and a quantity of interesting pieces placed in showcases in various portions of the Palais, sufficient to show the great progress which has been made recently by the manufactory under the combined efforts of M. Baumgart, the general manager, and M. Sandier, the technical manager, who have succeeded in renewing the various processes of manufacture, and emphasising their departure from the old routine so greatly criticised. The exhibits in the rooms reserved for the National Manufactory of Gobelins are magnificent; the managers, in order to celebrate the third centenary of the foundation of the establishment, have got together the most interesting examples of the work manufactured from the seventeenth century to the present time.

The Chamber of Rouen is considering the scheme submitted by the engineer, M. Berlier, for the construction of a tunnel under the Seine near Tancarville. This tunnel, which will be constructed in the form generally employed by M. Berlier for his celebrated tube tunnels, reinforced with armoured cement, is a matter of urgent necessity for the requirements of communication between the two banks of the Seine at Rouen.

M. de Nolhac, Curator of the Versailles Museum, is preparing in the upper portion of the Palace, called the "Attique du Nord," four new rooms to be specially devoted to paintings of the epoch of Louis XIII. A number of battle scenes of great interest as regards documentary evidence, coming chiefly from the collection once existing in the Château de Richelieu in Touraine, will form the nucleus of the collection. Amongst other works is a portrait of Richelieu in his cardinal robes, by Philippe de Champagne, and a portrait of Anne of Austria, also a replica of the portrait of Louis XIII. by Simon Vouet. One of the most important of the documentary paintings is a large canvas representing a meeting of the Prevots and Echevins of France in 1613, the only one rescued from a dozen similar works destroyed by fire at the Hôtel de Ville of Paris during the Commune. The new rooms will be opened in September.

An admirable collection of works of art, valued at about 250,000*l.*, has been bequeathed to the City of Paris by the late Auguste Dutuit, who died at Rome in July. This collection

comprises a large number of most rare and valuable objects acquired by M. Dutuit and his family in various portions of the world, consisting of Greek, Roman, and Etruscan bronzes, sculptured wood and ivory, tapestries and furniture, objects of gold and silver work, jewellery of the Renaissance period, faience of the epoch of Henri II., and several pictures by Rembrandt, Hobbema, Ruysdael, &c. M. Cain, the curator of the Carnavalet Museum, is busily employed in classifying the various objects, for according to the terms of the bequest it is necessary that the whole collection be properly installed and exhibited to the public at the Petit Palais before January 11 next, under penalty of the whole reverting to the City of Rome. M. Dutuit bequeathed also a sum of about 160,000*l.* to the Municipality, and in return for this generosity required the city authorities to take in hand the perpetual care of the tomb of his brother at Père Lachaise.

The monument to the celebrated draughtsman Gavarni, now being prepared by M. Denys Puech, will shortly be erected over the basin existing on the Place St. Georges at Paris. The monument will be very novel in design, and will consist of a lofty column supporting a gilt bronze bust of Gavarni. On either side of the column will be placed a figure of Thomas Virolleux, and figures of a Pierrot and a working woman, all faithful copies of the drawings of Gavarni. These figures, as well as the column, will be sculptured in white marble. The plinth will be formed of coloured marbles carrying four grotesque heads spouting water into the basin; these heads will be formed of pink and iridescent enamelled stoneware.

The Municipality of Nîmes has voted a credit of 12,000*l.* for the construction of a new museum for that town, and put the work to competition. The present museum is in such a state of ruin that the valuable paintings contained therein run a great risk of destruction. The jury, composed of M. Reton, Architect of the Louvre, and MM. Guadet and Fornigé, have just decided the competition and have awarded the first premium of 120*l.* to M. Max Raphael, architect, of Nîmes; the second premium, of the value of 80*l.*, to MM. Meisson & Garcin, architects, of Lyon; and the third to MM. Arnaud & Muller, of Nîmes and Marseilles.

The City of Paris has instructed M. Marcel, the sculptor of the group entitled "Enigme" at the Salon of 1901, to execute his group in marble, for placing in one of the vestibules of the Petit Palais.

The two new rooms at the Louvre Museum containing Egyptian antiquities have now been opened to the public, after a careful classification of the objects by M. Bénédite, sub-director. The principal object is the seated figure of an Egyptian scribe, sculptured in limestone painted red, discovered in the tomb of Schem-Ka. Around this statue are grouped the various objects employed by the Egyptian scribes, and a number of coloured statues of wood and stone dating from the twentieth century B.C.

The Bibliothèque Nationale has just acquired a valuable manuscript containing copies of sketches in red by Leonardo da Vinci. This document was preserved at Milan until the seventeenth century, and contains also several works on the higher mathematics employed by da Vinci.

M. Fremiet, the sculptor, has been commissioned by the town of Baltimore to execute a statue of Colonel Howard, one of the companions of Lafayette in the War of Independence. This statue will be erected on one of the public squares of Baltimore.

The statue of Duguesclin has lately been inaugurated at Dinan, the birthplace of the warrior. The life-size figures of horse and man are of bronze, cast from the clay model by M. Fremiet.

The first portion of the second line of the new Metropolitan Railway at Paris, going from the Place de l'Etoile to the Place de la Nation, is now completed, and has been handed over to the authorities. This portion, comprising nine stations, from the Etoile to the Square d'Anvers, will be opened during the present month.

The annual exhibition of the works of the artists of the National Manufactory of Gobelins is now open to the public. Some interesting work is exhibited by MM. Emile Maitoisi, Jacquelin, Gagnon, Berreau, Lallemand, Deluzenne, and Hanau, and a fine view of the church and campanile of St. Mark of Venice,

completed a few hours before the fall of the tower.

A new room is being installed at the Louvre museum for the exhibition of Italian faience from the excavations of Faenza.

M. Hannolin, a well-known decorator-architect, has been commissioned by the Gobelines manufactory to complete his accepted design for the immense carpet destined for the pavement of the Cour de Cassation at Paris. This will be one of the largest pieces of work ever executed by the Gobelines. The finished sketches will be exhibited at the Salon of next year.

One of the most interesting of the Parisian monuments of the fifteenth century, the Hôtel de Sens, situated at the corner of the Rue Guizot, and built by Tristan de Salazar in 1500, is doomed to destruction. Offers were made a few years ago by the Paris Municipality to purchase this building, but the offer was withdrawn owing to the high price (20,000*fr.*) asked by the owner.

The Minister of Public Instruction has instructed M. Edouard Detaille to complete a portion of the decoration of the interior of the Pantheon at Paris. M. Detaille has chosen for his subject "The Days of July" in the Revolution of 1830.

M. Guilbert, architect of the celebrated chapel of the Rue Jean Goujon, for which he obtained the medal of honour at the Salon of 1900, has now completed his plans and designs for the erection and decoration of the Armenian chapel, commissioned by M. Martacheff, of Iffis. This chapel will be erected at one extremity of the ground once occupied by the ill-fated bazaar in the Rue Jean Goujon. The work is being started, and will, if one may judge by the drawings, be as striking in originality and design as the chapel of the bazaar de la Charité. The two curved wings will be continued around the building, for according to the Armenian ritual the chapel should be isolated from any contiguous building. M. Guilbert took his inspiration from the celebrated church of Akhlamar, a *chapel d'evroue* of Armenian architecture, and will add his own special characteristics in design to the general form of plan and decoration taken from the above church as a model.

The fine monument to Lafayette in the square Gambetta, in the precincts of the Louvre, will shortly be inaugurated for a second time. The whole of the work, including the equestrian statue and the pedestal, is at present formed of plaster only. The sculptor, Mr. Bartlett, is completing his final work, and Mr. Hastings is preparing the white and coloured marble pedestal.

The monument to Pasteur, completed after the models left by the late M. Falguière, is now finished, standing at the entrance of the Avenue de Breteuil at Paris. The whole of the monument is composed of white marble. The pedestal was executed after designs by M. Charles Girault, architect of the Petit Palais. Pasteur is represented seated, draped in flowing folds of a toga; the surrounding group is composed of the figures of a mother and her daughter offering their gratitude to Pasteur, whose science has saved them from a lingering disease. The figure of Death, conquered, is seen cowering and dragging his scythe behind him. Three groups, composed of oxen, grape gatherers, and shepherds, decorate the sides and back of this important monument.

The bas-relief by M. Allar, representing Victor Hugo speaking before the Assembly, has just been cast in bronze, and will now replace the plaster bas-relief placed temporarily on the pedestal of the Victor Hugo monument on the Place Victor Hugo at Paris. As soon as this is done, the work of surrounding the monument by a decorative stone balustrade will be undertaken by M. Formigé.

The Académie des Sciences has awarded the Prix Bordin, of the value of 100*fr.*, to M. Lacombé, late Senator, for his work on the responsibilities of labour accidents.

Mme. Falguière, the widow of the eminent sculptor, has instructed M. Marqueste to prepare designs for a small monument to be placed over the tomb of the sculptor in the cemetery of Père Lachaise. The figure proposed and sketched out by M. Marqueste is that of a young girl standing in a pensive attitude against the tombstone, representing "Inspiration."

A large slab of bronze has just been cast for placing on the pedestal of the monument which is being raised to Charles Garnier, in the courtyard of the Opera House. This slab will bear no inscription, but simply a plan of

the Opera House engraved in the bronze. M. Pascal considers that this simple plan would be better than any inscription to the renown of the late architect of the Opéra. The date of the inauguration has not yet been fixed.

THE CONSTRUCTION OF SANATORIUM BUILDINGS FOR CONSUMPTIVES.*

ALTHOUGH the ordinary principles of hospital construction are involved in the erection of sanatoria for consumptives, there is a wide divergence of their respective requirements in many details. It is premised that tuberculosis in its early stages only is usually dealt with in such institutions, in the hope of ultimate success; the majority of such cases are able to move about, few being in a quite helpless condition. Provision is not often made for surgical cases, and dispensing being a minor matter the general arrangement of the building is modified accordingly.

In dealing with the primary consideration of site I do not purpose referring to climatic conditions, including altitude and proximity to the sea, which are beyond the scope of these notes, but there seems to be a consensus of opinion upon the desirability of a site possessing the following advantages:—1. Abundance of pure fresh air; 2. A maximum amount of sunshine; 3. Shelter from winds; 4. Dry and well-drained soil; 5. Remoteness from roads or ground productive of dust; 6. Privacy and quiet, away from all smoke or noisy factories; 7. Grounds of sufficient extent to permit of walks. The presence of pine trees affords grateful shade, and is by some deemed essential. A southerly or S.S.E. aspect is most desirable as a rule.

For the disposition of the buildings there is no accepted standard plan; rather the reverse, with great varieties of type, governed by ideas of the projectors and local circumstances; roughly, however, they may be placed in four groups:—1. The large self-contained block; 2. The connected pavilion type; 3. The disconnected pavilion type; 4. The chalet system. Of the first group (or self-contained block) a well-known example is that of Hohenhof Sanatorium, in the Rhine district. Five stories in height, it has a central building with two wings inclining forward at obtuse angles, the dining-hall being a projection at the rear.

Of very complete arrangement, it includes besides the dining-saloon, reception-room, reading-room, music-room, billiard-room, winter gardens, medical officer's department, inhalation-room, lifts, as well as the bedrooms, douche-rooms, &c., with a verandah around the sunny sides, and small balconies over. The verandah is in front of the bedrooms, and so does not affect the patients' rooms, the roof being at the ground-floor level forms an uncovered fresh air gallery.

It will be noticed that large provision is made for social re-union and amusement of the patients, a matter upon which opinions are at variance. Under the same head would come Wehrwald in Baden, described by Sir Lauder Brunton† as "the most perfect model yet built of what such a sanatorium ought to be." It has "a central building five stories high for the reception of patients, and two wings projecting backward at either end. Both these wings are only one story high, so that they do not interfere with a free current of air around the main building. "One wing is devoted to the medical department, and the other to the dining-rooms, offices, kitchens, &c. A verandah runs the whole length of the front, and below it is an arcaded passage for bad weather use. Above the ground floor the plan is almost a parallelogram, the south part being devoted to bedrooms, the south part being devoted to bedrooms with a corridor on the north from which project the staircase (with lift) and sanitary apartments."

The publication of Sir Lauder Brunton's description in the *British Medical Journal* evoked some criticism of an adverse nature on many points, the chief of which related to the height of five stories.

In transition to the next group may be placed the Falkenstein Sanatorium,† near Frankfurt, erected by the well-known Dr. Dettweiler. It has the high central building with obtuse angled wings, from which on either hand corridors connect with other

buildings. The large dining-hall seats 200; winter gardens, and social rooms such as music, reading, and billiard rooms, are included.

Proceeding to the connected pavilion type, we have as an example the East Anglian Sanatorium, at Nayland, in Suffolk; of two stories, the main building slightly converges in the centre, where is an open-air gallery, the patients' rooms being right and left, with a north corridor, but no verandahs. The dining-hall and billiard-room, kitchens and stores, form a north block connected by a central corridor having offices and staff-rooms on either side of it. Under this heading comes Dr. Knopf's plan of an ideal sanatorium, which shows a frontage of three two-story pavilions in line connected by two-story galleries, from each of which a corridor runs north to the dining-hall, winter gardens, and kitchens. Recreation and isolation pavilions are shown.

Of the disconnected pavilion type the London Open-air Sanatorium at Pinewood is a very good example, and has only been in use twelve months. There is a two-story central administrative block with hall, medical rooms, and library with central corridor. East and west of this are the patients' two-story blocks slightly inclining outwards and merely connected by low, open, covered ways. The dining-hall is some 40 ft. north of the central block, and quite detached from it. Behind the dining-hall are the kitchens, &c., with further isolated blocks for laundry, stables, engine and dynamo rooms. A verandah is placed in front of the central block, and two-storied verandahs at each end of the patients' blocks approached from the corridors only. Crooksbury Sanatorium, in Surrey, is another recent building, having a range of twelve bedrooms on the ground floor, and with nurses' quarters over the centre, the dining-room and kitchen block behind. A little higher up the hill is a two-story building for eight, with verandah and balcony at the end, where it does not interfere with the rooms. The ground floor rooms open on to a wide tile pavement, over which awnings are stretched when found desirable.

Of the isolated or chalet type, the Adirondack Cottage Sanatorium, New York State, has a central executive building surrounded by twenty-two or more different cottages, from 75 ft. to 100 ft. apart; these in many cases consist of four bedrooms, with a sitting-room in a re-entering angle, and a verandah outside. Among other places in England this idea is carried out at Hailey, near Goring, where the patients sleep in single-roomed wooden chalets, constructed with windows on each of the four sides, and a small verandah on the south. The dining-room and administration, as well as some bedrooms, are in the central building. This motive of thorough isolation has been further developed by Dr. Johns, at Parkstone, where the executive block is occupied by offices and officers' quarters only, the dining-hall and kitchens being separate, and excepting the seven-roomed pavilion for ladies, the patients occupy double-roomed chalets, widely separated, constructed of wood and iron, with provision for opening three sides, the doors being in a verandah porch. Asphalted paths are the passage ways. This latter system is eminently favourable where the adoption of a proposed site would be more or less experimental. Merely the nucleus of a hospital might be erected, and if proved successful accommodation could be added piecemeal, or altogether removed and placed elsewhere if the contrary happened; and further, after a certain number of years the whole of the building site might be purified by fire. Economy also favours this, but there is the drawback of warming being somewhat difficult.

Passing on to the component parts, of first consideration are the patients' bedrooms, best placed on the south front with only a corridor behind them, and this latter should have a sufficiency of opening windows as well as a floor space to each room of about 120 to 150 super. ft., and a cubic space of about 1,200 to 1,400, seems a fair allowance, but cubic space is secondary to thorough ventilation, and to ensure this about half of one wall should be window space, and for the ground floor rooms French casements reaching to the floor, with fanlights over, give best results, enabling patients with their beds to pass directly into the open. Several methods have been tried for cross ventilation, including air-ducts through the corridor from the outside of the north wall; the bedroom doors have been made with panels

* A paper by Mr. Harbottle Reed, architect, read at the recent Congress of the Royal Institute of Public Health, Exeter.

† Dr. Knopf.

† *B.M.J.*, June 7, 1902.

arranged to admit the air; but a hopper fan-light over the door is, perhaps, as effective as any, if the windows of the corridor are placed opposite each bedroom door; the hopper also shows whether the lights are used unduly. In the chalet system, with windows on three sides and door on the fourth, there is no trouble in this respect.

An open fireplace in each bedroom has been advocated, but it is a question whether the dust it causes does not counterbalance the gain from the cheerful aspect of a fire which is rarely used, and a smoke begrimed ventilating shaft. Radiators appear to present the easiest solution of the warming problem. Then the ordinary precautions observed in hospital construction should be enforced with regard to wall surfaces, rounded angles, abolition of mouldings, impervious floors; the usual plan adopted for the latter seems to be either a floor covering of linoleum or plain polished wood-work, only a damp cloth being used for cleaning.

For plastered wall surfaces paint or duresco is used, as are also varnished papers, and it is here that the weak point of timber buildings shows in the multiplicity of joints; at Nordrach I believe the planks are simply varnished repeatedly. Pegamoid paper and compo board decrease the joints, and when the latter is covered with a varnished canvas the result seems very satisfactory. The condensation on painted walls is said to have no effect on the patients. The Nordrach plan of douches in each bedroom does not seem to be in favour in this country; where separate rooms for douches and baths are provided, water closets or earth closets are placed in ventilated blocks. Outside sun blinds are sometimes used, and elsewhere draw-curtains of materials which permit of perfect cleansing. The dining-room must have ample windows, on at least two sides and where possible three, and if placed away to the north of the main block it will get considerable sunshine. Electric fans are useful in very large rooms. In connexion with the dining-room there should be adequate kitchens with stores and offices, and nurses' rooms; a milk steriliser is a requisite. A laboratory is necessary for bacteriological purposes, as well as the usual rooms for the medical officer, which should be placed slightly apart from those used by patients. Where inhalation forms part of the regime a room should be provided for it.

Means of isolating and nursing grave cases are sometimes desirable, as is a mortuary. The laundry block should include a disinfectant and a destructor, wherein paper handkerchiefs, spitcup linings, &c., may be burnt. The engine and dynamo rooms should be kept some distance away, and if an oil-engine is used care must be taken with the exhaust. For lighting purposes electricity is used where possible. Warming by low pressure steam or hot water is generally adopted, with the addition of open fires in some of the common rooms. In some instances (*vide* Dr. Walters) a medicated solution of creosote, turpentine, and eucalyptol is vaporised with the warm air apparatus.

Reverting to the question of verandahs, which are useful if properly placed, their value is decreased if fixed in front of patients' rooms and covered with an opaque roof, or balcony floor, since the access of air and sunlight to the room is bound to suffer in this country. A perfect continental model may not be at all suited to our less sunny climate; indeed, several of our English sanatoria dispense with large verandahs. Some authorities recommend them with a depth of 12 ft., and means of warming. An open fireplace has even been tried, but, as may be surmised, unsuccessfully. More essential than that the verandah should be warmed is that it should be properly ventilated, since patients can be so wrapped in warm clothing and provided with hot bottles as to be able to lie out of doors in a snowstorm. A wide paved floor immediately in front of the patients' rooms is most desirable, and over this movable awnings may be placed when demanded by the weather, as at Crooksbury. A second method is to have open-air galleries (as at Nayland) between the blocks, or at the Pinewood, where the verandah has a first floor and is provided with weather screens; care should be observed that doors or windows permit of beds being wheeled on the verandahs or balconies. At Overton, Bournemouth, the screens are also movable. It has been found

in many instances that the shelters in the woods are preferred to the verandah; in warm weather this is generally the case. At Nordrach "the grounds are provided with seats at intervals, but with only three small huts or shelters, and no regular liegchallen or covered walks; Dr. Walther believes that when rest is needed, it is best taken in the patients' own bedrooms." (Walters.)

English sanatoria usually have a number of liegchallen or sleeping chalets raised above the ground, some of the revolving pattern, others with sides that can be opened or closed, according to the weather, and when shelter is required much of the patients' time is spent in them, being thus practically in the open. They are generally in electric communication with the centre block, and provided with lights. At Kidmore they are double, with a glass roof for winter and shelter for summer. To gain the fullest advantage of sunshine other devices are sometimes employed, such as high-walled gardens where air baths may be taken, and centrates the sun's rays upon the patients. Seeing that the source of infection is the sputum, provision must be made for its reception and destruction. Frequent disinfection of the rooms is also recommended.

Furniture is another point on which much care is exercised to keep as plain and free from dust quirks as possible; wardrobes have sloping tops, and chests of drawers are blocked up from the floor so that they may be swept under; while beds are sometimes raised (at Kidmore) to the window level. Each bedroom should have bell communication with the doctor, matron, and chambermaid, and a ceiling and table light.

The limit of accommodation is a debatable point to be settled by medical authorities, some of whom favour a maximum of forty patients, with a separate bedroom to each person. The palatial German institution* of Falkenstein takes 150, Hohenhofner and Ruppertsheim 100 each. Sultzshayn (Hartz Mountains) 120. Dr. Walters states that Hohenhofner "cost nearly 72,000*l.*, or about 660*l.* per bed without reckoning the ground," while one of our recently erected sanatoria for twenty beds cost about 325*l.* per bed, and an additional block for eight beds would only cost 150*l.* per bed. Timber buildings, covered with corrugated iron upon a brick or stone foundation, would be considerably less expensive.

In conclusion, I should like to express my indebtedness to the many English medical officers who have courteously afforded me a view of their sanatoria; time did not permit me to inspect those on the Continent.

Illustrations.

THE PIAZZA, VENICE, BEFORE THE FALL OF THE CAMPANILE.

WHETHER the Campanile is rebuilt in its old form or not, it may be of interest to our readers to preserve a memorial of its appearance before the catastrophe, and we accordingly give a large photograph of the well-known site, taken from a point of view from which it has not often been illustrated, and which gives special prominence to the Campanile in relation to the surrounding buildings.

We are indebted to Mr. E. A. Gruning for the suggestion, and for the loan of the photograph, which was in his possession.

HILL END, WENDOVER.

THIS house had to stand in a belt of trees with views to the east, north, and west, but none whatever to the south, hence the general arrangement of plan. The ground pitched away quickly to the west, and this suggested the terrace shown. The materials to be used are brick covered with roughcast for the walls, with cement dressings in places, and the roof covering shown is stone slating. Mr. Leonard Stokes, of Westminster, is the architect, and the drawing reproduced was exhibited in this year's Royal Academy.

DECORATIVE PANELS, BROADLANDS, ASCOT.

THESE paintings, which decorate the panels in a coved ceiling over the fireplace in the hall

* Dr. Knopf.

at Broadlands, Ascot, represent ships of the time of James I., and heraldic devices. They are designed and executed by Mr. H. C. Brewer.

The work is slightly relieved in gesso, and painted in heraldic colouring and lacquered metals.

The drawing, which was exhibited at the Royal Academy in 1901, shows two of the panels.

THE HOUSING OF THE WORKING CLASSES.

THE following paper was read by Mr. H. Tozer, Vice-Chairman of the Housing Committee, Westminster City Council, at the recent congress, at Exeter, of the Royal Institute of Public Health. After some preliminary observations the author says—

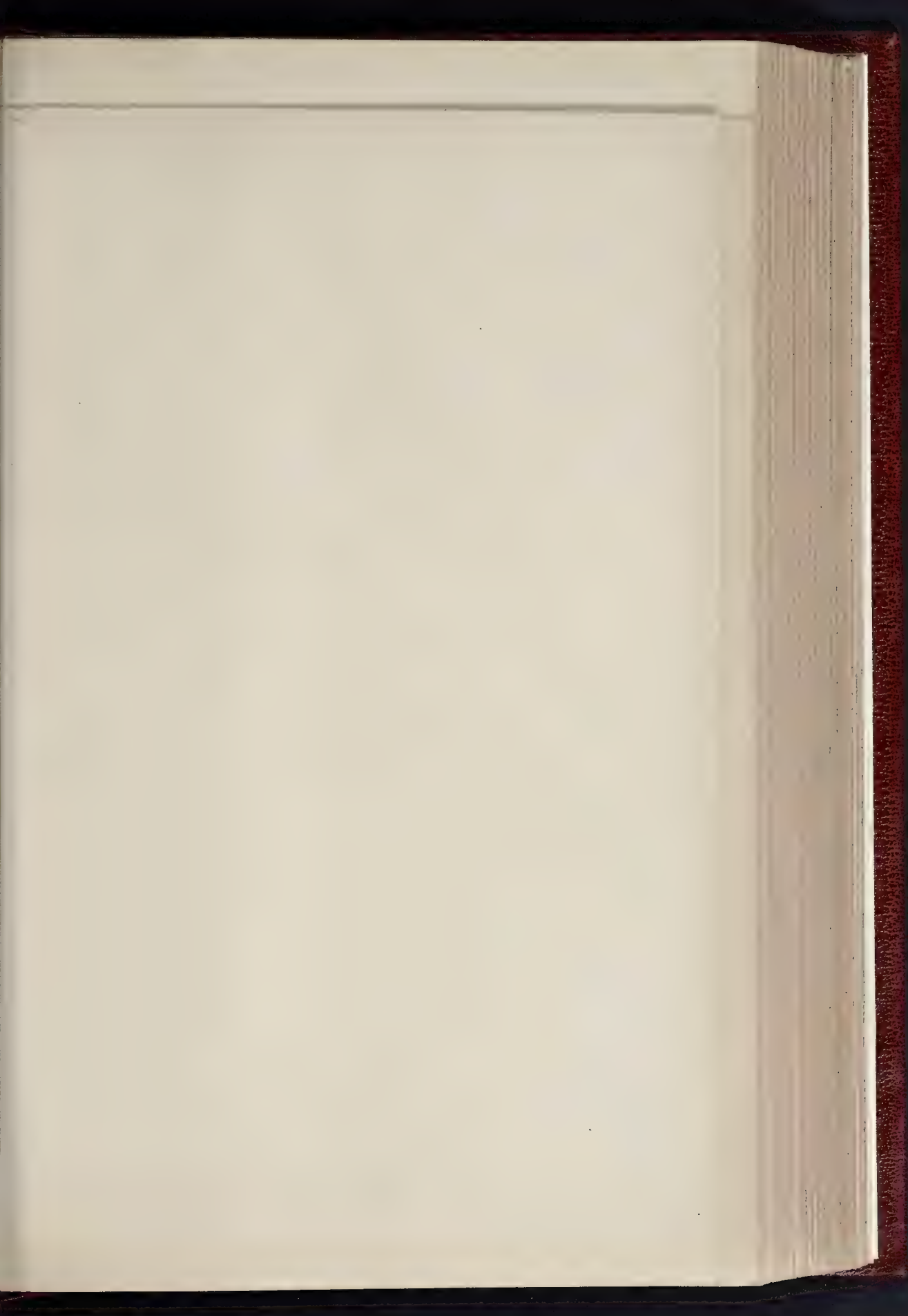
The academic question is often raised as to how far municipalities should take upon themselves what may seem to be the duty of traders, and the definite expression of a principle has often been invited. Is not this the right axiom, that municipal trading is justified, and is advisable where such things as are vitally necessary to the health and well-being of a community are inadequately provided by private enterprise, whether it be water, public lighting, tramways and other locomotion, housing of the poor, or other things?

As long ago as I can remember taking an interest in public questions, the housing problem existed here in Devonshire in regard to the agricultural labourer, and many of you may recollect the acute controversy of some forty years ago, led by Canon Girdlestone, which had no very satisfactory result. The question was practically solved in the course of time by the labourer leaving the land to a great extent, and this may be said to have been one of the principal causes why agriculture became in England a gradually declining industry. As true to-day as it was then is the saying that—"You cannot expect men to act like Christians when they herd like pigs."

Our cities and towns have so long attracted streams of labour from rural districts that proper housing of the working classes has fallen below its requirements, even from the health point of view only. So that in many large centres of population we are to-day face to face with the difficulties of this housing question. Our commercial supremacy, which depends in a great manner upon our raw labour, is seriously threatened, and it behoves us, *inter alia*, to "wake up" to the necessity of labour being properly sheltered. Our factories and workshops have been vastly improved, labour has in many respects been beneficially organised; but it must be admitted that generally the homes of the working classes do not come up to the modern standard of comfort and health. This must prejudicially affect the physique of the labourer, and deteriorate the quality of his labour; besides which overcrowding is admittedly one of the main causes of intemperance. In every city there is a natural tendency for workmen to concentrate as near their labour as possible, and the demand for decent homes being in excess of the supply, the rents become abnormally high, and, as a partial consequence, land becomes prohibitive in value for the purpose of erecting workmen's dwellings.

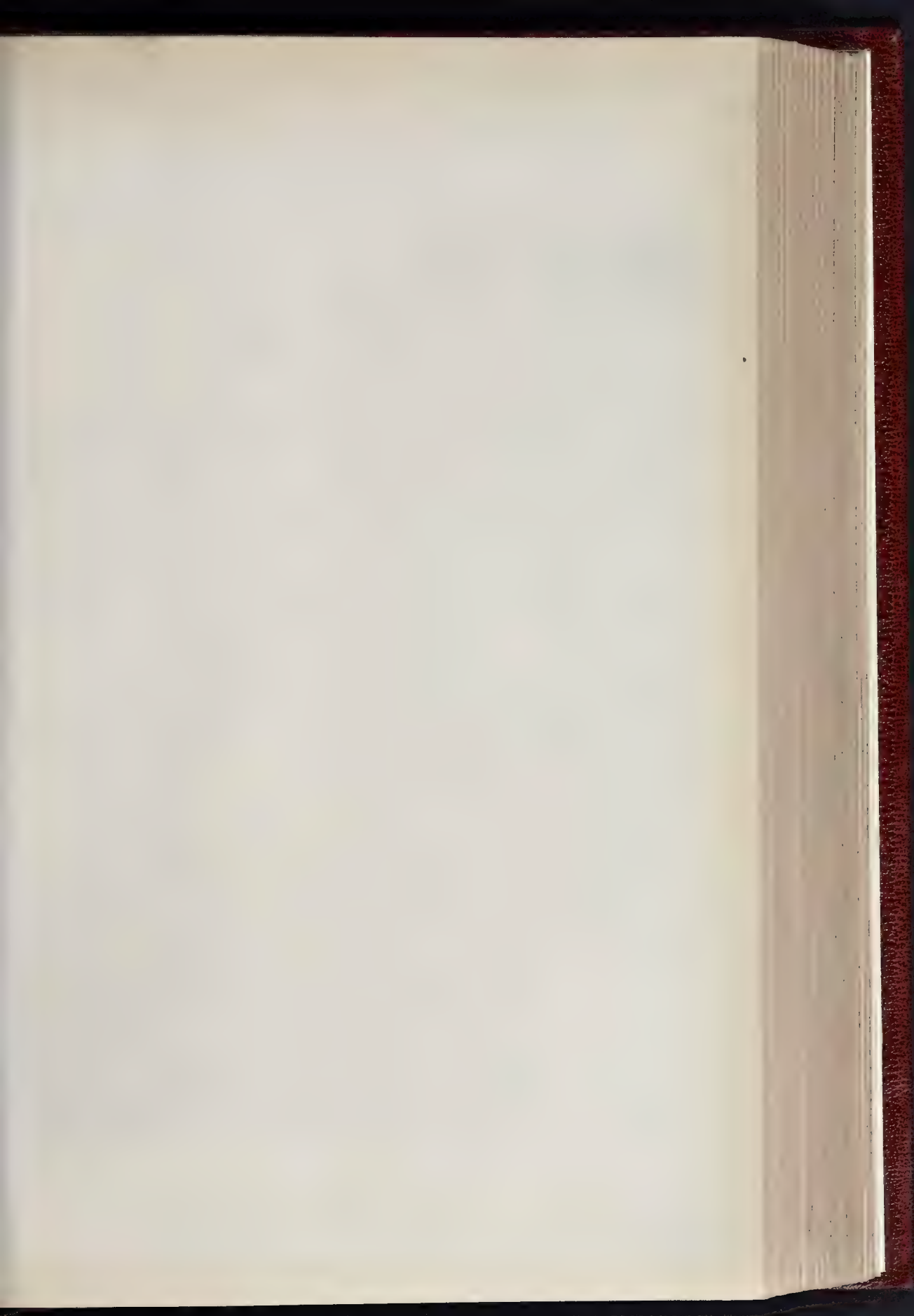
This concentration can only be obviated by what is now universally recognised as the first important step in dealing with overcrowding—cheap transit to outer parts of towns, so inducing large numbers of the working classes to go further afield and relieving the congestion in the populous centres of the towns. A cheap and efficient system of locomotion offers, as has been well said, the most immediate and least experimental, though not complete, solution of the housing problem. Build only where you can make the dwellings self-supporting, for philanthropy should not be an essential part of any scheme. Unless you can buy your land cheaply, you will defeat the success of your scheme. But where insanitary or undesirable sites are cleared at the expense of a municipality, and the land used for erection of dwellings, only the value of the land for such purpose should be charged against the housing scheme, and any excess of cost should be considered as civic improvements, and charged to an improvement fund. Still, this method should only be sparingly and conscientiously—certainly not invariably—adopted.

How to acquire land at a price that will





THE PIAZZA, VENICE: BEFORE THE FALL OF THE CAMPANILE.





"HILL END"
WENDOVER

LEONARD STOKES
ARCHITECT
LONDON
Edw. Louisa Walton Esq. R.C.M.P.



GROUND PLAN

SCALE OF FEET

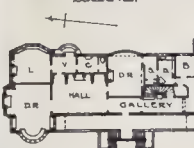
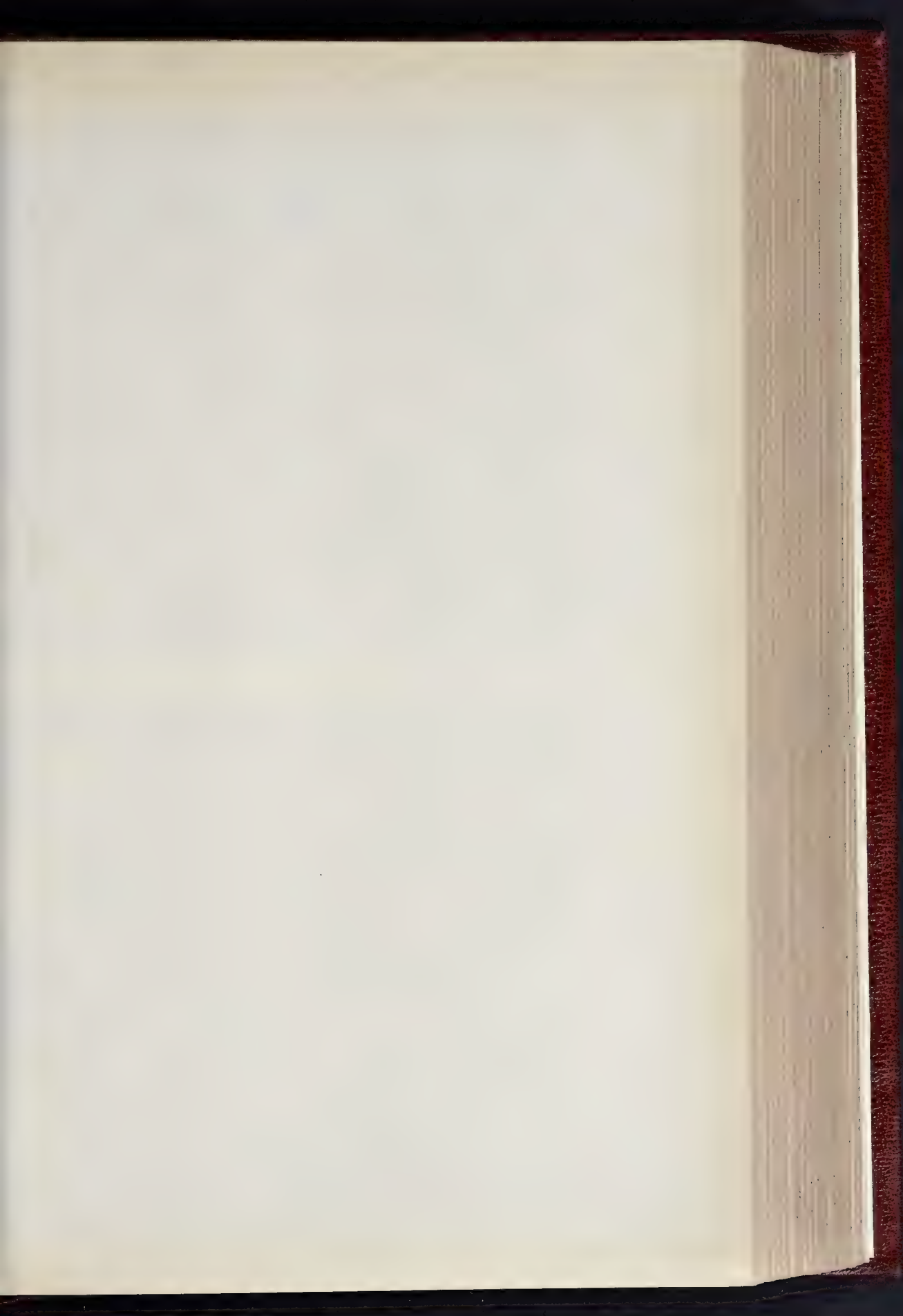
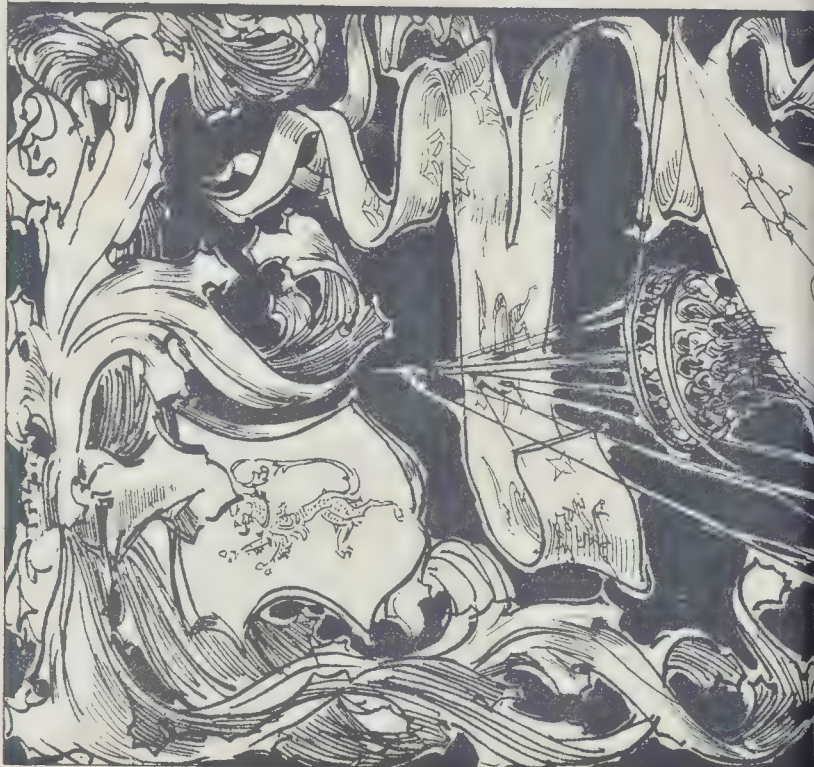


PHOTO LITHO. SPRAGUE & CO. LTD. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.



THE BUILDERS, SEPTEMBER 6, 1902



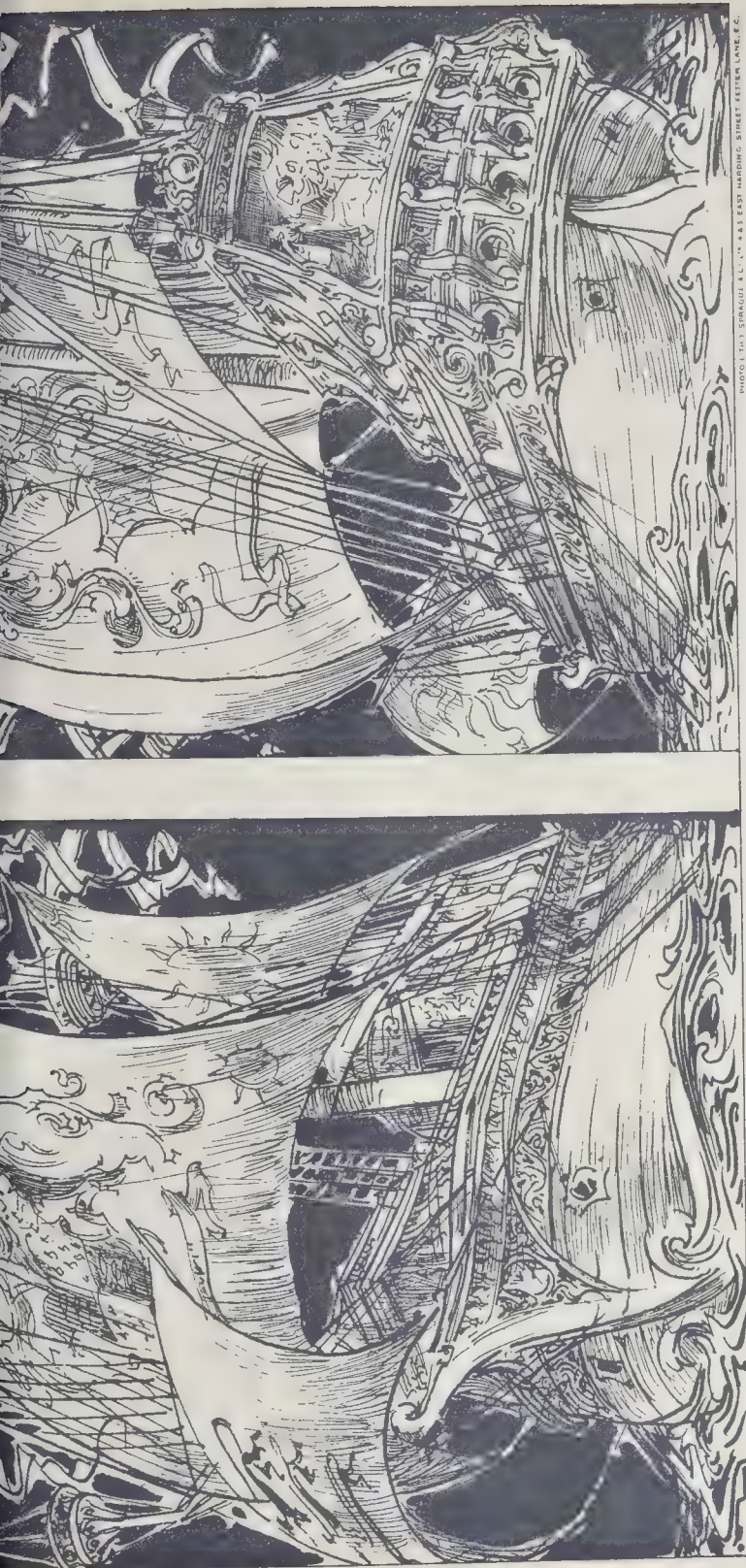


PHOTO BY J. STRAUSS, F.C., 425 EAST HADDON STREET, KETTER, LANC. E.C.

DECORATIVE PANELS AT "BROADLANDS," ASCOT—DESIGNED BY MR. H. C. BREWER

able you to provide attractive homes at rents is a matter that must be dealt with according to individual circumstances. But, some guidance, I may mention what the City of Westminster Council (of which I am a member) has recently done. They were the Ecclesiastical Commissioners, who possessed a large site in Westminster, and said—"Will you help us to deal with the land—using it for commercial purposes, but still a fair price; and be it said to the credit of the Ecclesiastical Commissioners (who are not, as you are aware, constituted for the dispensation of charity), they consented, subject, of course, to fair conditions. What was done in this instance can be done in other cases, although perhaps in a different way according to circumstances.

And now, as to some details of the various workmen's dwellings that have been erected in late years, which may be summarised in three classes, viz., lodging houses, block buildings, cottages, the first of which I do not propose in the short time at my disposal dealing with, for they are only erected in thickly populated towns, where there is a large class of unmarried labourers, earning scanty and irregular wages. The Rowton House system seems to form the most complete measure of provision for this class, and has met with great success.

Block dwellings are built in towns or urban districts where the high value of land does not permit of cottages being erected, so as to produce a reasonable rate of interest on the outlay at the low rents which the average working man can afford to pay. They are usually built from three to six stories in height, according to the locality and cost of land. There are two varieties of tenements in block buildings—namely, "self-contained" and "associated." A self-contained tenement is one which has a water-closet and scullery or laundry of its own. An associated tenement has the use of a water-closet and laundry in common with one or more tenements, and also the use of a sink or drawing water when the laundry is occupied. Associated tenements are only built by bodies such as the Guinness Trust, the Peabody Trust, and those Municipal Corporations who desire to house the lowest-paid class of wage earners. It is to be regretted that all Corporations do not hold the view that the poorest have the first claim on their attention. It is possible to let an associated tenement at 1s. 6d. less rent than can be charged for a self-contained tenement.

Tenements may consist of a single room; a living-room and one bedroom; a living-room and two bedrooms; and occasionally a living-room with three or four bedrooms, with the water-closet and laundry accommodation just mentioned in addition. The proportion of each kind of tenement naturally varies with the locality and the class and means of the persons to be housed. The tenements of all block dwellings are entered from a common staircase, or from an outside balcony. The latter is an objectionable feature, as it becomes necessary to pass a neighbour's windows before arriving at one's own entrance. The more tenements that are grouped round one staircase, the cheaper is the building to construct. The smallest number of tenements on each floor entered from one staircase that I have seen is two and the largest number is seven.

It will probably be of interest if I describe a tenement in detail, avoiding as far as possible technical language. The living room should be provided with a food cupboard, divided into two parts; the upper part, being for the storage of food, should be properly ventilated. The lower part can be utilised for storage of household utensils, but in the case of an associated tenement (where there is no scullery), a portion of the lower part should be reserved for coals. A dresser or rows of shelves with cupboards thereon should also be provided. The range now generally in use, though varying slightly in design, is of the kind known as a self-setting close range. This is a great preventive of smoky chimneys, as there can be no down-draught. Either an iron or a wooden mantel surrounds the range.

In planning the living-room care should be taken to provide a space for a bed in case of emergency, and the doors into the bedrooms should be so arranged as to afford proper ventilation of those rooms without destroying the comfort or utility of the living-room. Each

bedroom should have a register stove, which, although only used in cases of illness, affords an efficient means of ventilation at those times when no fire is needed. A dress cupboard or a row of clothes pegs is usually supplied in every bedroom. The former is far preferable, as the clothes are kept clean, and the room presents a tidier appearance. The laundry or scullery of a self-contained tenement should contain a washing-trough, an independent copper in which to boil clothes, a coal bunk, and, if possible, a small gas cooking range. The latter is a great convenience, as it enables a tenant to cook during the summer without lighting a fire in the living-room. Lines on which to dry the washing should also be provided in each laundry. The laundry of an associated tenement should be fitted with a washing trough, a rinsing trough, and a copper and drying lines, but no cooking stoves. It is generally arranged that each tenant has the sole use of this laundry for at least one day a week, and may lock it up to prevent theft of clothes while drying. If the other tenants require water they obtain it from the sink on the landing previously referred to. The water-closet does not require any description beyond stating that it should be entered either from an open balcony, or from the staircase landing.

Cottage dwellings may be roughly divided into two classes:—(1) Cottages containing one tenement only, to be occupied by one family; (2) cottages containing two or more tenements. The first-class are usually two stories high, and the accommodation provided consists of a living-room, kitchen, scullery, water-closet, and three or more bedrooms, and a small garden at the rear. The second class may be either two or three stories high, containing one tenement or flat on each floor. The accommodation in this type of cottage is similar to that supplied in block dwellings, viz.,—a living-room, scullery, water-closet, and one or more bedrooms, but there is no doubt that the greater privacy obtained by having a separate access to each tenement, and the absence of many flights of stairs, renders cottage dwellings more attractive than block buildings. Another attractive feature is the provision of a garden for each tenant. I must, however, again remind you that it is absolutely impossible to provide this type of dwelling in commercial centres owing to the great cost of land. The fittings in cottages are of the same design as those described for block buildings.

It will be interesting to give a few particulars of the average areas of rooms adopted in London by some of the bodies engaged in housing the working classes, and the rents charged by them. I have only included two-room and three-room tenements as they form the best basis for comparison, the greatest number of tenements erected having been of these two types.

		London County Council.		Guinness Trust.		Four per Cent. Industrial Dwellings Company.		Westminster Council.	
		Area.	Rent.	Area.	Rent.	Area.	Rent.	Area.	Rent.
Two Room Tenements.									
Living Room	.....	153 ft.	7s. 6d.	141 ft.	4s. to 5s. 6d.	176 ft.	5s. 9d. to 7s. 6d.	154 ft.	6s. 6d. to 7s. 6d.
Bedroom	.....	105 ft.		127 ft.	5s. 6d.	130 ft.	7s. 6d.	117 ft.	7s. 6d.
Total		258 ft.		268 ft.		306 ft.		271 ft.	
Three Room Tenements.									
Living Room	.....	157 ft.	10s. 6d.	155 ft.	5s. 3d. to 6s. 3d.	176 ft.	7s. to 9s.	154 ft.	8s. 6d. to 9s. 6d.
Bedroom	.....	96 ft.		101 ft.		105 ft.		98 ft.	
Second Bedroom	.....	124 ft.		101 ft.		105 ft.		126 ft.	
Total		377 ft.		357 ft.		386 ft.		378 ft.	

It may be stated that if the rents exceed 2s. 6d. a room for an associated tenement and 3s. 6d. a room for a self-contained tenement, the scheme is likely to be a failure from the point of view of housing the poorer portion of the working classes. The average rent per room charged by the Guinness Trustees is 2s. 1½d., and included in this low rent is the free use of baths, clubroom, Venetian blinds, chimney-sweeping, and boiling water obtained from a specially-constructed urn-house. For a nominal charge a tenant can have the whole of his washing dried in a special heating chamber or drying-room. To ensure that none but the

poorest wage earners benefit by the Guinness Trust, no tenant is accepted who earns more than 25s. per week. Of course, in certain districts where the value of land is abnormally high, such as in the City of Westminster, it is impossible to let rooms at less than 3s. to 3s. 6d. each, even on the associated principle, but it must be borne in mind that the occupants of the new buildings—chiefly artisans in a position to pay such rent—would have vacated other premises which would soon become let to their less fortunate brethren.

I will now give you some of the most important considerations in deciding upon the suitability, both from a financial and sanitary point of view, of any site or area for housing purposes, and which will enable you to form a judgement of the merits of any plans for covering the land which may be laid before you.

The cost of land in urban districts should not exceed 20s. for each room which can be placed thereon, and this amount is subject to my remarks hereafter under the heading of subsoil.

In suburban districts where cottages are intended, the cost of land should not exceed 1,800s. per acre. No site for block dwellings should be less than ½ acre, and if possible, 1½ to 2 acres, the cost of maintenance and superintendence not increasing in ratio to the extent of the area of the site. A square piece of land is most desirable, without awkward angles which cannot be developed. It enables the architect to design the buildings square—a great factor in saving design expense and a great factor in economical planning. The land should have frontages to as many streets as possible to avoid the waste of land involved by forming new roadways on the site.

The next important element to be considered is the subsoil. The most advantageous site on which to build is one with a good bed of gravel near the surface. This not only saves the cost of excavating to a great depth and putting in deep foundations, but, in addition, the gravel obtained from the excavations can be sold and will pay part of the cost of the foundations. If there is a bad subsoil, which is often the case, and it becomes necessary to excavate to a great depth before a sound bottom is reached, then a half-basement should be built—i.e., the lowest story should be sunk 4 ft. or 5 ft. below the surface of the ground, so that the expense of excavation is not incurred in vain. Before purchasing a site a series of trial holes should be dug, so as to ascertain the exact nature of the subsoil.

Block dwellings are rarely built less than four or more than six stories. The most usual number of floors is five without or six with a half-basement. The greater the number of stories the more economical is the building, as the cost of the land, foundations, paving, drainage, and roof would be a constant factor, and would be spread over a larger number of rooms in a five-story building than in a four-story building. Cottages are never built more than three floors high—lower ground, ground, and first floors—the cost of land being comparatively small where such dwellings are erected. The buildings, wherever practicable, should face east and west, so that every habitable room may obtain a share of sunlight every day.

The buildings should be very substantially constructed to avoid constant renewals and repairs. All pipes, except supply pipes, should be exposed, though not unduly, and easily

of these impurities than a clay to be used for making firebricks. The principal impurities are:—

Free Silica, or sand, which is a useful constituent of clay, for, although it reduces its plasticity, it also reduces the shrinkage which occurs when the clay is fired. The proportions of sand must not, of course, be excessive; otherwise the brick or other article manufactured will be deficient in strength.

Free silica, in the absence of fluxes, is infusible at brick-making temperatures, and, therefore, the more sand a clay contains the more fusible it should be. It is, however, asserted by Mr. C. T. Davis, an American authority on brick-making, that the action of free silica in clay used for making firebricks is to render the clay more fusible; a clay in which nearly all the silica is combined with alumina being more refractory than a clay containing a large proportion of free silica. The fact remains, nevertheless, that in England, at any rate, the fireclays most extensively used contain a large proportion of free silica.

Lime.—Lime renders clay more easily fusible, double silicates of lime and alumina being formed when the clay is fired. The lime is usually present in the original clay as carbonate of lime, but this is converted into silicate when the clay is heated. Lime in small proportions is beneficial for making building bricks, for it causes the grains of clay to partially fuse and to cohere strongly when the brick cools. An excess of lime is prejudicial, because the brick fuses too much and loses shape. Nodules of limestone in a clay are objectionable, because the lumps of carbonate of lime are converted into lumps of quicklime more or less coated with silicate of lime and alumina. The quicklime is liable to slake when the brick is wetted or exposed to the atmosphere, and the expansion which accompanies the change from the anhydrous to the hydrated condition is apt to split or disintegrate the brick.

Oxide of Iron.—The colour of the fired clay is mainly influenced by the quantity and condition of the iron it contains. Ferric oxide is not objectionable in clay to be used for ordinary bricks, but should not exceed 2 per cent. in clay to be employed for firebricks. Ferric oxide is not readily fused, but when heated in a reducing atmosphere ferric oxide is converted into ferrous oxide, which immediately combines with silica to form black ferrous silicate, a compound which readily fuses.

Iron Pyrites is a sulphide of iron (FeS_2) often present in clay. When a brick containing minute particles of this compound is fired, the sulphide of iron is converted into ferrous oxide and gaseous sulphur dioxide. The escaping gas produces small holes in the brick and the ferrous oxide combines with silica to form black ferrous silicate, which appears in the form of black stains in the neighbourhood of the holes. If the clay contain small nodules of pyrites the expansion which accompanies oxidation is liable to cause disintegration of the brick.

Alkalies.—Potash and soda should not be present in larger proportion than 1 per cent., because these alkalies greatly increase the fusibility of the clay. Clays found near the sea or near salt deposits sometimes contain a considerable proportion of sodium chloride and are then unfit for brickmaking, because bricks made with it warp and twist into useless shapes when fired. Alkalies are always present in clays, but if not present in greater quantity than 0.5 per cent. may be ignored.

Carbonaceous Matter is objectionable when present in a form not readily burnt out of the clay by firing, because the brick is darker in colour in the interior than on the surface. Bricks of this description when cut for face work would give the work an unsightly appearance.

Nomenclature of Clays.

Brick Clays, or brick earths, are clays of any description which are used for making bricks or inferior pottery.

Plastic or **Strong Clays** are comparatively pure clays, and require the addition of sand or sand substitute to prevent excessive shrinkage, and of lime to act as a flux. These pure clays are sometimes called "foul" clays.

Loams or **Mild Clays** contain an excess of sand. They require the addition of lime as a flux; otherwise bricks made with these clays would be deficient in strength. They sometimes contain stones, which must be extracted.

Marls or **Calcareous Clays** contain a con-

siderable proportion of carbonate of lime. If the proportion of lime be too large, bricks made with clay of this description will undergo excessive fusion and lose shape; but many marls are found of such composition that they may be used for brickmaking without admixture with any other substance.

Malm is an artificial imitation of good brick-making marl. It is made by mixing ground clay and chalk in a wash-mill, and is sometimes called "washed clay."

Fireclay must be almost free from fluxing materials such as lime and alkalies, and should not contain more than 2 per cent. of ferric oxide. The proportions of these fluxes commonly present in ordinary brick clays renders the clay too fusible for service as fireclay. Fireclays usually contain a large proportion of free silica.

Pottery Clays are comparatively pure plastic clays free from compounds which impart colour to the clay when burnt. Although these clays contain iron, the proportion is so small that the clay is perfectly white after being fired. Owing to their purity they shrink excessively and require admixture with sand or sand substitute. The sand must be free from iron or other colouring agent. China-clay, pipeclay, fuller's-earth and kaolin are names commonly applied to pottery clays. They are frequently grey when in the raw state, but are perfectly white after being fired. The finest kaolin or porcelain clay is almost pure silicate of alumina. Low-grade pottery may be made with coloured plastic brick clays.

Slate is a rock formed of thin layers of hardened clay. It is not so hard as slate, but it may be split into slabs like slate. Slate itself is a form of hardened clay, and shale may be regarded as clay in an intermediate state between slate and ordinary clay. Although not plastic in its natural state, it becomes plastic when kneaded with water.

Burnt Clay.—When clay is heated to redness it loses its combined water and changes its physical character. It cannot be again made plastic by admixture with water, and it may be used as a substitute for sand in brick-making and mortar manufacture. Burnt clay does not differ very widely in its composition from unburnt clay, so far as the total proportions of the different elements are concerned, save that the unburnt clay contains combined water, and the burnt clay is anhydrous. When a certain proportion of clay has been used in mortar as a substitute for sand it is impossible to ascertain with certainty by analysis whether raw or burnt clay was employed. Yet while burnt clay is harmless, or even beneficial, raw clay is a most prejudicial constituent. As mortar always contains combined water, the presence of this constituent does not indicate that raw clay was used in its manufacture.

ARCHITECTURAL SOCIETIES.

NORTHERN ARCHITECTURAL ASSOCIATION.—An excursion meeting of this Association was recently held at the Hartlepoons. The party first visited St. Hilda's Church, where the hon. Secretary read a description of the building from the "Archæologia Eliana," by the Rev. J. F. Hodgson. They then proceeded to the Burbank-street Chapel, over which they were conducted by the Rev. James Barker and the architect, Mr. Garry. All Saints' Church was next visited, after which Mr. Garry provided tea at the Grand Hotel, over which they were conducted by Mr. G. H. Duxbury, the proprietor, and Mr. Garry, the architect. Tunstall Court, the residence of Sir C. Furness, M.P., was next proceeded to, where the party were conducted by Mr. Dixon and Mr. Garry, the architect. Tunstall Manor, the residence of Mr. W. C. Gray, was afterwards inspected.

Correspondence.

BRONLLYS CHURCH.

SIR,—In your account last week of the proceedings of the Cambrian Archaeological Association at Brecon you interpolate a statement, apparently emanating from yourself, that the detached bell tower of Bronllys Church was the work of an amateur of recent years. I have not the *Builder* before me at the moment, and so cannot quote your exact words, but believe that I have correctly given their import.

I may say that, as knowing the church in question, I was much astonished at reading such a statement. The tower has the appearance of genuine fourteenth century work; and Theophilus Jones, the noted historiographer of Breconshire,

writing in 1805, describes the tower as follows: "It is the steeple, which is detached from the church, is also, contrary to general custom at the east end. . . . Which is the more ancient building we are not informed either by history or tradition; both appear to be of ancient date." Perhaps you can produce the authority for your statement that the tower is modern?

F. BALDWIN.

. The statement to which Mr. Baldwin takes exception, namely, the recent date of the detached tower in Bronllys Churchyard, was made at the meeting of archaeologists there. That it is a fact there can be no doubt. A local journal observes of the visit, "There was little remarkable about the church [of Bronllys] except its detached campanile which, however, was not a hundred years old, but was built on the site of a former one." And in the report of a previous visit of Cambrian archaeologists to the church, the *Archæologia Cambrensis* for October, 1872, states that "the tower stands detached near the south-east corner of the nave and has been rebuilt on the site of a former one about forty years ago." We did not say that the work was that of an "amateur."—ED.

GENERAL BUILDING NEWS.

CHURCH, BRIDLINGTON.—The foundation-stone of a new church for Hildershorpe Parish, Bridlington, to be known as Emmanuel Church, was laid on the 29th ult. The site adjoins Cardigan-road, and the church when completed will accommodate 700 people. It will consist of nave and aisles, with a narthex at the west end, and there will be porches on each side. The scheme contemplates the building at some future time of a parish room on the north side of the church, with a communication by a covered corridor. The tower and spire will be at the east end of the morning chapel, and will be 155 ft. high. In the meantime it is only intended to build the nave and the aisle. The architects are Messrs. Brodbeck, Lowther, & Walker, Hull and Bridlington.

WESLEYAN CHAPEL, RADSTOCK, SOMERSETSHIRE.—On the 27th ult. the chapel which the Wesleys have completed at Radstock was opened. Mr. R. Curwen, of London, prepared plans for the new place of worship and schools, the former fronting Fortescue-road, and the school coming out of Church-street. The site goes through from one thoroughfare to the other. The cost of the undertaking is about 5,000.

METHODIST CHURCH, CHESTER-LE-STREET.—A new church, to provide sitting accommodation for 500 people, has been erected at Chester-le-Street for the Primitive Methodists, on a site adjoining the school chapel. Plans were prepared by Mr. J. Walton Taylor, architect, Newcastle-on-Tyne, and the contractors are Messrs. Davison & Bolam, Blaydon & Birtley. The building is of freestone, hand dressed, and it is dominated by a tower supporting a spire. The entrance to the main body of the church is at the south end of the building, and is by a flight of twelve stairs leading to a Gothic door which again opens into a large tiled vestibule, on one side of which are cloakrooms and lavatories, and on the other an entrance to the tower and gallery, which, however, are approached also by a separate flight of stairs and Gothic doorway on the same front as the main entrance. The gallery stretches between the tower and the cloakrooms, and is reached by a staircase leading from the tower. The body of the church and the choir recesses are finished with a pitch-pine dado, to match that of the gallery, while the seats are to be of the same material.

METHODIST NEW CONNEXION CHURCH, SHEFFIELD.—A new Methodist New Connexion Church and school was opened on the 1st inst. at Hillsborough. The church and school have been erected at a cost of 5,500. The buildings have been erected on a plot of land fronting Langsett-road, bounded on the north by Lennox-road and on the south by Dorothy-road, and containing 1,045 square yards. The front of the church is in Lennox-road, the side and the front of the school being in Langsett-road. A portion of the site up to Dorothy-road is reserved for the Manse and caretaker's house. The main frontages up to both roads are of stone. The main features are the tracery windows in the front gable, and a tower and spire at the corner of the building next to the side of the church is cruciform in shape, with transepts on each side, and organ recess at the rear, with a gallery over the front entrances and corridors. The accommodation of the church, including gallery and choir seats, is for 450 persons. In connexion with the church are minister's and choir vestries, with separate entrances and conveniences to each. The school has its front entrance from Langsett-road, and the plan provides a large room, 22 ft. by 13 ft. 6 in., which has an entrance from the front vestibule without going through the school. The assembly or school room is 40 ft. by 30 ft., and on the ground floor is a classroom 16 ft. by 13 ft. 6 in. and an infants' room with a separate entrance. In connexion with the school, on the upper floor, are four classrooms, two at the front, each 21 ft. 6 in. by 13 ft. 6 in., and also two at the rear. These have a separate staircasing with a projecting gallery at each end of the school for access to the same.

basement contains a kitchen. There is also a room for tables, &c., and a heating chamber. The roofs are open timbered, with circular ribs, the principals, and are covered with Welsh and ornamental red tiles. The benches are of stone, and all the walls are wainscoted. The windows are glazed with cathedral tinted glass in lead. The contractors are: Excavating, draining, brickwork, stonework, and concrete, Mr. Morris Wood, of Shepley, near Huddersfield; carpenter and joiners work, Mr. James Broadbent, of Shepley; plumbing and glazing, Mr. George Ridley, of Shepley; slating and plastering, Messrs. George Beard & Son, of Thurlstone, near Penzance. The whole of the work has been carried out in plans and under the superintendence of the architect, Messrs. J. W. Firth & Son, Oldham.

SCHOOL, MOTHERWELL, LANARKSHIRE.—On the 24th ult. the new school which has been erected in Main-street, Motherwell, was opened. The building, which is from designs by Mr. James White, architect, Motherwell, is in the Italian Renaissance style, and is constructed on the central hall plan, and is fitted up with all modern conveniences and lighted by electricity. Accommodation is provided for 840 children.

BOARD SCHOOL, RAMSBOTTOM.—The new Peel Board School, Ramsbottom, is the first school erected by the Ramsbottom School Board. The school, which has been opened for the reception of scholars, has been erected from the designs of Thomas Bell, of Burnley, at a cost, including the fittings, of over 8,000l. It provides accommodation for 200 scholars, 400 mixed, and 200 infants.

SEA BATHING INFIRMARY, SCARBOROUGH.—At the Royal Northern Sea Bathing Infirmary, Scarborough, a new chapel was dedicated recently, and new wing of the infirmary was opened. The new wing was erected in order to provide better accommodation, and includes a private chapel, an isolation ward, &c. The additions to the infirmary consist of a large block of buildings two stories high, in the rear of the present main building, and connected therewith by a wide stone staircase. It contains 10 eleven-bed wards, one nine-bed ward, and two eleven-bed wards or isolation wards, besides nurses' room, bath-room, &c. In addition, there is a small private chapel with chancel, seating about thirty, and a small vestry. In the chancel there are two stained-glass lancet windows, with figures of St. Peter and St. Paul, and over the altar a rosewood screen, with sacred monogram, by Messrs. Harrison & Grylls. The altar and altar ornaments are from Messrs. Jones & Willis, of Birmingham. The old wards in the main building overlooking the sea have been converted into day rooms. The total cost of the additions will be a little over 2,000l. Mr. C. Edeson was the architect, and Mr. John Wray the contractor.

COLONY FOR EPILEPTICS, SANDLEBRIDGE, ESSEX.—At Sandebridge, near Alderley, Essex, are being erected a series of homes for epileptics. The buildings now in progress provide accommodation for 200 adults (130 of each sex), and for 100 children and the same number of nurses. The sexes are to be kept apart throughout, and neither the whole of the men nor the whole of the women will be housed together. There are residences for patients, and an administrative block, infirmary, kitchens, workshops, recreation hall. The buildings are Elizabethan in style. The villas each accommodate about two dozen patients. The electric light, generated on the spot, is laid on throughout. The recreation hall, which may be used either as a theatre, concert room, or chapel, has its stage (with trap door) and dressing rooms and an expansive gallery. The whole of the buildings are being erected by Messrs. William Brown & Son, of Salford, and the engineering contract is being carried out by Messrs. Mather & Platt, Manchester. Mr. Alex. Graham, London, is the architect.

A NEW PAVILION AT BOURNVILLE.—Messrs. Cadbury Brothers, Ltd., have opened the new pavilion at Bournville, which they present as a gift to their workmen, as a memorial of the Coronation. The pavilion forms a club-house built after designs by Mr. Lewin, architect to the firm, in the half-timbered style, the wood employed being solid oak. The gymnasium is fitted with a variety of apparatus under the superintendence of Mr. G. L. Atwater. On the second floor are a refreshment room, two dressing-rooms, bathrooms and lavatories, and a luncheon-room. A balcony, laid with plait, and entered from the gymnasium, overlooks the football and cricket ground. The cost of the structure amounts to 3,500l.

BUILDING SCHEMES, GOVAN.—On the 23rd ult. the new stables of the Cleansing Department, Govan, were formally opened. The new buildings have been erected at a cost of 7,500l. from plans prepared by Mr. F. G. Holmes, the Burgh Engineer.

INSTITUTE, NEWBROUGH, ANGLESEY.—On the 24th ult. the foundation-stone of the Pritchard House Institute was laid at Newbrough. The site is on the road from Newbrough to Gaerwen, and the institute will front the Menai Straits. Commencing some 26,000 square yards, the site will have three cottages or almshouses on each side, and the institute at the end, furthest from the high road, a quadrangle before it being laid out as a garden. The institute is Elizabethan in style, the cottages

being arranged to harmonise. From the ground floor to the first floor the building is to be of grey Anglesey granite, with dressings of Ruabon stone, and the upper part is treated in half timber, with two gables divided by a clock tower over the entrance hall. The tower will be of granite to the domed roof, which, with the spire, will be of copper. On the ground floor to the left of the vestibule is the library, 45 ft. by 30 ft. and on the right a smoking-room and a coffee-room. Over the library is an assembly hall of similar dimensions, and over the coffee-room a reading-room. All the necessary offices, such as kitchens, cloak-rooms, and committee-rooms are provided. The internal woodwork is to be of selected pitchpine. Mr. R. Lloyd Jones is the architect.

ISOLATION HOSPITAL, TANFIELD.—A new isolation hospital for infectious diseases has just been opened at Tanfield. The designs of Mr. George T. Wilson, of Blackhill, were accepted for the carrying out of the work. The administrative block is situated in the centre, with separate wards for males and females on either side, each being connected by long corridors. The administrative building consists of matron's and nurses' sitting-rooms on the ground floor, a medical superintendent's surgery, and a kitchen, scullery, and a general storehouse. Upstairs are bedrooms, bathrooms, lavatories, &c. Each wing contains sixteen beds, so that provision is made for thirty-two patients. There are nurses' day-rooms and small convalescent wards in each wing. The building is of stone. The whole of the floors are laid in marble terrazzo. Every angle in the building—walls, floors, and ceilings—is rounded off. There are patent removable windows. The cost of the erection, exclusive of the site, is 8,000l.

SCHOOL OF ART, FALMOUTH.—At Falmouth, on the 26th ult., Sir William H. Pye, K.C.B., F.R.S., opened a new School of Art. The architect of the new school is Mr. Cardwell (Penzance). The school is a two-story building of ordinary local stone, with brick quoins and rough cast panels. The total cost of the erection is 1,300l.

CONVALESCENT HOME, SWANSEA HOSPITAL.—The foundation-stone has just been laid on the hillside above Cwmdonkin Park, Swansea, of a convalescent home to be used in connexion with the Swansea Hospital. Having a south-west aspect, the building will be approached from Terrace-road. The home consists of three blocks. The centre one is the administration block, and on either side, approached by open corridors, are two ward blocks, one ward for men and one for women. On the ground floor of the administrative block is the entrance hall, with waiting and staff rooms, large dining-hall (for use of all patients), with kitchens and offices in close proximity, and a loggia in front running the whole length of the room. On the first floor are arranged bedrooms for the staff and nurses, with bathroom, lavatories, &c. The accommodation provided in each ward block is a large day-room, a ward for ten beds, bathrooms and lavatories, with verandahs running the whole length of the buildings. This provides accommodation for twenty patients. The work generally will be of local stone, with brick quoins and rough cast. The top floor of the administrative block will have the walls covered with red Broseley tiles, and the roofs will be covered with terra-cotta slates. The architect is Mr. Glendinning Moxham, and the contractor Mr. Griffith Davies.

SANITARY AND ENGINEERING NEWS.

THE NEW THAMES TUNNEL.—Messrs. J. Cochrane & Sons have completed the construction of the subway underneath the river from Millwall to Greenwich. The tunnel, being 1,217 ft. in length and having an inner diameter of 11 ft., lies 60 ft. below high-water level, and the crown of the arch is 13 ft. from the river bed. The tunnel was driven with a "shield" worked with compressed air from the Middlesex sea in the short period of eight months, but the works in all have occupied nearly three years, at a cost of 120,000l. The northern approach at the western end of Island Gardens, close to the North Greenwich Station, and the southern approach at the northern end of Church-street, behind the famous Ship Tavern, lead to circular shafts 55 ft. in diameter, containing stairways and lifts. The tunnel is built for the London County Council, and the work was superintended by Mr. W. C. Copperthwaite, the Council's Bridges' Engineer, Mr. Maurice Fitzmaurice being their Engineer-in-Chief.

ABERDEEN WATER SUPPLY.—The Report of Mr. Hawksley, C.E., who has been for some time engaged in considering the question of a new water supply for Aberdeen, has now been forwarded to the Town Clerk, and in due course it will be laid before the Water Committee and the other members of the Town Council. It is understood that Mr. Hawksley favours a new source of supply from a point above Ballater.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—A consolidation of R. Waygood & Co., Limited, and the Otis Elevator Co., Limited, has been effected, and the joint business will in future be carried on under the title of "Waygood & Otis,

Limited." The new company will become possessed of the patents, designs, and experience of the Otis Co., U.S.A., in addition to the manufacturing facilities of R. Waygood & Co. Mr. H. C. Walker, chairman and managing director of R. Waygood & Co., will be chairman, and together with Mr. R. Percy Sellon, M.I.E.E., managing director of the Otis Elevator Co., Limited, will act as joint managing director of Waygood & Otis Limited.

TWO HAMPSHIRE PROPERTIES FOR SALE.—The house known as "The Wakes," at Selborne, occupied by Gilbert White in the interval 1755-53, is offered for sale, and a proposal is made that it should be purchased for the nation. Additions have been made to the house since White's time, but the older portions (together with the garden, the old walls, bricked path, rain-gauge, and sundial), remain almost as they were when inhabited by him, and when he wrote to Barrington and Pennant the series of letters which his brother Benjamin published, 1780, in London. In the same county stands Hildon House, which has been placed in the market. It is situated upon high ground near Romsey. The estate, traversed by the river Test, extends over 1,100 acres, of which 340 acres form a park around the house, that was rebuilt for Sir Augustus Webster, Bart., by Messrs. Jenkins & Son, of white Suffolk brick with Bath stone dressings and green slate roofs, on an extensive plan, after Mr. Aston Webb's designs. The gardens were laid out by Mr. H. E. Maber. The house—see our illustrations of June 18, 1902—has a terrace along its south side, the rooms are arranged upon one side only of the corridors which overlook the courtyard, and the wings are cantled away from the court for the sake of the view and to soften the angles.

THE METROPOLITAN PUBLIC GARDENS ASSOCIATION.—The Association signify their readiness to put in order the graveyard of St. Mary Church, Whitechapel, provided the Stepney Borough Council will agree to maintain it as a public garden; and have under their consideration also proposals for making a riverside walk at Chiswick, the preservation of St. Peter's-square, Hammer-smith, and of an estate at Upper Clapton, together with Mr. E. N. Buxton's project (which we recently described) to acquire 800 acres formerly appertaining to Hainault Forest, in Essex. The Association recently decided to plant trees by All Saints' Church in Norfolk-square, Paddington, in Shepherdess-walk, Hoxton, and Great Cambridge-street, Shoreditch, and to oppose schemes for building on the disused churchyard of St. James's, Clerkenwell—now maintained as a public garden—and for advancing the building line of frontage over certain garden forecourts in Euston-road, St. Pancras.

THE COURT OF COMMON COUNCIL.—The Corporation have expressed their willingness to co-operate with the London County Council in an application to the Government to promote legislation in the next session of Parliament for obtaining statutory powers to regulate the breaking up by companies and others of thoroughfares in London, upon an understanding that the Corporation shall retain complete and absolute control over the streets within the limits of the City.—The Corporation have accepted a tender of 28,000l. made by Messrs. Holloway Bros. for the rebuilding of the Sessions House in Old Bailey, together with the demolition, which is already taken in hand, of Newgate Prison, and have approved the plans for the construction of a subway between the stations at Finsbury-pavement of the City and South London and the Great Northern and City Railway Companies.

PUBLIC IMPROVEMENTS, WOLVERHAMPTON.—At Wolverhampton, on the 26th ult., Mr. M. K. North, on behalf of the Local Government Board, held an inquiry into the application of the Town Council for sanction to borrow 5,500l. in connexion with the improvement of the Town Hall and public offices, 3,229l. for purposes of street improvement in New Hampton-road, and 3,000l. in respect of the new covered wholesale market. There was no opposition shown. Mr. H. Kendrick (assistant town clerk) stated that the original loan applied for respecting the Town Hall alterations was 11,074l., but that was before the receipt of the builders' estimate, which amounted to 12,655l., and several items of additional expenditure were also included. With regard to the second amount, it was explained that the holding of the Wolverhampton Art and Industrial Exhibition rendered the immediate laying of a double line of track in the New Hampton-road necessary, and this necessitated the purchase of property. With regard to the covered wholesale market, the Local Government Board last year sanctioned a loan of 13,850l. and allowed twenty-six years for its repayment. Since that date several alterations had been thought of with a view to the increased usefulness and efficiency of the market and the augmentation of revenue. The cost of the scheme had been increased by 3,000l. Mr. George Green, the Borough Engineer, gave evidence in support of the application.

MEMORIAL FOUNTAIN, SPRINGBURN, GLASGOW.—Some time ago Cowiars Co-operative Society decided to present a drinking fountain to the city on the celebration of their majority. On the 22nd ult. the unveiling ceremony took place. The fountain is situated in Vulcan-street, Springburn. It is

by Messrs. Scott & Rae, sculptors, Glasgow, and has a base of 6 ft., a height of 12 ft., and is of marble.

ARCHAEOLOGY IN SOUTHERN ITALY.—Mr. Neville-Rolfe, our Consul in Southern Italy, in his supplementary report for the past year mentions the chief recent incidents of archaeological interest. He says that for the last half century Cuma has yielded up treasures from its necropolis. The Count of Syracuse obtained a gallery of vases from it about fifty years ago. Mr. Stevens succeeded him at a short interval. Both these collections are now the property of the nation. For the last few years of the work of Mr. Stevens nothing of great interest was found, and it was thought that the necropolis was exhausted, but an Italian landowner has begun again with praiseworthy perseverance. After finding a statue and other objects of the Greek period, he came upon a tomb in which was a tortoise-shell case, a unique object which experts pronounce to have been a mirror. It is not impossible that it was the back of a mirror of which the reflecting surface has disappeared. This surface in ancient mirrors was silver-plated on bronze and such mirrors are frequently found in the tombs of Greek and Roman ladies, with highly ornate backs made sometimes of silver, but usually of bronze and decorated with bas-reliefs or incised drawings. No tortoise-shell has ever been found before. In the neighbourhood of Cuma some further interesting tombs have been discovered, and these are thought to be pre-Hellenic. One of them contained objects of silver and bronze, besides being rich in ornaments made of electrum, an alloy of gold and silver. Electrum objects are rare, the great collection of them by Baron Marcello Spinelli having been found on his estate a few miles from Naples, and considered till now unique. It has never occurred to any one, says Mr. Neville-Rolfe, to call these objects pre-Hellenic before. Pompeii has only yielded one object of great importance, a small statue of Perseus, about 20 in. high, of very spirited execution. The subject is unique as far as ancient sculpture is concerned. A second bronze organ has also been discovered very similar to the one found some twenty years ago. They are in the form of a syrinx or Pandean pipe, but are so large that they must have been blown with bellows or with a wind-bag like bagpipes. There is very little doubt that the modern organ was evolved from the syrinx, blown by mechanical means. The entire reorganisation of the Naples Museum has been a great feature of the past year. A vast number of objects, hitherto not exhibited, have been brought to light, much more space has been granted, and many of the objects have been named. The entire museum was re-numbered about sixteen years ago, and the new arrangement has thrown these numbers into confusion. The Consul thinks it would be of great service to students were the collection re-numbered separately—that is to say, if a series of numbers were given to the murals, another to the frescoes, and so on. Since by renumbering the museum as a whole upwards of 120,000 exhibits have been reached. An arrangement has been made with the Italian Government in regard to the magnificent frescoes found on private ground at Boscoreale, near Pompeii, whereby some of the pictures will remain the property of the Government, and the remainder will be allowed to be exported. The expenses amount to a very considerable sum, but the frescoes are of unexampled breadth of treatment, and are in value far beyond any yet found. Some interesting catacombs have been discovered running beneath the Monte di Dio in Naples. The entrance to them was discovered on pulling down some houses in Santa Lucia. They extend a long way into the hill, and are probably of the Roman period. As they have not been opened to the public no scientific account of them has yet appeared. *Times*.

REEREDS, CHORLEY PARISH CHURCH, LANCA-SHIRE.—A reered has just been erected in the ancient parish church of Chorley as a memorial to the late Mrs. Rawcliffe. It is composed of Portland stone and white and red-veined marble. The centre part consists of three pinnacles, divided by marble columns. The middle panel contains a floriated cross and the side panels figures of angels holding a chalice on a crown of thorns. The sides are arched in Portland stone, with marble columns. The work has been executed by Mr. Martin, of Cheltenham, from designs by Messrs. W. and C. A. Bassett-Smith, architects, of London.

BOARD OF EXAMINERS, INSTITUTE OF ARCHITECTS.—Sir Wm. Emerson, on the invitation of the Board of Examiners of the Institute of Architects, has accepted the position of Chairman of the Board, Mr. Aston Webb, A.R.A., having resigned the office on his election as President of the Institute.

RESTORED CROSSES.—All persons interested in Lancashire's ancient memorials will be glad to know that of the stone crosses which for centuries stood high and solitary in the uplands of the Forest of Rossendale two are to have speedy restoration. The sites are on Gamelide Moor, near Rawtenstall, at an altitude of over 1,150 ft. above ordnance datum. Mr. Alderman Compston, of Crawshaw-both, a representative of Rawtenstall on the Bury and District Joint Water Board, has the credit of rescuing the remains from oblivion, and of securing restoration by the Water Board. The age of the crosses is unknown. They may be pre-Norman,

but Mr. Compston relates them to the Norman period (or at latest to Plantagenet Edward I.), not less than 600 years ago. The crosses were probably part of the great system of moorland way-marks, when all local roads or tracks led to Clitheroe and (later) to Whalley. *Manchester Courier*.

PROPOSED STREET IMPROVEMENTS, DEVONPORT.—An inquiry was held at the Municipal Offices, Devonport, on the 28th ult., by Mr. W. O. E. Meade-King, M.Inst.C.E., one of the inspectors of the Local Government Board, into the application made by the Devonport Borough Council for sanction to borrow 2,361*l.* for the works of street improvement in Saltash-road, 1,500*l.* for the purpose of paying off loans raised on mortgage of certain sewage lands, and 21,500*l.* for the construction of new streets, the laying of sewers, &c., and also for sanction under Section 21 of the Devonport Corporation Act, 1900, to appropriate and use certain surplus land originally acquired for cemetery purposes, and adjoining Weston Mill Lake, for the purpose of the last-mentioned scheme. Among those present were Messrs. H. Lee, representing the Town Clerk (Mr. A. B. Filling); Cecil Stove, Assistant Borough Surveyor; Dr. Brough, Deputy Medical Officer of Health; and G. T. Geaton, Sanitary Inspector.

THE AMALGAMATED SOCIETY OF CARPENTERS AND JOINERS.—The members of the Amalgamated Society of Carpenters and Joiners recently took a vote upon the question whether the society should undertake house building on the co-operative principle. This shows a large majority in favour. In various centres the society will undertake building work, and to provide the capital for this the members have agreed to a special levy of 6*d.* per week for four weeks, which it is estimated will produce a sum of 6,000*l.* Under the Trade Union Acts the society is not allowed in itself to undertake speculative business, and to get over this it will be worked by a special board of management apart from the society, and in connexion with which a new set of rules has been registered under the Industrial Societies Provident Act.

WHITWORTH SCHOLARSHIPS AND EXHIBITIONS.—The following is the list of candidates successful in the competition for the Whitworth Scholarships and Exhibitions, 1902.—Scholarships, of the value of 125*l.* a year each (tenable for three years): W. M. Selvey, London; L. Bairdton, Halifax; I. V. Brown, West Hartlepool; A. Baker, Gosport, Hants. Exhibitions, of the value of 50*l.* each (tenable for one year): C. Cook, Landport, Portsmouth; J. S. Mitchell, Uddington, near Glasgow; C. J. Stewart, Fratton, Portsmouth; A. H. Gibson, Sowerby Bridge, Manchester; W. E. W. Millington, Hollinwood, Oldham; N. J. Maclean, Kelvinside, Glasgow; H. J. Jones, Southsea; H. Rawstorn, Oldham; G. E. Childs, Portsmouth; N. L. Ablett, London; W. E. F. Curror, Ilford, Essex; W. L. Fort, Brighton; J. Alexander, Glasgow; L. D. Stansfield, London; R. J. A. Pearson, Sheffield; W. L. Perry, Plymouth; A. S. Angwin, London; F. G. Steed, Devonport; H. A. Bagg, London; F. J. Crabbe, Southsea; A. Garrard, Forest Gate, E.; B. J. Thomas, Devonport; Mr. B. Daby, Glastonbury; T. Wadhams, Wolverton; O. S. Spokes, Crewe; J. Crone, Charlton, Kent; A. B. Sowler, Glasgow; F. Sykes, Huddersfield; F. E. Rebbeck, Belfast; F. W. Harris, Swindon.

LEGAL.

ANCIENT LIGHT DISPUTE SETTLED.

The case of Ellis v. Skillington was in the list for hearing before Mr. Justice Swinfen Eady in the Vacation Court on Wednesday last, the 3rd inst., on a motion by the plaintiff for an interim injunction to restrain the defendant, until trial or further order, from erecting buildings so as to obstruct plaintiff's ancient lights.

Dr. Napier stated that, as the parties had agreed to terms, it was proposed, with his Lordship's sanction, that no order should be made on the motion.

His Lordship assented to this course being adopted.

BUILDING DISPUTE IN THE VACATION COURT.

The case of Johnson v. Berastest came before Mr. Justice Swinfen Eady in the Vacation Court on Wednesday, the 3rd inst., on a motion by the plaintiff for an interim injunction to restrain the defendant, until trial or further order, from erecting buildings so as to obstruct the plaintiff's ancient lights in Nos. 45 and 47, Great Arthur-street, Golden-square.

Before the motion was opened, Counsel for the defendant stated he was instructed that the plaintiff's premises were likely to be the subject of a sale from the plaintiff to the defendant, and that the contract was to be signed that afternoon. He therefore asked that the motion should be directed to stand over.

After some discussion, his Lordship ordered that both parties should give an undertaking to sign the contract as it now stood; and on the defendant undertaking not to build so as to obstruct any of the ancient lights of the plaintiff before the purchase was completed, and on the plaintiff giving the usual

undertaking in damages, he directed that the motion should stand over till the second motion day next sittings.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

8,869.—A METHOD OF MOISTENING AND HEATING AIR: F. Watson.—A fan worked by a strap driven air through the trunk of the apparatus, water flowing from a pipe over the fan—or steam from an annular pipe—moistens and cools the air, which may also be warmed by the steam, and is dispersed with a revolving nozzle. By closing a valve in the upper arm of the trunk, and closing a door below the valve, air may be drawn away from a splendor or weaving shed.

8,870.—AIR PIPES FOR MINE-VENTILATION: J. Zacher.—The air pipes are formed of a wire spiral which has outer and inner coverings of paper, as to constitute a doubly-walled tube. Spirals, bayonet, or other joints are made out of metal rings that form the ends of the pipes. Fire and waterproof paint may be applied to the paper covering, both within and without.

8,881.—COLLAPSIBLE GATES: A. F. Bataillon.—The metal gates consist of bars disposed diagonally in pairs, and of which the ribs are jointed to one another with pivot pins—in one shape the bars and ribs being arranged vertically; the bars will overlap when the gate is shut by means of the transverse lazy-tongs.

8,882.—A SELF-CLOSING VALVE: S. A. S. Hays.—A partition and flanged end wall form a portion of the casing, through which a tube will slide, the tube being secured to the end wall a leather packing sleeve, which a spiral spring forces against the tube. There is a handle with which the closed inner end of the tube can be caused to slide away from the outlet, and thereby expose a seat of opening through the tube near its other end.

8,907.—A MITRE-SHAPED ROTATORY CUTTER: A. J. Norris.—The tool is especially intended for cutting shouldered recesses in the stiles of door frames, and so on. The bearing faces of the cutter block are inclined as tangents to a cone that is set concentrically with the axis upon which the block rotates. Clamping-bolts are inserted through transverse slots in the cutters, and the ends of the bolt fit into a dovetailed groove which is parallel to the edge of the cutter. A triangular wedge, which is screw working in a bracket on the wedge will fix the position desired, effects the adjustment of the cutters, or that may be done by means of a guide plate which is clamped with a bolt in a slot. The work is fed across the top of the rotating cutter.

8,920.—AN ELECTRICAL SWITCH: F. E. Spagnoletti.—A switch that can be changed over from one circuit to another has its two arms pivoted at a common point on a support, and are joined with springs to a frame pivoted on to the support at the same point and fitted with a handle. The switch is held open with catches. When the switch is "on," one wishes to change over, the handle is moved so as to extend one of the springs until the heel of one of the arms raises that arm, so that the spring will give a quick break.

8,931.—A PLUG COCK FOR MEASURING PURPOSES: M. Martin.—The plug cock has a hollow horizontal plug which a cross-diaphragm divides into two parts, of which the capacities are equal to one another, and ports are disposed into two crossing meridian planes.

8,934.—A PLATFORM FOR USE WITH LADDERS: E. Baridin.—Beneath the top-step of a hinge ladder are arms on to which is pivoted a folding platform and links which are pivoted on to both the platform and the ladder carry a guard-rail, a cross-bar, and a tool-box; notches cut in the bars of the platform take the cross-bar of the back supports when the ladder is opened. The platform, links, and tool-box will be folded up between the back supports when the ladder is closed.

9,043.—A CARRIER FOR PICK-BLADES: J. Smith.—The carrier has lugs that are bridged by a bolt which works in a slot and has a nut. The pick-blades are laid between the lugs which have tongues that will engage with the recesses of the blades and there are shields for the points of the blades. If the shields are made so as to project downwards a collar passed through one of a set of holes in the lugs will hold up the blades.

9,048.—FITTINGS FOR ELEVATORS: P. M. Prillhard.—The bearings that carry the shaft of the lower sprocket-wheel are arranged to slide vertically in guides, and there are helical or C-springs that, under normal conditions, press them downwards, whereby the buckets will yield upwards so as to prevent any jamming of lumps of the material between the buckets and the casing.

9,069.—MEANS FOR HEATING ROOMS OF BUILDINGS: F. W. Foster and E. B. Condon.—The inventors utilise the heat that commonly escapes to the chimney by joining to the chimney a divided chamber or drum by its elbow part. A dampers plate sliding lengthwise regulates the flow of the products of combustion. The dampers can be folded, and are hinged on to the edges of the body portion being worked from without with rods. A straight, divided pipe, fitted with a cap, will serve for the drum.

9,141.—A FRAME FOR LAVATORY BASINS: G. D. Innes.—An adjustable support or frame for the

is composed of two side pieces and a front piece, the latter being secured with bolts to the other. The side pieces are adjustably bolted on to the frame by means of slots cut in them.

106.—AN APPLIANCE FOR CLOSING DOORS: *J. G. Kelly and J. Pritchett*.—The lever which closes the door is mounted upon a pivot having a roller at its end. The curved ends of two levers surround the roller. The two levers are pivoted on to the frame, and composite lugs force them towards one another, so that whenever the door is opened from either side it will move automatically closed through the action of springs upon the ends of the levers.

107.—AN APPLIANCE FOR THE STARTING OF AN ELECTRICAL CRANE, CAPSTAN, OR WINDING MACHINE: *Sir W. G. Armstrong, Whitehead & Co., and F. Honner*.—For the pedal action starting-resistance the inventors connect the liquid in the starting-resistance by means of a rope that is passed and pulleys to the weighted end of the lever of the crane. The other end is to be pressed by the foot of the operator from a point of the pedal-lever between its end and the weighted end. It is attached to a weight, and the rope from the starting-resistance is connected to a pivoted lever (placed between the resistance and the first pulley) to another weight at the other end of that lever. Slow speed will be rendered by a certain amount of pressure upon the pedal that will lift the last-mentioned weight, for high speed it will be necessary to press the pedal so as to lift the other weight as well.

108.—A GUIDE FOR BAND SAWS: *H. Harris*.—The invention provides also for the lubrication of the saw before it passes through the guide, which is arranged above the table and takes the shape of a cup. The guide is carried by a spindle having ball-bearings. The lower part of the guide is a wooden block that is secured adjustably to the face of the casing, so that the contact of the back of the saw with the face of the guide is at a suitable distance from the centre of the disc. A similar guide is put beneath the table so that an oil from a cup drips into a channel that conveys it to brushes which rub against the side of the saw.

109.—AN ELECTRICAL CUT-OUT: *D. & W. Fiske*.—The fusible cut-out has an auxiliary fuse for the minimising sparking and for showing the position of the cut-out. All but the middle part of the casing, which has metallic caps at its ends and closes the main fuse, is filled with slaked lime or similar material, and a paper drum is inserted in the middle portion. The end caps clip the subsidiary fuse, which is threaded through holes in the casing. The portion of it being left out and encased in the casing is at a middle hole covered with an insulating powder or sulphocyanide of mercury that will indicate when the fuse has blown. In other forms the auxiliary fuse is directly connected to the main fuse, or the whole of it may be outside the casing, a part of it may be rendered visible through a glass window.

110.—IMPROVEMENTS IN INCANDESCENT GAS LAMPS: *F. Fischer*.—Additional air, for increasing the illuminating power, is admitted to the base of the globe through apertures in the globe-holder. The customary chimney may be discarded for a globe having its lower and upper ends contracted. The globe-holder may either be rested directly upon the burner supports, or be slipped over the chimney-holder.

111.—CONSTRUCTION OF KILNS: *J. H. Smith*.—For a down-draught kiln the inventors devise passages or flues, to be regulated by dampers, and cause hot air from one kiln which is becoming cool to be conveyed to another kiln which is becoming hot. The hot air-flue from one kiln to the other has two branches that communicate with the ends of the kilns, and both of the flues are joined to an underground flue which is connected to the chimneys.

112.—FITTINGS FOR AUTOMATIC FIRE EXTINGUISHERS: *International Sprinkler Co.*—Two valves which sustain the valve are disposed in such a manner that they will hold up the valve so long as their ends are joined by soldered plates, but they will fall when the heat of the fire has melted the soldered joint of the plates; a revolving distributor carried by the head of a screw underneath the valve of the two levers, two concentric flanges are fashioned upon the upper face of the distributor, and one of them has inclined slots which will produce a rotation of the disc as the water jet strikes them; the nozzle may be inverted, and provision is made for dispersal of the water through orifices in the distributor.

113.—A MACHINE FOR CUTTING DOVE-TAILED JOINTS AND TENONS IN BOARDS: *P. Havel*.—In this machine two inclined shafts that are geared together have a Hooke's coupling, are fixed arms that carry the cutters, a belt-pulley drives one of the shafts and the other turns at an equal speed. The movement of the cutters in planes inclined towards one another, the angle desired causes them to cut out dovetailed recess between two tenons as the board is fed downwards from above them. The board is then advanced one step by the removal of the pawl from the teeth of the rack and the turning of a pinion until the pawl has fallen between the next pair of teeth. A similar machine is available for cutting mortises, the board being applied with a tangential feed instead of a radial one—at the

point of intersection of the planes of the cutters.

114.—ARC LAMPS: *T. W. Young*.—Inclined troughs carried by springs hold the carbons by similar troughs mounted upon headed pins and fastened to insulating-sockets to the ends of an expandable metallic strip, which is enveloped with a coiled heating-resistance connected in series with the carbons, so that the heated strip as it expands will force the moveable troughs against the carbons to separate them with a sufficiency of current, but will let them move together and slip downwards with a decrease of current. The ends of the heater or solenoid wires are joined on to both parts of one of the retaining springs, which an insulator divides. Various adaptations are specified.

115.—A METHOD OF HEATING WITH ELECTRICITY: *I. Timar*.—For a heater is contrived a wire, which is wound in slots cut in bars of slate or other incombustible, non-conducting substance, that are disposed upon metallic bars inserted in radial slots in end-plates carried upon metallic angles, which serve also for making the electrical connexions.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 16.—By FERRIS & PUCKRIDGE (at Reading).
Brimpton, &c., Berks.—The Blacknest Estate, 128 a. 2 r. 2 p. f. p. £4,533
August 20.—By MESSRS. BALLS (at Baintree).
Sible Hedingham, Essex.—The Hestage Estate, 190 a. 1 r. 10 p. f. y. r. 23d. 2,410
August 21.—By A. G. & A. NOTLEY (at Lowestoft).
Barby, Suffolk.—The Crossway Farm, 189 a. 2 r. 10 p. f. y. r. 11d. 2,600
August 23.—By M. DERMOT & SON (at Kendal).
Grayrigg, &c., Westmoreland.—Beckhouses, Broadhead, Broadhead, and Simgill Farms, 362 a. 0 r. 37 p. f. y. r. 31d. 10,600
By BRADLEY, WOOD, & CO. EDWIN J. GILBERTS (at Frinton).
Frinton-on-Sea, Essex.—Oxford-rd., three plots of land, f. 195
Third-av., plot of building land, f. 200

August 26.—By JOHN BOTT & SONS.
Herne Hill.—267, Norwood-rd., u.t. 69 yrs, g.r. 61. 6s. 6d. r. 27d. 10s. 555
17, Rymer-st., u.t. 44 yrs, g.r. 54. 10s. w.r. 36d. 8s. 220
By THORNBOROUGH & CO. (at Penrith).
Pooley Bridge, Westmoreland.—Eusemere Estate, 53 a. 3 r. 8 p. f. and G. 5,550

August 27.—By GIBBS & WINTERTON.
Lambeth.—17, Tenison-st., u.t. 202 yrs, g.r. 61. 10s. y.r. 48d. 975
St. George's, East.—94, 96, and 98, Christian-st., u.t. 202 yrs, g.r. 75d. y.r. 13d. 10s. 125
By RICHARDSON & MARTIN.
Soho.—1 and 2, Tyler's-court, u.t. 145 yrs, g.r. 11d. 18s. 9d. y.r. 38d. 10s. 540
August 28.—By HENRY SMITH & SON and ERIC H. BILLINGHURST.
Holloway.—2 and 4, Archway-rd. (S), f. y. r. 150l. 12d. Archway-rd. (S), u.t. 61 yrs, g.r. 54. 5s. y.r. 6d. 3,030
33, Victoria-rd., u.t. 29 yrs, g.r. 54. y.r. 30d. 1,000
Archway-rd., f. g. r. 12d. reversion in 72 yrs. 385

FRED. FARLEY & SON.
Finchley.—Finchley Park, Holly Dene, and 4 acres, f. y. r. 33d. 10s. 775
Strood, Kent.—65, Oakfield-rd., u.t. 75 yrs, g.r. 81. 10s. y.r. 48d. 495
August 29.—By A. J. SHEPHERD.
Poplar.—103 and 105, St. Leonard's-rd., u.t. 37 yrs, g.r. 15. 5s. y.r. 67d. 12s. 420
28, Sussex-st., f. y. r. 33d. 10s. 420
East Ham.—70, Gladstone-av., f. y. r. 30d. 485

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; f. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; w.r. for weekly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for places; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard.

PRICES CURRENT OF MATERIALS.

* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

£ s. d.
Hard Stocks 1 13 0 per 1,000 alongside, in river
Rough Stocks and Grizles 1 10 0 " " " " " "
Facing Stocks 2 10 0 " " " " " "
Shippers 2 0 0 " " " " " "
Flettons 1 12 0 " " " " " "
Red Ware Cuts 1 12 0 " " " " " "
Best Fareham Red 3 12 0 " " " " " "
Best Red Pressed 5 0 0 " " " " " "
Rushton Facing 5 0 0 " " " " " "
Best Blue Pressed 4 6 0 " " " " " "
Staffordshire 4 11 0 " " " " " "
Do., Bullnose 4 11 0 " " " " " "
Best Stourbridge 4 0 0 " " " " " "
Fire Bricks 4 0 0 " " " " " "

PRICES CURRENT (Continued).

BRICKS, &c.

£ s. d.

GLAZED BRICKS.
Best White and Ivory Glazed
Stretchers 13 0 0 per 1,000 at railway depôt.
Headers 12 0 0 " " " "
Two Sides and one End 20 0 0 " " " "
Splays, Chamfered, Squints 20 0 0 " " " "
Best Dipped Salt Glazed Stretchers and Headers 12 0 0 " " " "
Quoins, Bullnose, and Flats 14 0 0 " " " "
Double Stretchers 15 0 0 " " " "
Double Headers 14 0 0 " " " "
One Side and two Ends 25 0 0 " " " "
Two Sides and one End 25 0 0 " " " "
Splays, Chamfered, Squints 14 0 0 " " " "
Seconds Quality
White and Dipped Salt Glazed 9 0 0 " less than best.
Thames and Pit Sand 7 0 per yard, delivered.
Thames Ballast 6 0 " " " "
Best Portland Cement 31 0 per ton, delivered.
Best Ground Blue Lias Lime, 22 0 " " " "
Note.—The cement or lime is exclusive of the ordinary charge for sacks.
Grey Stone Lime 10s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 27s. 0d. per ton at rly. depôt.

STONE.

£ s. d.

Ancaster in blocks 1 11 per ft. cube, deld. rly. depôt.
Bath 1 7 " " " "
Farleigh Down Bath 1 8 " " " "
Bees in blocks 1 6 " " " "
Grimsbill 1 10 " " " "
Brown Portland in blocks 2 2 " " " "
Darley Dale in blocks. 2 4 " " " "
Red Gorsehill 2 5 " " " "
Closeburn Red Freestone 2 3 " " " "
Red Mansfield 2 4 " " " "
Hard York in blocks. 2 10 " " " "
" " 6 in. sawn both sides landings, to sizes s. d.
(under 40 ft. sup.) 2 8 per ft. super. at rly. depôt.
" " 6 in. Rubbed Ditto. 3 0 " " " "
" " 3 in. sawn both sides slabs (random sizes) 1 3 " " " "
" " 2 in. self-faced Ditto 0 9 3 " " " "
Hupton Wood (Hard Bed) in blocks 2 3 per ft. cube, deld. rly. depôt.
" " 6 in. sawn both sides landings 2 7 per ft. super. deld. rly. depôt.
" " 3 in. do. 1 2 2 " " " "

SLATES.

in. in. £ s. d.
20 x 10 best blue Bangor. 12 0 0 per 1000 of 1200 sq. yd. dep.
" best seconds " 11 10 0 " " " "
16 x 8 best " 6 17 6 " " " "
20 x 10 best blue Portman. 10 0 0 " " " "
" do. " 11 7 6 " " " "
16 x 8 best blue Portmadoc 6 5 0 " " " "
20 x 10 best Eureka un-fading green. 13 10 0 " " " "
16 x 8 " " 7 10 0 " " " "
20 x 10 permanent green 12 10 0 " " " "
16 x 8 " " 6 0 0 " " " "

TILES.

£ s. d.
Best plain red roofing tiles. 41 6 per 1,000, at rly. depôt.
Hip and valley tiles. 3 7 per doz. " " "
Best Broseley tiles. 48 6 per 1,000 " " "
Hip and valley tiles. 4 0 per doz. " " "
Best Rusbon Red, brown or brindled Do. (Edwards) 57 6 per 1,000 " " "
Do. ornamental Do. 60 0 " " " "
Hip tiles. 4 0 per doz. " " "
Valley tiles. 3 " " " "
Best Red or Mottled Staffordshire Do. (Peakes). 50 9 per 1,000 " " "
Hip tiles. 4 1 per doz. " " "
Valley tiles. 3 8 " " " "

WOOD.

BUILDING WOOD.—YELLOW.

At per standard.
£ s. d. £ s. d.
Deals: best 3 in. by 22 in. and 4 in. by 9 in. and 11 in. 14 10 0 76 0 0
Deals: best 3 by 9. 13 10 0 15 0 0
Battens: best 2 1/2 in. by 7 in. and 3 in. by 7 in. and 8 in. 10 10 0 11 10 0
Battens: best 2 1/2 by 6 and 3 by 6. 10 10 0 less than 7 in. and 8 in.
Deals: seconds. 10 10 0 " " " "
Battens: seconds. 8 10 0 9 10 0
2 in. by 4 in. and 2 in. by 5 in. 8 0 0 9 0 0
Foreign Sawed Boards—2 in. by 12 in. by 12 in. 10 0 0 more than battens.
Fir timber: Best middling Danish or Memel (average specification) 4 10 0 5 0 0
Seconds. 4 5 0 4 10 0
Small timber (8 in. to 10 in.). 3 10 0 3 15 0
Swedish balks. 2 15 0 3 0 0
Pitch-pine timber (30 ft.). 3 0 0 3 10 0
[See also pag. 219.]

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Additions, &c., to Infirmary	Newark Guardians	212 guineas	Oct. 14
Infectious Diseases Hospital	Strood R.D.C.	16 guineas	Oct. 15
Designs for University Buildings, Cape of Good Hope	Agent-Gen. for Cape of Good Hope	400l., 200l. and 100l.	Jan. 31

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Alterations to a Building, Cardiff	Great Western Railway Co.	G. K. Mills, Paddington Station, London	Sep. 9
Drainage Works, &c., Pottton, Beds	Biggleswade R.D.C.	Taylor, Sons & Crimp, Civil Engineers, 27, Great George-st., S.W.	do.
Road Works, Victoria-road	Bromley (Kent) U.D.C.	F. H. Norman, Council Offices, Bromley	do.
Sanitary Work at Workhouse	Belfast Guardians	Young & Mackenzie, Engineers, Belfast	do.
Sewerage Works, Stratton, Wilts	Highworth R.D.C.	Beesley & Co., Engineers, 11, Victoria-street, S.W.	do.
Road Making and Paving Works	Bromley U.D.C.	Council's Surveyor, Bromley, Kent	do.
Walterwork, Howes, near Barnard Castle	Stafford R.D.C.	J. B. Parker, Civil Engineer, Post Office Chambers, Newcastle	Sep. 10
Cast Iron Pipes	Swadincote U.D.C.	G. B. Smalley, Gas Works, Swadincote	do.
Wall, &c., Kington	Plympton St. Mary R.D.C.	F. W. Cleverton, 4, Buckland-terrace, Plymouth	do.
Infirmary, Stapleton	Bristol Guardians	H. P. Adams, Architect, 28, Woburn-place, London, W.C.	do.
Hospital, Penryn, Cornwall	Chatterfield Hospital Committee	G. E. Boshaw, Architect, 189, Lord-street, Southampton	do.
Sewerage Works, Pinner	Hendon R.D.C.	J. A. Webb, Civil Engineer, Stamford	do.
Five Cottages, Carlton, near Wakefield	Leeds Co-operative Society	J. W. Fawcett, 10, Ainslie-street, Leeds	do.
Alterations to Greyhound Inn, Pontefract	Messrs. Beverley Bros., Ltd.	T. Burdett, Architect, Pontefract	do.
School, Bargoed, Wales		T. Roderick, Architect, Aberystwyth	do.
Drainage Works, Maesteg, Margam		F. B. Smith, Civil Engineer, Port Talbot	do.
Asylum Extension, Gortlough		A. Skirving, Architect, 121, West-Regent-street, Glasgow	do.
New Sorting Office, Walthamstow	Commissioners of L.M. Works &c.	J. Wager, R.M. Office of Works, Storey's gate, S.W.	Sep. 11
Cast Iron Pipes	Salford Corporation	Borough Surveyor, Town Hall, Salford	do.
Maendani (1,000 tons)	Grays Thurrock U.D.C.	A. C. James, Surveyor, Council Offices, Grays	do.
Surveyor's Materials	Ramsbottom (Lancs) U.D.C.	T. H. Bell, Surveyor, Council Offices, Ramsbottom	do.
Stabling, &c.	Leobw Vale (Mon.) U.D.C.	E. J. Thomas, Engineer, Ebbw Vale	do.
School, near Cardenden, Fife	Auchterderran (N.B.) Sch. Bd.	W. Williamson, Architect, 220, High-street, Kirkcaldy	Sep. 12
Paving Works	Halifax Corporation	J. Lord, Civil Engineer, Town Hall, Halifax	do.
Bridge, Attercliffe	Sheffield Corporation	C. F. Wike, Civil Engineer, Town Hall, Sheffield	do.
Granite and Flints	Stains U.D.C.	Mr. Grogan, Surveyor, Padstow	do.
Street Works, Granville-street, &c.	Woodford (Essex) U.D.C.	W. Farrington, Surveyor, Woodford Green	do.
Hospital, Sretton	Hereford R.D.C.	T. Liswaine, 8, St. John-street, Hereford	do.
Synagogue, Osborne-street, Hull	Manchester Corporation	City Architects, Town Hall, Manchester	do.
Lavatory, &c., Blackley		J. Leonard, Architect, Plymouth	do.
Additions to Dundaroch House, Fitchroy		J. T. Jones, 51, Mountain-street, Rhos	do.
Alterations to Public Hall, Rhos, Wales		Mr. Grogan, Surveyor, Padstow	Sep. 13
Boundary Walls, &c., Salden, Lancs	Messrs. Victor & Morris	T. Roderick, Architect, Merthyr	do.
House, New-road, Bowdla		W. Lloyd, 5, Beech-grove, Troedyrhiw	Sep. 14
Alterations to Chapel, Troedyrhiw, Wales		J. Keen, Architect, Centre, Glam.	Sep. 15
Rebuilding the School, Llywycelyn, Porth, Wales	Hastings Corporation	F. H. Palmer, Civil Engineer, Town Hall, Hastings	do.
Sewers, Whitlock-road		do.	do.
Sewer, St. Helen's-road		do.	do.
Drainage Works	Northallerton R.D.C.	W. Fowle, Council Offices, Northallerton	do.
Granite Road Metal (1,100 tons)	Felkstone U.D.C.	F. E. Jennings, Town Hall, Felkstone	do.
Cottages, in n Shed, Gates, Fencing &c.	Hendon U.D.C.	Council's Surveyor, the Burroughs, Hendon, N.W.	do.
Business Premises, Chapel Brow, Leyland	Industrial Co-operative Soc., Ltd.	The Secretary, Society's Offices, Golden Hill, Leyland	Sep. 16
Alterations, &c., Kestridge, Cowfold, Sussex	Willenden District Council	W. Buck, Architect, Horsham	do.
Wood-paving Works	Borough of Fulham	Council's Engineer, Lyde-road, Kibbura, N.W.	do.
Making-up Lyde-street	West Ham Union	Borough Surveyor, Town Hall, Fulham, S.W.	Sep. 17
Unclimbable Iron Railing, Oak Cleft Fencing with Gates	Tonbridge R.D.C.	The Clerk, Union Workhouse, Leytonstone, N.E.	do.
Drainage Works	Croydon R.D.C.	W. V. Graham, Engineer, 5, Queen Anne's Gate, S.W.	do.
Road Works, &c., Cranley Gardens, Wallington	Devonport Corporation	Borough Surveyor, Town Hall, Croydon	do.
Buildings at Gasworks	Hastings Corporation	Borough Surveyor, 24, Ker-street, Devonport	Sep. 18
Wrought Iron Fencing	Southwark Union	F. H. Palmer, Civil Engineer, Town Hall, Hastings	do.
Converting Railway Arch into Stables, Ewer-street	Woodwich Borough Council	G. D. Stephenson, Architect, 13 and 14, King-street, E.C.	do.
New Municipal Buildings	Sherburn R.D.C.	A. S. Thomas, Architect, 5, Queen Anne's Gate, S.W.	do.
Water Supply, Folkestone	Leigh (Lancs) Corporation	F. H. Read, 22A, Dean-street, Scarborough	Sep. 19
Cast Iron Pipes (1,100 tons)	Burnley R.D.C.	J. Foster, Engineer, Gas Offices, Leigh	Sep. 20
Sewerage Works	Kirkcaldy School Board	S. Edmondson, Surveyor, 15, Nicholas-street, Burnley	do.
School, Sand-road	London County Council Asy. Com.	W. Williamson, Architect, 220, High-street, Kirkcaldy	do.
Tar-paving at Horton Asylum, Epsom	Stepney Borough Council	Clerk of the Committee, 5, Waterloo place, S.W.	do.
Stores, art & Van Sheds, Lodge, & Public Urinals	Hammermill Guardians	Borough Engineer, 15, Great Ainslie-street, E.	Sep. 22
Board Room, Offices, Receiving Home for Children, &c.	Metropolitan Asylum Board	J. H. Richardson, Architect, 67, Musbury-pavement, E.C.	Sep. 23
Hot-water Heating apparatus, Park Hospital		Office of the Board, Embankment, E.C.	Sep. 24
Laundry, Busted-road School, Sutton		Newman & Newman, 34, Tooley-street, London Bridge, S.E.	do.
New Entrance Gates, &c., N.E. Hospital, Tottenham	Borough of Hammersmith	Office of the Board, Embankment, E.C.	do.
Workmen's Dwellings, Yelcham-road	Essex County Council	Borough Surveyor, Town Hall, Broadway, Hammersmith	do.
Laboratories in Duke-street, Chelmsford	West Hartlepool Corporation	County Architect, Duke-street, Chelmsford	Sep. 25
Sewers, Bridge-street	Fylde Guardians	J. W. Brown, Borough Engineer, West Hartlepool	Sep. 26
Workhouse, &c., Weeham, Lancs.	Tottenham U.D.C.	Haywood & Harrison, Architects, Acclington	Sep. 27
Making-up Road	Ley's Malleable Castings Co., Ltd.	Council's Engineer, 712, High-road, Tottenham	do.
Extensions to Vulcan Iron Works, Derby	Messrs. Wears & Watson	R. K. Ridgway, Architect, Long Eaton, Notts	do.
Perath Arms, High-street, Gateshead	Co-operative Society, Ltd.	L. H. Armour, 16, West-street, Gateshead	No date
Rebuilding Premises, Waterloo-st. Newcastle-on-Tyne		F. E. L. Harris, Architect, 1, Ballou-street, Manchester	do.
Sinking Pit, Greenwell, Wales		Secretary Greenwell & Garside Collieries, Ltd., 40, Queen Victoria-st.	do.
Four Cottages, May Place-road, Bexley Heath		W. F. Potter, Architect, 15, York-gate, Queen's-rd., Hatcham, S.E.	do.
Church, Corporation-road, Darlington		W. J. Morley & Son, Architects, 209, Swan-arcade, Bradford	do.
Warehouse, Whitehall-road, Leeds		A. & W. Lee, Architects, 15, South-parade, Leeds	do.
Schools at Newport-road		The Clerk, Station-road, Aldershot	do.
Road Making Works, Stafford		Buckland & Garrard, 5, Fredericks-place, Old Jewry, E.C.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Architect's Assistant	Borough of Ealing	21	Sep. 17
*Second-class Draughtsman	Board of Agriculture Civ. Ser. Com.	Not stated	No date

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv, vi, vii, x, & xxi. Public Appointments, xviii, & xix.

PRICES CURRENT (Continued).

WOOD.		
JOINERS' WOOD.	At per standard.	
Jo. s. d. £ s. d.	£ s. d.	£ s. d.
White Sea: First yellow deals,		
3 in. by 11 in.	20 0 0	23 0 0
3 in. by 9 in.	20 0 0	21 0 0
Battens, 2 in. and 3 in. by 11 in.	16 10 0	18 0 0
Second yellow deals, 3 in. by 11 in.	18 0 0	20 0 0
3 in. by 9 in.	16 10 0	18 10 0
Battens, 2 in. and 3 in. by 11 in.	13 0 0	14 0 0
Third yellow deals, 3 in. by 11 in.	14 0 0	15 10 0
Battens, 2 in. and 3 in. by 11 in.	11 10 0	13 10 0
Petersburg: first yellow deals, 3 in.	20 0 0	21 0 0
by 11 in.	17 0 0	18 0 0
Do. 3 in. by 9 in.	13 0 0	14 0 0
Battens.	13 0 0	14 0 0
Second yellow deals, 3 in. by 11 in.	15 0 0	16 10 0
3 in. by 9 in.	13 10 0	14 10 0
Battens.	11 10 0	12 10 0
Third yellow deals, 3 in. by 11 in.	12 10 0	13 10 0
Do. 3 in. by 9 in.	10 0 0	11 0 0
Battens.	10 0 0	11 0 0
White Sea and Petersburg:		
First white deals, 3 in. by 11 in.	14 0 0	15 0 0
3 in. by 9 in.	13 0 0	14 0 0
Battens.	11 0 0	12 0 0
Second white deals 3 in. by 11 in.	13 0 0	14 0 0
by 9 in.	12 0 0	13 0 0
Battens.	10 0 0	11 0 0
Under 2 in. thick extra.	10 0 0	11 0 0
Yellow Pine—First, regular sizes.	39 0 0	33 10 0
Broads (12 in. and up).	2 0 0	more.
Oddments.	22 0 0	24 0 0
Second regular sizes.	24 10 0	26 10 0
Yellow Pine Oddments.	20 0 0	22 0 0
Kauri Pine—Planks, per ft. cube.	0 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Small, per ft. cube.	0 6 3	0 3 0
Wainscot Oak Logs, per ft. cube.	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as		
inch.	0 0 7	0 0 8
3 in. do.	0 0 7	0 0 8
Dry Mahogany—		
Honduras, Tabasco, per ft. sup.	0 0 9	0 0 11
Selected, Figury, per ft. sup. as		
inch.	0 1 6	0 2 0
Dry Walnut, American, per ft. sup.	0 0 10	0 0 10
Teak, per load.	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube.	0 3 0	0 3 6
Prepared Flooring—		
x in. by 7 in. yellow, planed and		
shot.	0 13 0	0 16 6
x in. by 7 in. yellow, planed and		
matched.	0 13 6	0 17 6
x in. by 7 in. yellow, planed and		
matched.	0 13 0	0 16 0
x in. by 7 in. white, planed and		
shot.	0 11 0	0 13 6
x in. by 7 in. white, planed and		
matched.	0 11 6	0 13 6
x in. by 7 in. white, planed and		
matched.	0 13 6	0 15 6
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SEPTEMBER 13, 1903

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Church of St. John the Divine, Sidcup..... Mr. G. H. Fellowes Prynn, F.R.I.E.A., Architect.
Village Church, Port Sunlight..... Messrs. William & Segar Owen, Architects.
House at Wolves Newton Mr. A. Jessop Hardwick, Architect.

Blocks in Text.

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The Restoration of the Erechtheion.



TWO years ago we gave some account of the "restorations" now being carried on upon the Acropolis of Athens—and at the time we ventured to express our fears that, as is usual in such cases, there would be a danger of overdoing the work. Since then the work has very much progressed, and, perhaps, approaching completion as far as the Parthenon is concerned. We are now able to judge of the result, and whilst admitting the necessity of doing something to preserve the ruin in as intact a manner as possible, we still think more might have been done in the way of support by steel archons, ties, &c., instead of replacing portions of the ruin with new marble abatement, mouldings, and even capitals to the columns. The inner range of columns of the west pediment of the Parthenon is now provided with a completely restored abated architrave resting on capitals which have nearly all been restored in halves—i.e., the huge Doric capitals where defective seem to have been cut in half perpendicularly, and a new marble half has been joined on to so much of the original capital as could be retained. Fragments of the original sculptured metopes have been replaced over this new marble architrave. The base of the old Turkish minaret, with its winding staircase, still blocks up one side angle of the portico. This will, no doubt, be removed in due course. The marble for the work is all being provided by the English Marble Company, which is now working the ancient Pentellic quarries on a grand scale, turning out blocks far larger than the ancient Greeks ever contemplated using. A visit to these quarries with their elaborate machinery and wire saws, stretching across from hill to hill, constitutes an interesting addition to a visit to Athens.

There must always be a certain sense of the ridiculous when one examines a "faked-up" ruin—the more so according to the importance of the monument in question. Both in Athens and Rome very much is being done to the ruins of classic times

which our descendants—for whose benefit we are presumably working—will look upon with astonishment and regret. In Athens these restorations of primitive monuments are especially out of place, considering their Cyclopean character and their much ruined condition. To restore a mediæval church or castle is, perhaps, excusable on the score of utility—an excuse which can hardly be urged in the case of a disused pagan temple or a Cyclopean ruin resembling Stonehenge.

Possessed by that insatiable spirit of inquiry which leaves no stone unturned in the course of modern investigation, the international corps of archaeologists stationed in Athens, who may be considered to control the destinies of all the antiquities and monuments of ancient Greece, has destroyed every trace of the curious subsequent history of the site. Moslem, Frank, and Byzantine evidences of occupation have been ruthlessly removed, and, as a consequence, many traces of still older buildings which would probably survive under the successive layers of these later constructions have disappeared. The archaeologists of the last fifty years seem to have been determined to denude the Acropolis of its former coating of soil, and every ancient monument upon it of the usual accompaniments of mud walls and traces of human occupation. The Acropolis is now reduced, as far as possible, to a barren rock covered with mutilated blocks of marble.

In ancient times the Acropolis was covered with mud-wall buildings, the adjuncts of the Parthenon and its prehistoric predecessor, the plan of which latter has only been unearthed during the last few years. As has been proved on many occasions, the cob-wall buildings of an extreme antiquity may be traced even at the present day surviving in the dry climate of the Levant, and the rubble foundations on which they were built are, of course, common enough. But, unfortunately, on the Acropolis all traces of such a kind have now disappeared, in consequence of the extensive excavation, or rather denudation, of the plateau. During this denudation the immense collection of primitive art fragments now in the Acropolis Museum was found.

The triple monument known as the Erechtheion has suffered very much from the alterations to which it has been sub-

jected, even in classic times. At the present day it is practically an unintelligible ruin, and all authorities seem agreed that there is no evidence as to the actual intention or use of the three porticoes. No suggestion has ever been advanced as to the object for which the very remarkable projecting bay decorated with the caryatides can have been intended. It is commonly termed a portico, but it can hardly be considered as such in the ordinary sense of a porch or covered entrance. It would seem to be mentioned on the famous inscribed tablet referring to the Erechtheion (in Brit. Mus.) written at the beginning of the fourth century B.C. But the use it may have served, or the purpose for which it may have been constructed, still remains an unexplained mystery. The puzzle is complicated by a possibility that the *Adytum* with which it may have been connected, and the colonnaded wall above (represented in Stuart and Revett, but since ruined), are of Late Roman work.*

To the present writer the caryatide "portico" suggests the idea of a gallery for displaying relics, &c., or perhaps a special seat for the priestesses of Vesta at the time of the great festivals on the Acropolis. In any case a wooden floor or staging must have been provided inside the high stylobate, if such were the use.

The western portion of the collection of buildings called Erechtheion has completely disappeared, leaving a few traces of where it was joined to the existing fragment behind the north portico. The elaborate old steel engravings of the nineteenth century, in the innumerable works which have been published on the Acropolis, are invariably incorrect in their planning of these traces. To judge by the stones which still survive, the western portion of the group of buildings must have been most irregularly joined on—probably with the idea of following the contour of the Acropolis summit. But as we have already remarked, the rock of the Acropolis has become denuded of everything except fragments of marble, and any

* The *Adytum* or crypt here referred to is the oblong chamber at the west end of the building, with a doorway leading to the vanished portions of the Erechtheion. This underground chamber has in subsequent times been turned into a cistern, to judge by the thick layers of cement still remaining on some of the walls. Another small crypt, in which is the mouth of a well, exists underneath the north portico.

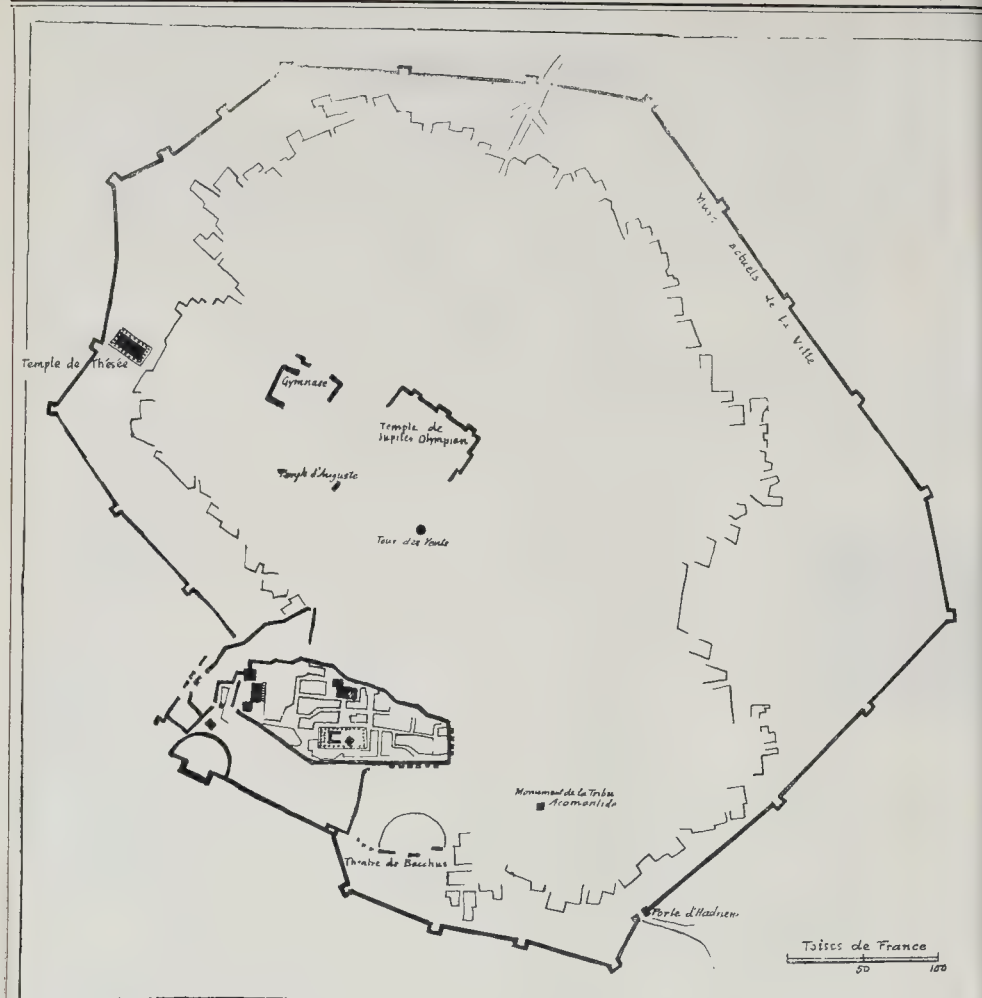


Fig. 1.

trace of such buildings as the western portion of the Erechtheion, which may very possibly have been of inferior materials, has been swept away.

The accompanying plan of the Acropolis (fig. 1), which occurs in several books of the early nineteenth century, represents it in a condition immediately preceding the era of denudation by the archaeologists. It is interesting to observe the disposition of the roadways at that period, which probably reproduces to some extent the older disposition of the site. At that time the outline of the western portion of the Erechtheion seems to have been preserved in the oblong building occupying that position. This plan has been taken from the Report of the French expedition to the Levant at the beginning of the nineteenth century. The same plate has been used in Walpole's "Travels in the Levant", (London, 1817). The view of the Acropolis showing the houses and fortifications after the ruin of the Parthenon (fig. 2) is by the Venetian engineer Verneda, shortly after the siege in 1687.

At present the Erechtheion is undergoing

VEDUTA DEL CAST D'ACROPOLIS DALLA PARTE DI MEZO GIORNO.

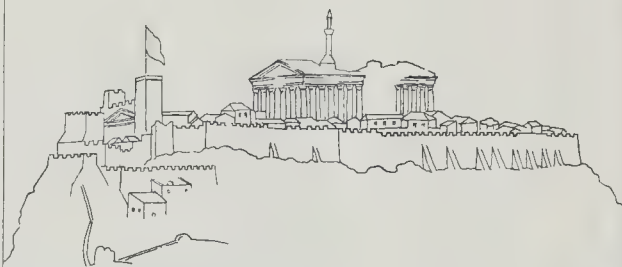


Fig. 2.

a very thorough "restoration" (fig. 3)—but, perhaps, on more conservative lines than has been the case with the Parthenon. There is less appearance of new marble, and more reliance is evidently being placed on work in supports and ties.

A great deal of the Erechtheion was "replaced" in 1838, at the time when the

aces of Turkish occupation were cleared away, and not long after the date when so many details of the building were carried off by Lord Elgin. Since then very little has been done to the ruin except to clear away the



Fig. 3.—Commencing the Restoration of the West End of the Erechthion.

earth from its base. It is to be hoped that the present "restoration" may be as satisfactory as that of the charming little Temple of Winged Victory, which was put together once more in 1835, after serving as material to form a Turkish battery.

A FRENCH MANUAL OF MEDÆVAL ARCHITECTURE.

M. ENLART'S manual* follows very much on the same lines as the "Abécédaire" of M. de Caumont, published in 1853, and comprised in two volumes, the first dealing with ecclesiastical, and the second with civil and military, architecture. As yet only one volume has appeared of M. Enlart's work devoted to "Architecture Religieuse," but in its preface he refers to a second which will comprise "Architecture Civile" and form the first part only of a complete manual of French archaeology. The second will include "mobilier," costume, sculpture, painting, and iconography.

A comparison of this first volume with M. de Caumont's shows the great strides which have been made during the last half-century in the science of archaeology, for M. de Caumont, who is regarded as its founder in France, put forward what were then new theories in a tentative manner only, and was accustomed to return again and again to the subject in the *Bulletin Monumentale* to limit or modify some of his statements. M. Enlart, on the other hand, is able now to speak with much greater authority on the subject owing to numerous works published since, to the archives of the "Commission des Monuments Historiques," and to the very large collection of photographs taken for that Commission. These have enabled M. Enlart to compile a record of hundreds, if not of thousands, of churches, many of which were unknown in De Caumont's time; he claims also to have visited the greater number of the buildings mentioned in his work, giving him a grasp of the subject which one recognises throughout in his work.

M. Enlart's first volume, which unfortunately is not provided with an index (a common defect in all French architectural publications), is divided into seven chapters, the first being devoted to definitions and principles, and the second and subsequent chapters to (2) Latin and Merovingian; (3) Carolingian; (4) Romanesque; (5) Gothic;

(6) Renaissance; and (7) Architectural Accessories.

The first chapter, to which 100 pages are devoted, is original in its treatment and of great interest and value, so much so that it might have been extended to form a volume by itself. The first eight of its eighteen sections serve as a kind of glossary, including, however, only those terms which are in everyday use, but describing them in detail. As a definition of the elements of mediæval architecture, a description of the various materials employed, and a summary of the principal constructive features found therein, it errs, if anything, only by its necessary restriction. Subsequent sections describe the habits and customs of the artists of the Middle Ages, the resources for building, transport of materials, the custom in early work of using up the decorative features of more ancient buildings, attempts at imitation and other archaisms. In Section 16, "Repentirs et Refaçons," we find a new term, "Repentirs," defined as changes occasionally found in churches which have taken place during the progress of the work. "Refaçons" are partial reconstructions at a later period, such as the vaulting of a nave originally built to carry a timber roof (Abbaye-aux-Hommes, Caen). The last section deals with the value of recorded dates of foundations, and points out the danger of accepting them without due comparison with other work, owing to the fact that reconstructions have frequently taken place within comparatively short periods of one another. In all these cases references are given to existing examples in copious notes.

In consequence of the paucity of examples of either the Merovingian or Carolingian periods in France, the second and third chapters of M. Enlart's work (assumed to deal with French archaeology only) are more concerned with buildings outside France, and we think that the two chapters might have been merged into one, especially as in the latter the title given is "Carlovingien et Baptistères," as if baptisteries were independent of period or style, and he has been obliged to give a second description of the one Merovingian baptistery in France, that of St. John at Poitiers. We note in chap. iii. an illustration of the section of the church of Germigny-les-Prés, in which a dome, resting on squinches, is shown over the tower. There is no authority for this, and a glance at Constant Dufeux's measured drawings of the same, published in Vol. VIII. of César Daly's "Revue d'Architecture," will show that it is quite impossible that there were ever any squinches to carry the dome. The church has lately been restored, and it is probably one of those "restauration déplorables" to which M. Enlart constantly refers throughout his work. The French theory of restoration, such as is approved by the bishops throughout France, is that—first, so far as the funds will allow, the structure should be rebuilt to last for another 500 years; and second, that such alterations and improvements (?) may be introduced as the architect of the Middle Ages might have adopted if he had been living at the present day. This is how the front at Périgueux was restored, or rather destroyed so far as its history is concerned. In the Church of Notre Dame at Poitiers the fine ashlar work of the two western bays (built fifty years or more later than the eastern portion) has

been replaced by "petit appareil"—small rubble masonry—so that it might accord with the work of the earlier church. Folly can go no further.

In the fourth chapter, describing the architecture of the Romanesque period, M. Enlart devotes to it almost as many pages as in that given to Gothic work, and in this respect fills up a gap left in M. Viollet-le-Duc's "Dictionnaire Raisonné," which dealt more fully with the complete development of the style than with its earlier conceptions.

Owing to the vast extent of ground which M. Enlart has to cover in these two chapters, it has only been possible to give a tithe of the illustrations required to explain their description; and the references given in the notes to hundreds of churches cannot be expected to take their place, so that, unless by chance the buildings are known to the reader, or can be followed by him in the collection of photographs in the Trocadéro library, these references have not the value which M. Enlart apparently attaches to them. We note this because not only are there too few illustrations, but a large number of those given might have been dispensed with altogether, being either very poor examples or misleading from the position they occupy. In Section 16, dealing with the important subject of Romanesque elevations, only one illustration is given, viz., fig. 97, two bays of the section of the Church of Cerisy-le-Forêt. In Section 17, treating of the Romanesque vault, fig. 98 represents a church without vaults in either nave or aisles. At fig. 116 is the elevation of St. Front de Périgueux, which should have come in the preceding section.

There are many passages in the manual which will amuse its English readers. In the preface M. Enlart discusses the terms which are employed to define the architecture of the Middle Ages. "Gothic" he thinks quite unmeaning, and "Ogival" or "Pointed" insufficient. "French architecture" he thinks would be the most exact, but then "we have had," he says, "so many styles of French architecture." Section 4 of the fifth chapter on Gothic architecture is devoted to the expansion or spread of French Gothic architecture beyond the French frontiers, and it will be new to us to learn that in Beverley, Hereford, Rievaulx, Ripon, Worcester, and York we continued to follow the Norman school, and that the style of the cathedrals of Salisbury, Winchester, and Wells was imported from Anjou, and recalls Puy-Notre-Dame, Candes, and Cunault, all in that province. He claims that in the architecture of the two sections the Gothic art of the South was imported in 1266 by Charles I. of Anjou, being unaware that probably the Saracenic artists of Sicily carried their style into the Holy Land in the twelfth century, and that the pointed arch arcades of two orders, as built by them in Syria, were imported afterwards into France by the Crusaders. On the other hand, M. Enlart fails to recognise that the pendentives and domes of Périgord, dating from 1013 A.D., were taken by the French to the Holy Land, and that the Church of St. Barnabas in Cyprus, which he seems to think might have been the source from which the masons of Périgord derived their domes, was distinctly the work of the Périgordian masons; the eastern dome dates from the first half of the twelfth century, and the western dome, with its double order of pointed arches, fifty or sixty years later in

* "Manuel d'Archéologie Française depuis les Temps Mérovingiens jusqu'à la Renaissance." Première Partie, Architecture, par Camille Enlart. Paris: Alphonse Picard et Fils. 1902.

the same century. M. Enlart is of opinion that the plan and design of St. Front were taken from the Church of the Holy Apostles at Constantinople, and not from the Church of St. Mark at Venice, and so gives the last *coup de grâce* to M. Verneilh's theory of the Venetian colony at Limoges.

The best sections in both the Romanesque and Gothic periods are those describing church towers and belfries, and they are also the best illustrated.

Chap. vi., devoted to the Renaissance period, deals only with those buildings into which Italian ornament enters, the conceptions being still Gothic. The churches described and illustrated belong to a period which has hitherto been somewhat neglected, owing to the greater interest felt in its secular architecture. This chapter is, therefore, a valuable addition to our knowledge.

The last chapter of the volume (vii.) treats of what are called "Accessories de l'Architecture Religieuse," such as altars, piscinas, pulpits, choir-screens, fonts, ossuaries, &c., among which the altars are the best illustrated. The first section refers to pottery which is sometimes found embedded in vaults, and is assumed to have served acoustic purposes. In the illustration given, fig. 350, portions of the vault of a church at Famagusta in Cyprus are shown, and as the mouth of the terra-cotta jug (for the specimens shown all have handles and, therefore, were made for other purposes) opened into the church, some such object as that mentioned may have been aimed at. As shown in fig. 350, they were evidently not built in to lighten the vault, as is the case with those embedded in the cupola of San Vitale at Ravenna. Some examples are referred to in the notes of similar employment in the vaults of some French churches, but from the few churches quoted the employment of such acoustic vases must have been rare.

We have already referred to the copious references to churches in every Department of France. An additional value to these is given in the list following the chapter on Gothic architecture by the inclusion of the names of the master masons employed in some of the principal cathedrals and churches. In the Church of St. Rémi at Rheims M. Enlart has been able to trace the names of eight or nine "maîtres-d'œuvres" who conducted the works from 1211 to 1359 A.D. Following after the sixth chapter is a list of the principal artists of the Early Renaissance in France—some Italians and some Frenchmen who had pursued their studies in Italy, and, lastly, those Frenchmen who were trained in France. In all these cases a list of their works and the dates thereof are given.

In conclusion, M. Enlart's manual is a work showing considerable research, which cannot fail to be of great service to those architectural students who are acquainted with some of the buildings described. It would add to the value of his work if, in the second edition which he contemplates, he would, failing an illustration of some important feature he is describing, refer the student to some work where it is represented, giving the number of the plate or woodcut. It is not sufficient to the note to give the name only of a church where the feature may be found, and there are not many students who could find the time and opportunity for consulting the numerous works quoted in the Bibliography.

NOTES.

The British Association.

THE seventy-second annual meeting of the British Association for the Advancement of Science was opened at Belfast on Wednesday, when the President's address was delivered by Professor Dewar. The address was a notable one, an important part of it being taken up with the question of scientific education. The President referred to the enormous expansion in recent years of German industries, particularly the chemical industries, which were largely founded upon basic discoveries made by English chemists, but never properly appreciated or scientifically developed in the land of their birth. What was the explanation of this disastrous phenomenon? In one word, it was want of education. We had the material in abundance when other nations had comparatively little. We had the capital, and we had the brains, for we originated the whole thing. But we did not possess the diffused education, without which the ideas of men of genius cannot fructify beyond the limited scope of an individual. The root of the mischief was in the want of education among our so-called educated classes, and secondarily among the workmen on whom these depended:—

"It is in the abundance of men of ordinary plodding ability, thoroughly trained and methodically directed, that Germany at present has so commanding an advantage. It is the failure of our schools to turn out, and of our manufacturers to demand, men of this kind, which explains our loss of some valuable industries and our precarious hold upon others. Let no one imagine for a moment that this deficiency can be remedied by any amount of that technical training which is now the fashionable nostrum. It is an excellent thing, no doubt, but it must rest upon a foundation of general training. Mental habits are formed for good or evil long before men go to the technical schools. We have to begin at the beginning. To my mind, the really appalling thing is not that the Germans have seized this or the other industry, or even that they may have seized upon a dozen industries. It is that the German population has reached a point of general training and specialised equipment which it will take us two generations of hard and intelligently directed educational work to attain."

Facts and opinions similar to these have been expressed before, but it is satisfactory that they should be publicly stated by this year's President of the British Association.

Municipal Competition.

IN a series of voluminous articles the *Times* is now engaged in dealing with the complex question of "Municipal Socialism." One point emphasised amongst many others by the writer is the injustice done to private traders by municipal competition, but we find no word of sympathy for architects, engineers, and other professional men who are necessarily deprived of remunerative practice by the countless multiplication of public officials. Almost every borough surveyor and every surveyor to a district council has now come to regard himself as an architect as well as a civil, mechanical, electrical, and sanitary engineer. He will cheerfully undertake the design of bridges, town halls, technical institutes, hospitals, bathing establishments, electric light and power installations, destructor stations, or anything else that may be wanted. It is very rarely that one man can be found who is adequately qualified by training and practical experience for so varied a selection of duties, and the struggle with novel problems

seldom leads to satisfactory results, while the acquirement of proficiency by the surveyor certainly adds to the burdens of the long-suffering ratepayer. This aspect of "progressive municipalism" deserves some attention from our contemporary, and the architect is clearly entitled to the same sympathy which has been expressed with those engaged in industrial pursuits.

The Sanitary Institute Congress.

THE Sanitary Institute Congress was opened at Manchester on Tuesday, when Earl Egerton of Tatton, the President, delivered an address. In the course of some interesting remarks, Earl Egerton dealt with several subjects of national importance, such as the housing of the working classes, national health, &c. In speaking of the physical power of the inhabitants of large towns, he said that the commercial position of this country, threatened as it is by the vigorous races of North America and by the trained intellects of Germany, depended on the British people being roused to greater vigour and adapting themselves more readily to the change of circumstances produced by the introduction of new forces, new motive powers, and greater facilities of locomotion. Later on he said: In that great city (Manchester) they had triumphs of engineering and mechanical art applied to various industries, but the population which inhabited it had, as in other large towns, degenerated in size and physical power from the ancestor or progenitor who was attracted into the town by higher wages from the country districts. The same process was still going on; and the large percentage of rejections from physical disabilities among those who offered themselves as recruits, even in Manchester itself, gave an alarming proof of the degeneracy of the town population. While this is unfortunately true, are the methods proposed to arrest this deterioration, and to make up for the necessary drawbacks of town life, *i.e.*, greater care in the physical education of the young and in teaching them the principles of hygiene or the preservation of health, the only or the most likely ones to arrest this decay? A great deal could be done for the health of the working-class population of large towns by the provision of dwellings in the suburbs, and still more if employers would transplant industries to the rural districts.

The Choice of Steam Boilers.

THERE is probably no occupation more perplexing than the study of figures professing to afford guidance to the uninitiated in the selection of steam boilers, especially if the statistics are those reproduced by makers of such necessary adjuncts to modern life. According to these, almost every type of boiler seems to evaporate more water than any other boiler, and generally to do it on much cheaper terms. The easiest, but not always the cheapest, way out of the difficulty clearly is to pin one's faith to some maker of repute, and, having followed his advice, to rest confident that the result will be in every way satisfactory. And so, no doubt, it will be, for given correct design, good materials, and good workmanship, any boiler may be relied upon for efficiency and durability. Variable as published records may be, the variations always depend upon different sets of conditions, and

a careful analysis of statistics leads to the inevitable conclusion that within certain limits one boiler is as good as another, so far as the question of "commercial" efficiency is concerned. Thus it will be found on examination that the price of a boiler varies comparatively little with the type, providing the standard adopted for judgment is that of evaporative power. Taking nearly all types of boilers produced, the price per 1,000 lbs. of water evaporated per hour will be found to be approximately constant, when the size is reasonably large, and the pressure within moderate limits.

In the construction of engine fly-wheels, especially when of large size, the arms are frequently formed so that they offer unnecessary resistance to the air, with the result that power is wastefully expended. Some experiments recently conducted in Germany serve to demonstrate the importance of this point. The tests to which we refer were made with a heavy fly-wheel fixed between a pair of compound engines of 450 h.-p., and the arms, built with a channel section, were found to create a powerful draught, thus signifying the development of excessive air friction. For the purpose of reducing loss of power the arms were covered with sheet steel, and arrangements were made for the purpose of ascertaining the amount of the energy thereby saved. In order to carry out the trials the engine and fly-wheel were driven without load by a direct-coupled generator caused to run as a motor. Without the sheathing the absorption of power was found to be 17.83 h.-p., and with it 13.23 h.-p., thus showing a difference of 4.6 h.-p., which represented over 1 per cent. of the engine power, and an estimated saving of more than 50¢. per annum. Similar experiments were made with a larger engine, when still greater differences were observed. These figures are worthy of note.

Inspection of Brooklyn Bridge. SYSTEMATIC supervision has now been substituted for the neglectful methods formerly prevailing in connexion with the Brooklyn bridge, of which Americans are justly proud. A properly qualified engineer is installed as Commissioner of Bridges, with the result that the bridge is now regularly inspected and kept in repair. Each working day a careful inspection is made by a gang of men under the supervision of the assistant engineer-in-charge, and a daily record is made of all that is done. Some time ago we referred to the failure of several suspender rods at the middle of the span, partly owing to faulty construction, but chiefly to want of proper attention. All rods of the kind are now under minute inspection, and the hinged bearings of the shorter ones are kept oiled so that they may permit free movement to take place as necessary. A number of suspender rods, removed from the structure, have been tested and in every case the breaking strength was found to be from ten to twelve times the maximum load to be carried. This result confirms the opinion we expressed at the time that want of attention to the condition of the bearings, especially necessary in view of their imperfect design, was the chief cause leading to failure of the rods.

A COUNTY COUNCIL publication has just been issued, entitled "London Statistics," which contains much interesting information relating to the work of that body. Several pages of the volume are devoted to the question of housing, particulars being given of the various schemes which the Council has dealt with. During the fourteen years the Council has been in existence it has displaced, or is about to displace, 16,278 persons from insanitary areas, at an estimated cost of clearance of 1,088,724*l.* It has provided, or is about to provide, 3,348 tenements, with accommodation for 21,526 persons, and plans are in course of preparation for 9,879 more, with accommodation for 58,000 persons. The cost of providing all this accommodation—*i.e.*, the housing value of the land, plus the cost of buildings, plans, &c., is estimated at 3,847,416*l.* This figure represents the remunerative outlay. The net cost of clearance—*i.e.*, the gross cost of clearing, less the housing value of the land—is unremunerative outlay, and falls on the rates. In connection with street improvements, involving submission of a scheme of rehousing to the Home Secretary, the Council has displaced, or is about to displace, 12,000 persons of the labouring class, and arrangements have been made for providing other accommodation for 11,500 persons. During the year under review the Council made a profit on its workmen's dwellings of 2,313*l.*, as compared with a deficiency in the previous year of 1,157*l.*

AN advertisement has just been issued for designs for a public library proposed to be erected in the Borough of Greenwich:—"A premium of 50*l.* will be paid for the design to be adjudged the first, and a premium of 30*l.* for the second in merit, provided not less than two bona-fide designs be sent in. . . . The Council shall not be bound to adopt the design to be adjudged first in merit, or any design, and may adopt a design from any architect not competing." This is one of the most interesting competition advertisements which have appeared for some time. The second paragraph, which stipulates that a second premium will be awarded "if not less than two bona-fide designs" are sent in, is uncommonly "canny" and very funny. The latter part of the final clause, however, is neither canny nor funny. There is an honest ring about it, as if the sympathies of its composer had risen above his official conscience. If, on the other hand, it has not been so inspired, the fatuity of the Competition Committee is established, as it is difficult to conceive anything more conducive to a "one-man show," the possibility of which may be responsible for the extraordinary caution shown in the second part of the first paragraph.

MAGAZINES AND REVIEWS.

In the *Art Journal* Mr. Addison McLeod, in an article on "The Influence of Dante on the Art of his Century," argues that the elements of the horrible in Orcagna's paintings in the Campo Santo at Pisa are derived from Dante's "Inferno." It is not improbable, though it is a kind of thesis hardly capable of demonstration. "A Plea for the Stencil," by Mr. R. Davis Benn, is really a recommendation to take example and inspiration from the Japanese school of stencil design, in which the stencil has gained a freedom and even poetry of effect which has never been imparted to it by

western decorators. A good many miniature reproductions of Japanese stencillings accompany the article, and should have a stimulating effect on the European stencil-cutter. A view of the new wing of the Metropolitan Museum at New York does not impress us very much, as its chief feature is the employment of coupled columns of an order, projected in front of the main wall line, to carry nothing at all but useless blocks of stone. Nevertheless, if the *Art Journal* so much admires what it calls "this fine addition," the editor might at least in fairness have added the name of the architect. In the ordinary English illustrated periodical one is never surprised to find the name of the architect ignored; but we must say that an "art-journal" ought at least to set a better example. An article on the armour at Hertford House is of value as coming from an expert, Mr. G. Francis Laking; and following this is a short description of a new drawing instrument, the "aerograph," which consists of a receptacle in the form of a fountain pen, through which colour is forced by working a treadle; it is the sand-blast principle, in fact, applied to the laying on of colour, and drawings can be made with it just as designs can be made with the sand-blast; but we do not think the method is of any artistic importance. It may be very useful for stencil work.

The *Magazine of Art* devotes an article to that fine painter of French coast and fishing life, M. Cottet, whose name, now celebrated, was hardly known five years ago. Mr. Walter Crane contributes an article on "Modern Decorative Art at Turin," in which he speaks pretty severely about the tendencies of the "new art," and concludes that to go through the Turin Exhibition and apply the test of selecting what one would like to live with, would involve such a process of elimination as would not leave enough to furnish one's house! M. Henri Frantz contributes an article on "The New Room at the Louvre" containing the Rothschild bequest collection, and Mr. E. F. Strange continues his article on "The Scenery of Charles Kean's Plays" and the works of scene-painters whom he employed. Several of the scenes illustrated are mainly architectural, and they are not nearly so good as the author seems to suppose. J. Day's "Entrance to St. Stephen's Chapel, Restored" is nothing better than a kind of nondescript and impossible Late Gothic—stage Gothic all over; and the scene for "Much Ado about Nothing," with two immense Greek Doric columns flanking the porch of a house, with staircase "ramps" butted against them, is absurd in every way. What has Greek Doric to do with the play? As far as there is any local colour suggested, it is an Italian Renaissance play; there was no such thing as Greek Doric in any Italian mansion of that day; its very existence, in spite of Pausanias, was not known, as one can see from the architectural publications of the period which professed to deal with the Classic orders. Hamlet's Castle at Elsinore, by Jones, is better. But the fact is that, both then and now, playgoers and theatrical critics are so ignorant of the simplest historic facts in regard to architecture, that the management has only to say that "Mr. Mahlstick has paid the greatest attention to the architectural scenery," and playgoers and critics after that will swallow anything that the scene-painter chooses to give them, without ever thinking of questioning its accuracy.

In the *Antiquary* is an interesting article by Miss Robson on "Medieval Trading Life" and the things that have passed away in the course of modern changes and machinery; and Mr. Rutter continues his discussion of the subject of "Moated Mounds," to which we have before referred.

The *Architectural Record* (New York) opens with an article by Professor Melani, of Milan, on "Modern Italian Architecture." The illustrations do not give one a very favourable idea of modern Italian architecture, which seems to alternate between eccentricity and a rather dull classicism. The modern Florentine architects, we are told, are more under the dominion of classic precedent than those of the other leading Italian cities, and are "deficient in imagination." . . . "If they have to erect a monumental palace they cling to the design of the Palazzo Strozzi; if a residence or country house is wanted, they fall back upon the style of Brunelleschi, and compose a façade exhibiting an absolute respect for straight line and symmetry. The façade

always has the round door in the centre, and at the side windows decorated with pediments, while on the second and third floors the windows are likewise adorned alternately with rectangular or curvilinear pediments. The ensemble is sometimes pretty, but eternally the same." In Venice "the partisans of the straight line are doing a great deal of harm," and one is not surprised to be told that "Venice is losing that local colour which is its principal merit"; a rather cold way of putting it, by the way. The charm of Venice, in fact, seems to appeal much more to northern visitors than to Italians; and as to the Venetians themselves, in spite of the recent lamentations over the fall of the Campanile, they seem to care nothing about it; the Technical Bureau has not one architect attached to its staff, and "art is absolutely subordinated to mechanical questions." We have long thought that, if we are to have "Venice Preserved," it must be got out of the hands of the Venetians; there should be a European combination to effect this; it would be worth a liberal expenditure to effect this object, for Venice is priceless, and there will never be another one. The record of some other cities is rather better; and though in Genoa "the utilitarian spirit prevails," the villa Schmidt, by Signor Parodi, of that city, is a really pleasing bit of modern architecture, neither imitative nor eccentric. An article on "A French Method of Cement Construction," by M. Jean Schopier, is chiefly concerned with the illustration of the use of the Cottançin system by M. de Baudot in his church of St. Jean du Montmartre, about which so much has been said; and which, however well constructed it may be, will assuredly not assist in recommending the system from the artistic point of view; it is a hideous structure, with the proportions and appearance of cast-iron. This, however, is no inevitable result of the employment of the structural system in question; it is simply that M. Baudot, while professing to throw over precedent, has in reality been far too much under its influence. He undertakes to show how medieval architects would have built if they had had the Cottançin construction to work with, and his method of doing this is to build a vaulted church on very thin supports; whereas, if such systems of structure had been available in the Middle Ages, vaults in the medieval form would never have been built at all. The architect should have neglected medieval forms entirely, and designed a church based on the best forms for the new construction; whereas he has taken just so much of medieval precedent as serves to spoil his work, by presenting us with a kind of skeleton medieval church the proportions and design of which, regarded from that point of view, are meagre and deficient in monumental character, and only serve to remind us how much finer a medieval church is. Perhaps, however, indirectly this may have a good result, in discouraging the use of a system of construction which, though it may be very useful for mills and other such purely utilitarian erections, is, in our opinion, perfectly unsuitable for monumental architecture of a high class. An article on American systems of re-inforced concrete construction, which follows, takes for the most part the line of showing the use of this kind of structure in buildings merely utilitarian (and mostly very ugly), though we presume that the heavy piece of Classic architecture called the Nassau County Court House is constructed with re-inforced concrete, as its illustrations are appended to the article, in which, however, no reference is made to it. The article, by Mr. G. Hill, a member of the American Society of Civil Engineers, contains some practical details of interest; it seems rather out of date, however, to be told seriously in an architectural paper that a beam of concrete alone possesses considerable compressive strength, but "would fail by breaking on the tension side"; in a professional magazine this might surely be "taken as read." From this we jump to the purely æsthetic use of the order in architecture, in the description and illustration of Mr. G. B. Post's New Stock Exchange at New York, the front of which is a Roman Corinthian temple in *antis*, with a pediment and an enormous blocking and balustrade behind it. Why this should be taken as specially an example of the proper and logical use of the Classic order does not exactly appear, though we admit that the building may be taken as an example of that simple unity of conception which is one of the best qualities in

architecture; but this would have been better brought out had a plan and section been added to the illustrations. An article on the French revival of sculpture in wax, by Mr. F. Lees, with illustrations of some charming work in this delicate material, ought to be interesting to sculptors.

The *Architektonische Rundschau* for this month contains hardly anything of special interest. The most important work illustrated is perhaps Herr Teichen's brewery building in Berlin, not a bad piece of work in itself, but one hardly understands the fancy for making a brewery look as much as possible like a military structure or a fortification, with machicolations and battlements as its dominant features. A house-front, No. 13, Bellevuestrasse, Berlin, by Messrs. Cremer & Wolfenstein, is picturesque in general appearance, but the details show the old German vices of interpenetrating mouldings, &c., and are in what in this country would be thought very poor and flimsy taste, though they still seem to have charms for German architects.

The *Monthly Review* contains an article by Mr. Halsey Ricardo on "The Betterment of London," not in the usual sense of improvement in the alignment of streets and public monuments, but in regard to the possibility of getting more of the beauty of colour into London. The main argument of the article consists in describing the colour element in Persian and other oriental forms of architecture, and in suggesting how a similar treatment might be applied to building in London by the use of structural polychromy, which is evidently what is intended, though that expression is not actually used. Among other things, Mr. Ricardo suggests also that each parish should have its own established colour for such things as lamp-posts and area railings, which all have to be painted some colour or other; so that there should be uniformity of colour in each parochial division, and a stranger might be able to discover at a glance in what locality he found himself. This, as the author observes, is only carrying out further and on a larger scale the system of colour distinction already employed in London omnibuses. The idea is at all events worth consideration; but are there colours enough to go round? The same number contains the third instalment of Mr. Arthur Morrison's essay on "The Painters of Japan," and an article by Mr. Charles Bright, F.R.S.E., on "The Possibilities of Wireless Telegraphy." Mr. Bright, while admitting that we cannot as yet foretell all the possible results of wireless telegraphy, thinks that its inferiority to telegraph by cable is, at present, "as marked as would be the delivery of our letters on the pavement—to be picked up by any one—instead of in the letter-box." Cable shareholders may therefore take comfort, and need not regard copper wires, gutta percha coverings, and iron sheathings, as things to be shortly relegated to a museum of antiquities.

In the *Nineteenth Century* Sir Robert Hunter writes a valuable article on—or against—"The Inclosure of Stonehenge," accompanied by a plan showing what public paths are stopped by the present fence. Sir R. Hunter's view, however, is much wider than the mere question of rights of way, though these partially affect the argument; it may be estimated from the following quotation, with which we entirely agree:—

"Can there be any better reason for the existence of roads, than that they lead to a place so remarkable that year by year it brings people many miles to take part in a gathering the origin and significance of which have passed into oblivion? Is it not idle, in the face of such facts, to suggest that there cannot be a public right of way to Stonehenge because its stones were placed there by man and may be removed by man? As a matter of fact they are older than anything else in the nature of building which the British Isles can show. Removable they may be, but centuries have seen them standing in the same place, and centuries have seen them an object of interest and an object of resort. The megaliths of Stonehenge saw old Sarum grow into a great city; they saw it deserted, they saw its buildings fall to pieces, they have seen it for centuries a mere series of concentric earthworks; they have seen the new city of Salisbury (now old as British cities go) rise mushroom-like in its stead. If any structure of man can claim permanence, it is Stonehenge. If the public character of a road depended in any degree upon the permanence of the object to which it leads (as a matter of law it does not), assuredly no place could lay as good a claim to be a worthy terminus of a public road as Stonehenge. . . . The private ownership which is to be so tenderly respected is a signet

of modern law. The public of this island had an interest in Stonehenge before any system of private land owning was dreamt of. The right of the public to approach it is far older than the right of the landowner to the soil on which it stands."

Naturally, Sir Robert Hunter sums up in favour of the substitution of legal for mechanical protection; in other words, of the purchase of Stonehenge for the nation. Among other articles in the same number are "The Faber Fund of Westminster Abbey" (apparently somewhat ideal quantity), by Miss Bradley and "The Exhibition of Early Flemish Art in Bruges," by Miss Mary H. Witt.

In the *Pall Mall Magazine* Mr. Archer, so well known as a specialist on railway subjects, writes an article on "Fast Trains," the main object of which is to open the eyes of English readers to the fact that we are being beaten by the French in the matter of fast trains, and to consider how and why this is. He admits that this rivalry is of very recent date, and also that it is only illustrated by a few special trains; the general average of speed on French railways being still much below that of English lines. But the French seem to have wakened up to the commercial advantage of high speed on through express routes, and Mr. Archer draws attention to the type of engine with which this work is done—the De Glehn four-cylinder compound, with leading bogie, and four or six driving wheels coupled. "The heating surface of the boilers of these mammoth locomotives is much larger than that of their British contemporaries, and the steam pressure also is higher." But the most important point mentioned is that these French express locomotives, with their high steam pressure and coupled "drivers," are unopposed for the ease with which they can mount banks (a "bank" in railway parlance is anything in the way of an ascending gradient), which obviates the necessity of running at high speed down hill. This is surely a wiser policy than that of slow speeds up hill with a tremendous run down the declivities, such as is practised on each slope of what is known as Shap Summit on one of our Scotch routes, and which in our opinion may some day lead to a fearful catastrophe: the slightest unexpected defect in either road or engine might do it. On this head Mr. Archer's article should have the attention of railway men. Mr. Marillier contributes an article on "The Electric Lighting of St. Paul's"; and Mr. Herbert Paul one on "The New Order of Merit" and the men who have received it. We agree that the most interesting of these are the one artist and the two authors among the number—Mr. Watts, Mr. Morley, and Mr. Lecky. Mr. Paul makes some suggestions as to others who might have been worth the Order, and while remarking that there is no reason why the Order should be confined to one sex, says, "we have no female astronomer like Mrs. Somerville, no female economist and historian like Miss Martineau," &c. The latter we may admit, but as to the astronomy, is Mr. Paul, a man of the world and for many years an eminent journalist, really unacquainted with the name of Miss Clerke?

The *New Liberal Review* contains an article on "The Legal Position of Trades Unions," which, without being intended so, is rather amusing reading. The main subject of the article is the result of recent well-known judgments fixing legal responsibility on Trades Unions for acts of coercion and combination. While the author is obviously a friend to the unions, he tells them plainly that they cannot well escape from the meshes of the new law, and that their best and in fact only course is not to transgress it. The remarks on the present state of the law as regards what used to be facetiously called "peaceful picketing" serve to show at any rate that the practisers or supporters of this time-honoured weapon of persecution recognise that their hands have become pretty securely tied. The writer (Mr. Anton Bertam) asserts indeed that a "free labourer" on his way to a job is now "hedged about with an almost greater sanctity than an ancient tribune of the Plebs"; and certainly it would seem that some of the modern interpretations of the Statute of 1875 (the words of which he quotes) seem to render it rather difficult to speak to the "free labourer" at all without coming within the wind of the law. It was high time, however, that something were done to put a stop to the shameful abuses connected with picketing, and the ill-temper of the Labour

arly under the enforcement of the law is a radical proof that such strong measures were necessary and are having their effect. What we does not understand is, how such "picketing" tactics as have been carried on down to only a very short time since could ever have been allowed when such a statute as that of 1875 was in existence. Had the law become a dead letter, or had no judges or magistrates the courage to enforce it? In the same magazine an article on "Antiquities, Old and New," by Mr. Ralph D. Blumfeld, criticises in clever and trenchant style the successive crazes for different kinds of antiquities—a particular style of furniture, a particular form of engraving, &c., whereby things that originally were worth pounds are sent up to hundreds of pounds. The writer has a good deal to say, also, about the constantly increasing trade in spurious articles which dogs these crazes, and which we imagine has arrived at a development little suspected by the general run of purchasers and collectors. Furniture is one of the easiest classes of articles to produce in sham antique, and we recommend the following remarks to the purchasers of this class of antiquities:—

"Half the chests of drawers and writing-desks that one now sees in old shops are made up from odd pieces of old furniture without a particle of new wood or metal in them, so that after all they are not altogether fraudulent. In those parts of the country which are frequented by tourists, particularly Americans, one finds that the making of spurious antiquities is a most thriving trade. A good many cottagers in the country lend themselves to this profitable business. The American lady in search of treasure spies a beautiful oak chest in the wide-open room of a wayside cottage. A yearning for its possession overcomes her, and the poor woman, who knows it is the only link with the past that is left to her, parts with it for a good round sum. Three days later another and similar chest stands in the same place. That is called 'salting,' and the cottager takes her fair share of the profits from the maker, whose workshops are situated in the nearest town. At Rouen the trade of 'salting' has become a fine art. There are enough ancient grandfathers' clocks in this town to have sufficed for every family in France a hundred years ago, and still they are being made at the rate of a hundred or more a day."

Under "The Field of Art" *Scribner* gives a most useful article by M. Alexandre Sandier (a translation probably from his French) on the history and development of the Louvre as an art museum, accompanied by plans showing the dates of the various portions of the building and the general classification of the collection. The article is to be concluded in the October issue of *Scribner*. In the same number is a lively article on "Prix de Rome Students at the Villa Medici," past and present, which throws an amusing light on the humours of a life of what may be called æsthetic Bohemianism which can hardly have its counterpart anywhere else.

In the *Century* an article on "Civic Improvement in Street and Highway," by Mr. Sylvester Baxter (with illustrations by Jules Guérin) adds another to recent indications of the manner in which attention to this subject has been awakened in the United States. The author justly remarks, in a practical spirit, and in dealing with the improvement of streets and highways is the first consideration. While observing that "the good-roads movement" has become widespread in the States, he feels obliged to admit that "the average American highway is still perhaps the worst to be found in any really civilised country." It is a curious thing how the standard of road-making and maintenance varies in different countries, and that each country, considered as a whole, is pretty sure to have either all the main roads good or all of them bad. Thus there has been for a long time in France a high traditional standard of road-making, probably dating in the main from the liberal and (in this respect) enlightened policy of Louis XIV.; though, as far as we have evidence, the streets in Paris remained in a very bad state long after the "grandes routes" had been brought nearly to perfection. The United States seem to have started from the first with a tradition of bad road-making, which has been so persistent that the nation is only just beginning to awake to the necessity of improvement in this respect. Readers of the date when "Uncle Tom's Cabin" was a popular book may remember Mrs. Stowe's description (obviously from fact) of what was called in her day a "corduroy road" in the States, which consisted of logs of

wood laid crosswise, like railway sleepers, on a mud foundation, such a road forming a portion of the only available route by which a certain Senator could reach the seat of Government. We presume "corduroy roads" no longer exist, but it is significant that in the early part of last century such public roads could have existed under an otherwise energetic Government. The attention which has been paid to brick for road-making in America is explained by Mr. Baxter's reference to districts in the West "where the character of the soil makes dirt roads impracticable and macadamising materials are scarce," and where the introduction of brick pavements has laid the foundation for an entire regeneration of the civic character of a town. This one cannot be surprised at; it is impossible to imagine a dignified town architecture on either side of what is called a "dirt road." From another passage we gather that there seems to be need of firmer by-law legislation in American cities; as the author, while remarking on the advantage of setting back the houses and leaving some greenery between them and the street line, complains that the effect is spoiled by commercial structures being built out to the street line. Apparently the idea of an officially guarded "frontage line" is rather a new one in the States. Two suggestions are emphasised by illustrations are worth notice. One is the view of Beacon-street Boulevard in Brookline, Mass.; where the space for the double tracks for electric tram-cars is kept not in the middle of the road, but on a wide margin of grass lawn along one side of the road, the rails being laid through the grass, which of course is quite uninjured by the passage of horseless cars: a row of trees is planted along the borders of this green space. This is a new and admirable idea, whereby the necessary space for the tram-car tracks is made to add to the picturesque appearance of the road, instead of only making an arid paved desert in the middle of it. The other example is that of Essex Woods-road, near Manchester-by-the-Sea (also in Massachusetts), where, the road having been made through a tract of woodland, a strip of this has been secured in perpetuity along each side of the road, so as to preserve theylvan character of the road, even though the rest of the land may be cleared for building. This also is a hint worth bearing in mind.

Harper contains an article on "Epochs of Gem-engraving," by Mr. Maxwell Sommerville, Professor of Glyptology in the University of Pennsylvania. It is a short article; a merely suggestive sketch of the outlines of a great subject, but illustrated by engravings of some remarkable examples of cameos and intaglios. The most curious of these is that which forms the tailpiece to the article, an intaglio on sardonyx illustrating the days of the week, better explained, he says, in French than English; though this is only partially the case, for the figure of Saturn is better explained by "Saturday" than by "Samedi," and that of Helios better by "Sunday" than by "Dimanche." On the other hand, we have the figure of the moon, "Luna," answering to "Lundi"; that of Mars answering to "Mardi"; Mercury represents "Mercredi"; Jupiter answers to "Jeudi" and Venus to "Vendredi"; and here the record is certainly much closer in French than in English. It would have added to the value of the article if the writer had given us the provenance of this and other examples illustrated, and their present whereabouts; to say that this is "one of the most curious intaglios ever found" at once suggests the question, by whom found, and where? to which no answer is given, nor is the date suggested in the case just mentioned, though it is in some other cases. Are we to understand that the illustrations are all from the author's own collection? If so, he must have been an able or a fortunate collector. The same issue contains an article on some of the scenery and castles of "Stevenson's Country," with some fine sketches of Tantallon and Prestonpans castles, and bits of Fife-shire scenery. Tantallon Castle should hardly have been mentioned in connexion with Scottish literature without a reference to Burns's remarkable use of it as a symbol of endurance, in his complimentary verses to a Scottish poet—

"The teeth o' Time may gnaw Tantallon,
But thou's for ever."

The *Revue Générale* contains an article by M. Pierre Verhaegen, "De la Restauration des Monuments Anciens," a subject not often

treated in foreign reviews. The author takes what may be called the moderate common-sense view of the subject, distinguishing between buildings which are ruined and those which, while ancient and in need of repairs, are still buildings in use, such as churches and old mansions and town-halls, which he calls "monuments vivants," and which he considers should be repaired, restored, or added to as is demanded for their use to-day, without too great a regard for the past. In regard to buildings of which a portion only is left, in a ruined state, he propounds a rather doubtful thesis, viz., that after the archaeologist has arrived, by a close study, at the real meaning of these remains and the indications of what were formerly the portions now entirely perished, it is allowable to restore these latter, as documents of explanation for the general public. The answer, of course, would be that they are not documents, but only suppositions, and liable to error. Make drawings of the obliterated portions, if you like, to show what the building may have been when entire; but do not put anything on the site itself. As to the claims of a building, originally in one style, to be disencumbered of later and incongruous additions, the author quotes the following from a French or Belgian writer, M. Cloquet:—

"Un édifice remis à neuf, dans l'unité de son style primitif, semble créé d'hier; il a perdu sa saveur, son caractère instructif et touchant en même temps que l'authenticité de ses lignes. C'est là un point de vue respectable, mais non le seul à envisager. Cette considération a, il est vrai, une importance majeure. Si l'unité de style est une règle capitale dans un monument neuf, la conservation des apports des styles successifs peut, dans un monument ancien, être plus intéressante que l'unité d'aspect. Pourtant, l'esthétique du monument a aussi ses droits légitimes, et peut avoir une importance de premier ordre pour les édifices bâtis d'un seul jet dans un style très pur. La pensée n'est jamais venue qu'on pût se tolérer, et maintenir des adjonctions ultérieures troublant l'harmonieuse pureté d'un temple grec de la belle époque de Périclès; et un autel de la Renaissance, fût-il ancien, serait, au même titre, insupportable dans la Sainte-Chapelle de Paris."

There is a great deal of truth in this, and we quote it, because it represents a point of view almost entirely overlooked and even contemned among English writers on the subject.

In the *Gentleman's Magazine* an article on "London in Verse," by Benvenuto Solomon, collects together a good many quotations in which London has at different times been described by poets or versifiers. There are some which are not well known; on the other hand the author has missed a very fine passage from Joanna Baillie, which deserves citation in any such collection. The writer seems, from one passage, to be quite unaware that the church in Covent Garden is a building of any particular note, and in another place apologises for quoting Herrick, apparently regarding him as an obscure poet, but assuring us that there are many pretty things in his works; so we may take it that she (for we presume "Benvenuto" is a lady's name) is not quite in touch with current thought on art and literature.

COMPETITION FOR POLICE-COURTS AND FIRE-STATION, SUNDERLAND.

MR. J. S. GIBSON, A.R.I.B.A., the assessor in this competition, having made his report, the drawings were exhibited to the public on Saturday and Monday last in the reception-room of the Municipal Buildings, Sunderland.

The site of the proposed buildings is an L-shaped one, which presented some difficulties in planning by reason of its peculiar disposition. The site was also obstructed by some property which has not yet been acquired by the Corporation. Competing architects were required to submit alternative plans, showing in one case their plan on an unobstructed site, and, in the other case, showing their buildings so disposed as to avoid the obstructing buildings. Most of the competitors have done this, but others have taken for granted that the obstructing buildings will be eventually acquired by the Council, and have not unnaturally abstained from planning alternatives which would never be carried out.

The north leg of the L, which the instructions indicate is to be reserved for the police and sessions court buildings, and which faces a fairly wide street called Gill Bridge-avenue, is bounded on its northern and longer side by a large field, which is used by the local

volunteers as a drill ground, and which is not at all likely to be built upon or indeed used for any other purpose than the present one. Competitors were told that there was right of light over this field.

This opportunity of making an elevation to the open garrison field has been seized by very few of the competitors, while only one or two have endeavoured to give a complete architectural treatment of the two sides and the obtuse angle formed by them as seen in combination. Most of those who have thus treated their design have united the two elevations by a circular corner feature, tower or dome.

In considering the plans one cannot help noticing one or two mistakes which have been made by most of the competitors, thus spoiling in some cases otherwise good plans. The arrangement of the cells in connection with the charge and parade room in most cases leaves much to be desired. The Prisons' Board Regulations require that the cell-corridors shall be directly commanded by the charge-room, but only one or two drawings show even a portion of the cells so commanded. The return of the fire-engines is a point which has not been satisfactorily solved by the majority of the competitors, nearly all of whom have planned their engine-sheds so that returning engines cannot be taken directly into their places, but must pass behind the other engines standing in their places; while the sheds are shown so narrow that such passing would be either inconvenient or impossible.

The first premiated design is "Order," by Messrs. W. & T. R. Milburn, Sunderland, and Messrs. Wills & Anderson, London, which gives plans of police-courts and fire-station, with alternative plan of fire-station showing the obstructing buildings avoided. An elevation is shown fronting to Gill Bridge-avenue, while the permanently exposed flank to Garrison Field is left with a plain elevation. Sunderland is not noted for the beauty of its public buildings, and the elevation shown in this design, which will, in all probability, be carried out, will not tend to raise the standard. The treatment is of a rather stiff Renaissance character, but without any prevailing idea. The plan reveals several defects. The entrances to the sessions and police-courts, the public entrances to the galleries of the courts, the magistrates' entrance, and the entrance to the police station, are all placed close together at the north end of the site, in such a manner that on a busy day there will be an awkward crowding at this point, and magistrates, witnesses, solicitors, &c., will have to fight their way through an assemblage of the usual police-court loungers. In this plan the cells are arranged in two groups, separated by an airing yard. One of these—the female group—is placed close to the charge-room, and its corridor is directly overlooked therefrom, but the other—the male group—is placed some distance from the charge-room, and totally cut off from any supervision therefrom, while the end of its corridor is lighted by a window directly overlooking a public back street.

The charge-room is cut in two by a long counter or desk, but has no connexion with the clerk's office, with which it ought to communicate by a window for the booking of charges. This clerk's office is, instead, placed almost at the further end of the building, and adjoins an enquiry office, which instead of being near the entrances, as one would expect, is at the end of a corridor some 80 ft. or 90 ft. away, in a position which will make it not easy to find by one unacquainted with the building.

The Police and Sessions courts, with their accessory office, take up the whole of the first floor. Here, again, the planning leaves much to be desired in the way of convenience. Take the position of the grand jury room, for instance, which should be in close connexion with the Sessions court. It is not only on a different floor, but is at the further end of the building, and has the Police court between it and the Sessions court. Thus, to get from the grand jury room to the Sessions court one has to pass along a corridor on the second floor, on which it is situated, descend a flight of stairs, and then proceed along some 80 ft. or 90 ft. of first-floor corridor, passing the rear of the Police court and the area dividing the Police and Sessions courts. Adjoining the Sessions court is a room marked "Jury Retiring-Room," which is presumably for the use of the common jury, but is without means of

entrance or exit except through the Sessions court or the Indictment office.

Although less exception can be taken to the plan of the fire brigade station, it is open to the objection of inconvenience in arrangements for returning fire-engines, common to most of the plans. This difficulty with returning engines is, no doubt, the outcome of the peculiar shape and position of the site and its approaches. Another objection may be raised to this plan, as well as to most of the others, in the placing of the superintendent's house, so that it does not in any way command the rest of the buildings.

To "Lex," Messrs. Stones & Stones, Blackburn, and Mr. W. Edward Sprout, Glasgow, has been awarded the second premium. An elevation is shown to the garrison field, as well as to Gill Bridge-avenue, and the angle formed by the two is well and effectively treated. This is shown in a beautifully executed perspective.

With regard to plan, although the plans are so crowded on the sheets that they are somewhat difficult to follow, the general arrangement of the various suites of rooms seems very convenient, and would no doubt work well. Perhaps the greatest objection can be taken to the arrangement of the cells, which are in four groups on the ground, mezzanine, first and third floors, and thus cannot all be overlooked from the charge room, but are so commanded on the ground floor only. Here, too, the clerk's office is too far away from the charge room, while the magistrate's entrance is placed too close to the public entrance to the courts.

In the fire station plan the objections to return arrangements for fire-engines, and the position of superintendent's house, apply as in the winning plans.

"K. C." (Mr. Alfred Corbett, Manchester), shows a heavy prison-like treatment of the exterior, with very plain elevation to Garrison Field, and no attempt to mask or treat architecturally the obtuse angle at the north-east corner. In this plan the charge and parade rooms are entirely separate apartments, the former being somewhat too small for the purpose. The clerk's office is placed on the opposite side of the corridor, and thus, though nearer to the charge-room than in the two previously mentioned plans, is not quite near enough for practical requirements. The female cells are placed on the mezzanine floor, and the male cells on the ground above, and lighted from an airing yard 6 ft. wide. In neither case is the corridor overlooked from the charge-room as it ought to be. The Indictment and jury rooms are better placed than in the winning plan, while the sections show a very effective treatment of the interior of the courts. A very neat elevation is shown to the fire-station buildings, but is marred by the treatment of the large flat-topped hose tower. Here, again, the return of the fire-engines is inconvenient, but the superintendent's house is better placed for commanding yard and buildings than in the two previous designs.

Three very good designs are submitted by "Justice"—Messrs. Joseph & Smith, Blackburn, Mr. E. A. Lloyd, Revidge, and Messrs. J. & H. Aspinall; "Firebrand," Mr. F. E. Coates, Sunderland; and "Doric," Mr. Frank Caws, Sunderland, any of which would have looked and worked well if carried out.

"Justice" shows a very effective elevation, with central entrances and low domes at either end of the principal elevation. The cells are well under command of the charge-room and the courts and their accessories are conveniently arranged. The drawings are well got up, with, perhaps, the exception of the perspective.

"Firebrand" shows a very effective elevation with a well-designed tower, and the plans are well worked out and conveniently arranged.

"Doric" gives a very good plan in the form of a great semicircle, which is both convenient internally and effective externally. The latter effect is shown in a well-drawn perspective. The elevations are good though quiet, perhaps too much so to show well on paper. The plans show the cell corridors and exercise ground thoroughly overlooked by charge-room, while the clerk's room adjoins the latter and communicates with it by a window through which the charge may be booked. The plan of the fire station shows a very convenient return way for engines, by which each one can be returned to its place without interfering with the rest. The dormitory and recreation rooms also have numerous communicating poles to engine sheds, as have also the married firemen's dwellings, and the

superintendent's house has complete control of the station works, yard, and entrance.

"Spero," Mr. G. Spencer Hoffman, London, shows a well-drawn set of plans and elevations, but is defective in the lighting of the police-court, having only one large three-light window at one end to light the whole court, some 60 ft. long. The elevations are well designed, and there are two well-drawn perspectives.

Another very good design is "Ad Rem," Messrs. Jas. Henderson and John Hall, Sunderland. The front elevation to Gill Bridge-avenue, the north-east angle, and the flank to Garrison Field are well treated and adapted to the site, the angle feature being a projecting entrance hall surmounted by a low dome flanked by two smaller domes, the proportions of which might perhaps be improved in working out.

Messrs. Mitchell & Raine, London, submit a good design, with a stencilled lion as motto, which is somewhat wanting in convenience of plan, but shows very effective elevations and interior treatment for the courts. It is accompanied by two well-drawn and effective perspectives. In this, as in one or two other plans, the police dwellings are shown fronting to a narrow back street, which is widened by giving up a strip of the site to this street. In view of the somewhat slum character of this street, this does not recommend itself so well as the method most of the competitors have adopted of making the dwellings face to the drill-yard.

Messrs. G. T. Brown and Jos. Spain, Sunderland, sent in a neatly got up set of drawings with a red cross as a motto. The elevations look very pretty on paper, but seem wanting in dignity. In the plan of the fire station the married firemen's dwellings are placed the full length of the drill yard away from the engine shed, which would be inconvenient in working. In the police-court buildings only a portion of the cells are overlooked by the charge-room, while the conveniences are placed in the corridors as in the plans signed "Lex."

"Black Friar," Mr. T. Sington, Manchester, shows an elevation in the style of a mediæval castle, with numerous small octagonal turrets, totally at variance with modern ideas, and indifferently drawn.

"Light," Mr. Arthur Stockwell, Newcastle, sends a very good plan. All the cells in the police buildings are well overlooked from the charge-room, but have the disadvantage of being lighted through outside walls.

"Vival Rex," Mr. Wm. L. Edwards, Birmingham, and "Bee," Mr. Ernest Hazell, London, exhibit very good treatment of elevations, neatly and well drawn.

ISOLATION HOSPITALS.*

IN the choice of a site the same principles apply as in the case of any building where people wish to live the healthiest possible lives, and in many towns it is really difficult to find such a site. If the ideal ground is not available, the arrangement and construction of the buildings upon it must be such as to make the most of, and, if possible, improve the natural advantages already existing. In this country the conditions to be aimed at are a warm, dry soil, with good water supply and outfall for drainage, a proper means of sewage disposal, as much open space around it and as much sun and air and quiet as possible. The best combination of accessibility and isolation are particular requirements. But, in any case, the site must be large enough to contain all the buildings required at proper specified distances one from another and from the boundaries, and to admit of future extension whenever it may be required, or for temporary wards should they be needed in a sudden emergency of epidemic.

We may divide isolation hospitals into three classes:—(1) Large urban hospitals; (2) hospitals of a smaller class serving a smaller town or country district; (3) small isolation wards connected with a large institution, e.g., asylums, workhouses, &c. The first and last of these will almost certainly be in the vicinity of other buildings, the second may and should stand perfectly free in the open country.

However small or simple an isolation hospital may be, it contains in its principle of

* Part of a paper to be read this week by Mr. Percy Worthington, M.A., A.R.C.S., before the Sanitary Science and Preventive Medicine Section of the Sanitary Institute Congress, Manchester.

angement and of construction the germs of ger and more complicated buildings, and in materials and details, so far as they go, there could be no difference whatever. Let us, therefore, to begin with, take a simple form of hospital and examine the points to be observed in its plan and construction. In districts where only a small number of beds is required, it is not necessary to make any considerable provision for subdivision of diseases. Small isolation rooms in connexion with the larger men's and women's wards will probably be sufficient. But if more than, say, twenty beds for men and ten women are needed, the consideration of subdivision will come in; in such buildings will then be required for the treatment of diseases. Let us take a hospital of fourteen beds—seven men and seven women.

The administration will be in the centre, dividing the men's and women's sides, and connected to each by an isolated corridor, and containing accommodation for matron and nurses, a doctor's room, reception-room (which will probably also serve for discharging patients), a bathroom, stores, and offices, with men and its offices at the back. Behind, in detached building, will be the mortuary, ambulance-house, and disinfectant, with boiler-house, coal stores, &c. For dealing with infected linen and clothes a galvanised iron on wheels will be found most useful, which could stand just outside an opening convenient for receiving the infected things and then an arrangement for turning boiling water and disinfectants into it. Everything can then be removed at once to the disinfectant. The wards on each side are approached from the administration by a corridor, which should have a disconnecting lobby or covered way open to the air between the administration and the other buildings. From these, either side of the hospital may be approached directly without passage through the administration buildings, and each side will contain a ward of six beds with a kitchen adjoining and dividing it from a single ward, and perhaps two for isolating cases from the larger ward. The kitchen should have a small range for keeping food warm, boiling milk, &c., a sink with hot and cold water, and a ventilated cupboard for keeping food and milk, and it must also have means of supervision of the larger and smaller ward through windows opening into each. There will be a store for ward linen, &c. Convalescent rooms are, perhaps, a luxury in a small hospital. As much opportunity as possible should be given for throwing corridors completely open to the air.

Separate sanitary arrangements cannot be provided, and are not needed for the small wards, but those for the larger wards should be detached blocks and separated from them by cross ventilated lobbies with a door at each end, so as to form complete cut-off passages. The bathing and washing arrangements should be in a separate block from the water-closets and nurses' sinks, and both should be slightly warmed to a lower temperature than that of the wards by pipes in connexion with the hot water service. A similar means may be adopted for keeping linen stores properly aired. One water-closet to ten patients is sufficient, and adjoining should be the sink-room for slops, washing ward utensils, &c., and out of this should open a private nurse's water-closet. The sanitary blocks should be lined with glazed bricks or tiles; if the former, narrow division bricks, known as Shepherd bricks, make strong and thin partition walls. The divisions need not go up to the ceiling, and thus cross ventilation may be obtained by windows on opposite sides. In the smallest hospitals fixed baths are not always required, a movable one being alone provided. But this is not a very desirable arrangement. The best baths for hospital use are probably vitreous enamel baths, which are now made by many firms, and which, while having a lasting surface similar to that of a stoneware bath, are much less costly, and, being made of metal, get heated at once instead of remaining cold like stoneware.

As to the space to be given to each bed, the following are the figures generally accepted:—Cubic space of air per bed, 2,000 cubic feet. Floor space per bed, 144 square feet. Wall space per bed, 12 ft. lineal between centres. The figures give a ward 24 ft. wide, a little under 14 ft. high, and of a length according to the number of beds, each additional bed adding 12 ft. to the room. In a single bedded ward

the height of 14 ft. gives a room 12 ft. square, or 14 ft. by 10 ft. These rooms may, with advantage, be made rather larger, and a height of 12 ft. 6 in., or 13 ft. is quite enough. In a hospital of this type the wards should be not at right angles with the remainder of the building, so that one side wall against which the beds are placed is partly an interval wall, but so that the interval wall is the end of the ward, and so that a window may be placed between each of the beds.

Small isolation wards will be required in most large general infirmaries for a few beds for men and women, especially in districts where mining and other accidents of a similar nature are frequent. They afford the means of isolating infectious disease should it occur, pending its removal to an infectious hospital, but will be chiefly useful for the treatment of septic cases.

The moderate sized hospital for larger rural districts will consist (1) of an administration block which must either be built large enough in the first instance to suit further extension, or so planned that a definite idea of the necessary additions is laid down in the original plans, a proviso which applies also to the arrangement of the ward blocks and to the laying out of the site generally. The administration block contains the accommodation in the hospital previously described upon a suitable scale, with a dispensary and rooms for a caretaker and his wife, who will look after the hospital if it is empty, and be qualified to help in it when it is occupied, or a separate cottage may be erected. In addition to the receiving-room, a detached discharging-room should be provided with bathing facilities and clothes storage, &c. The administration block will be near the entrance, but so placed with regard to the wards as to render service as convenient as possible, for food will have to be prepared here and distributed to the wards, with which there may be connexion by covered ways open at the sides.

In the country it should never be necessary to build the wards of more than one story, but, as before mentioned, the site should be adapted to considerably more ward accommodation than is built at first. The men's and women's sides must be completely separate, and pavilions erected for the treatment of separate diseases, so that no two may be located in the same room. A small single ward in a pavilion may be safely used in case of an isolated case, even in the same block with other diseases, if due precautions are taken. But it is not desirable. In this climate it is only in very exceptional summers that we get too much of the sun, and the wards must therefore be planned so as to catch the most useful sunlight all the year round, and the axes of the wards should therefore be north-east and south-west. The planning of the wards will be upon the same principle as those previously described, the number of beds in each being determined by the needs of the locality and the convenience of nursing.

It is recommended sometimes that all wards should be built upon arches, so that there is a clear air space underneath open to the air, as there is above and around. The idea is plausible, and from a constructional point of view permissible where a hospital ward is of necessity raised a man's height above the level of the ground, and the space below cannot be usefully occupied. On very sloping ground, where the wards must be connected by corridors, this sometimes happens in order to avoid unduly steep gradients in the corridors, but never in an infectious hospital where the buildings are completely detached and will be adapted with terraces each to its own position. Unless the arched space is high enough to walk about in, it only becomes a receptacle for all kinds of refuse and rubbish, and, even then, unless properly attended to.

There still remain those large urban hospitals to which different conditions apply, and where the details of administration become considerably more complicated. Here we shall require more wards and further subdivision, and besides them the following buildings:—(1) a receiving block, (2) discharging block, (3) porter's lodge, (4) quarters for the resident medical staff, (5) quarters for matron, nurses, and seers are central and convenient for the service of the whole establishment; (7) dispensary; (8) block containing boiler house, disinfectant and destructor, mortuary, and post-mortem rooms, ambulance sheds and stables, and conveniently situated with regard to the

boilers, washhouses, and laundries for the patients and the staff. It is probable that the wards may have to be of more than one story. Their axes should be north-east and south-west, and no two wards, either on the same or different levels, should have communication by closed passage, stair, or lift with one another. The pavilions may be connected by open covered ways, but everyone must have its access direct from the open air.

In a large hospital which is continually occupied, it is necessary to allow the wards in turn to lie empty or fallow for a time, and therefore this must be taken into consideration in the number of wards required. The rooms attached to each ward, which should not contain more than twenty to twenty-four beds, will be more in number than in the previous types examined. In addition to a ward kitchen there will be a room for the sister in charge, and probably two separation wards, one adjoining and inspected from the ward kitchen, the other from the sister's room. The supply of these rooms should be liberal, as they may be used not only for cases which require separation from the general ward, but also for private paying patients, whose number will probably increase rather than diminish in the future, though they should not be allowed to encroach upon the primary object of such a hospital, i.e., the isolation and nursing of the sick poor. Still the objection does not apply in the case of an infectious hospital to the same extent as in a general infirmary, since isolation is a protection to the public. The sanitary blocks will be of the same character as those before described, but in proportion to the number of beds, and containing a small room for the retention and examination of excreta, with a sink in a ventilated cupboard. Circular wards are not unsuitable for infectious purposes.

The materials used should, of course, be as absorbent as possible, and their surfaces hard, smooth and easily cleaned, with no holes or corners for lodgement of dirt, dust, or germs. Probably nothing is better for walls and ceilings than Portland cement or adamant, or for the floors than terrazzo; all floors should be of solid concrete. Terrazzo is apt to crack if laid in the ordinary manner, but this may be largely prevented, and it is probably better for the purpose under consideration than any wood-block floor. There is, however, a wide difference of opinion about this; but, if a wooden surface is adopted, the blocks (oak or maple for choice) should be thoroughly well seasoned, and great care should be taken as to the atmospheric conditions under which they are laid. All external and internal angles to walls, floors and ceilings, should of course be rounded, and raised borders should run along the lateral walls of the wards to keep the beds off the walls, and in one-story wards and on the first floor of two-story blocks, the ceiling may with advantage be curved if the proper ventilation is secured at the highest point.

The windows should, up to about two-thirds of their height, have double hung sashes, the lower half with a deep bottom rail to allow of the admission of air at the meeting rails without draught at the bottom, or so as to fall inwards as a hopper, the sides of which are closed in by projecting casings filling up the angles flush with the wall face on their inner side. Above the sashes is a transom dividing them from three hoppers, one above the other, which open and close with gearing worked by a key in possession of the nurses. The doors should be upon the same principle, the place of the sashes being taken by the doors, and the ventilating hoppers in both should be carried as near the ceiling as possible.

The doors of all rooms should be glazed in the upper part for light and easy inspection. Wooden floors should be wax-polished, and other woodwork varnished, and cement walls painted and varnished. Fireplaces in the smaller rooms are probably best made of salt-glazed or faience ware, very simple and without mouldings, and the ward fireplaces should be considered as a part of the scheme for their warming and ventilation.

The ventilation of one-story wards in an open position is, of course, simpler than that of wards of more than one story in a town atmosphere, and probably doors, windows, and effective types of roof ventilators, and of central stoves, will serve the purpose best. Ventilation must, of course, always be carefully considered in connexion with any artificial heating introduced apart from the stoves. If a certainty is to be made of effective

ventilation without draught in all sorts of weather, there is no doubt that mechanical means must be adopted, and that warmed air must be admitted and the vitiated air extracted by fans through flues in the walls. The atmosphere of manufacturing towns is not what we should wish to admit to a hospital, and attempts are often made to cleanse and warm or cool the incoming air in basement chambers, and thence pass it through ducts into the rooms. In hospitals this seems to me a bad thing. Its costliness is no objection if it is the best method, and if the money is available; but it entails grave defects, to my mind, as applied upon a large scale. The air admitted to the wards is not of the pleasantest or healthiest nature, and the excessive length of ducts for inlet and outlet, inaccessible, and sure to collect dust and germs after considerable use, become sources of danger. It is quite possible to arrange the extraction of foul air at the ceiling level, and at one point, so that the shaft is of comparatively short length, straight and large enough for a man to get into for cleaning purposes. But it is impossible to heat a large ward satisfactorily upon this principle with only one inlet, and it is the multiplication of the flues that is, to my mind, undesirable. On the other hand, the system is quite applicable on a small scale, e.g., for the warming and ventilating of an operating-room, provided that the greatest care is taken to secure the means of cleaning and disinfection.

In country districts water and sewage will be difficulties. The former will, of course, be one of the first considerations in the choice of a site, and without it no hospital can be erected.

COMPETITIONS.

MUNICIPAL BUILDINGS FOR CREWE.—The Crewe Town Council, in response to invitations for competitive designs for the new municipal buildings, received forty-five sets of plans. Messrs. Woodhouse & Willoughby, of Manchester, were the appointed assessors. The first premium has been awarded to Mr. Henry T. Hare, London, and the second has been divided between the following:—Mr. Albert Dixon, of Leeds; Messrs. Banister Fletcher & Sons, of London; and Messrs. Rodney & Denning, of Bristol. The estimated cost of the new buildings is 14,000l.

POLICE BUILDINGS, SUNDERLAND.—A meeting of the Sunderland Watch Committee was held on the 4th inst. for the purpose of meeting the assessor in regard to the plans for the new police buildings and fire-station, which are to be built near the baths in Gill Bridge-avenue, at a total cost of 30,000l. The Corporation offered premiums of 100l., 50l., and 25l., for the three best plans, and twenty-five plans were sent in. Some of them were for buildings of a more expensive character than the Council proposed to build. The award was as follows:—1st, "Order," Messrs. W. and T. R. Milburn, Sunderland, and Messrs. Wills & Anderson, London, joint architects; 2nd, "Lex," Messrs. Stones & Stones, Blackburn; and W. Edward E. Corbett, Manchester.

DRAINAGE, EATON BRAY, BEDS.—The open competition amongst sanitary engineers for the drainage of Eaton Bray, Bedfordshire, has resulted in the plans prepared by Mr. J. R. Elliott, A.M.Inst.C.E., of Nottingham, being selected, and he has accordingly been appointed engineer to carry out the work. There were fifteen schemes submitted.

TOWN HALL, DURBAN, SOUTH AFRICA.—At a recent meeting of the Durban Town Council, a report was read from the Borough Engineer on the requirements of the new Town Hall, which is estimated to cost from 200,000l. to 250,000l. The building is to be erected in the Town Gardens, and will occupy, with the museum, library, and art gallery, a space 250 ft. by 170 ft. The building is to consist of three floors and a sub-basement, and will comprise a large hall to accommodate 3,000 people, also a supper-room and lecture hall, occupying 21,600 square feet, the library, museum, and gallery to take 44,000 square feet, and the municipal offices, &c., 27,900 square feet. Competitive plans are to be called for. It is suggested that a competent assessor should be appointed to select six designs from the first competition, and that the authors of the six so chosen should send in fuller plans and specifications for the final award. The premiums offered are to be 500l. for the first, 300l. for the second, and 200l. for the third.

Illustrations.

ST. JOHN'S CHURCH, SIDCUP.

THE original church, consisting of a broad nave, and crypt, was built in 1844, and was known by the name of the East Chislehurst Church. The first alterations were made in 1875, when the cloisters which surrounded three sides of the church and the galleries at the west end were removed, and the ground floor space resealed. In 1882, Mr. R. J. Withers, architect, was consulted with reference to further additions, and plans were submitted for the entire rebuilding of the church, but only a portion of the scheme was carried out, namely, the chancel, with a small chapel on the south, and vestries on the north side, and one bay of the west end. No further additions were undertaken till the latter part of 1898, when Mr. George H. Fellowes Prynnne, of Queen Anne's-gate, Westminster, S.W., was consulted. It was decided to abandon the late chancel, which it was determined to keep, Mr. Fellowes Prynnne was instructed to prepare designs for a new church, with tower, embodying the existing chancel and vestries. The plan of the new church consists of a broad nave, 30 ft. wide by over 105 ft. in length, giving accommodation for 500 adults, north and south transepts and aisles, and south chapel, with accommodation for 311. This, together with the choir, and possible extra seats in the church, shows a total accommodation of over 900.

The tower is placed at the west end of the south aisle, and its ground floor space is designed to form a baptistry.

The main entrances are placed at the west end of the nave and north aisle, while north and south entrances are placed midway between the transepts and aisles. Very considerable alterations and enlargements have had to be made to the old vestries, giving far better accommodation generally.

Externally the architect felt bound, to some extent, to carry out the somewhat simple architectural style and treatment of the existing chancel, but internally red brick and stone are used freely. The tower, with its copper-covered roof, will rise to the height of about 140 ft.

The architect's main difficulty was to work in the old chancel to prevent its appearing small and commonplace, in comparison with the larger and somewhat more ornate new nave. This he has endeavoured to do by putting in an entirely new chancel arch, and raising it to the highest limit, and increasing its breadth as much as possible, and then playing the ends of the nave wall to meet the jambs of the chancel arch. The spays are enriched by niches, brackets, and canopies, which are designed to be placed with figures of the twelve Apostles and Archangels.

The nave is divided into six bays, the columns and arches rising to the height of 20 ft., the wall plates 32 ft., and the apex of the barrel-vaulted roof 45 ft. from the nave floor level. The roof is stained green, the ribs and cornice being picked out in a cream-coloured rope pattern. This gives a very rich and light decorative effect. The transepts and aisle roofs are treated in a similar manner. The chancel screen, which forms an important decorative feature in the church, is carried out in Corsham Down stone, with green stone shafts, the lower panels being filled with gold mosaic, and much of the stonework richly carved. Sculptured figures representing the four Archangels stand in niches over the main piers. The gates and grille are of rich wrought ironwork, and the centre portion of the screen is surmounted by a wrought-iron grille and cross rising almost to the apex of the chancel arch. This wrought ironwork has been carried out by Messrs. Percy Bacon & Bros., of Newman-street, W.

The work has been carried out by Messrs. Goddard & Sons, of Dorking; and the carving is the work of Messrs. H. H. Martyn & Co., of Cheltenham. The heating, which is by the hot water low-pressure system, has been carried out by Messrs. J. Jones & Sons, of Farringdon-street, E.C. The total cost of the church was about 11,500l.

PORT SUNLIGHT CHURCH.

THE church at Port Sunlight, which is now in course of erection, is situated in the centre of Port Sunlight village, on the banks of a

small ravine, in which formerly ran a tributary of the river Mersey, called Bromborough Pool. The church is to be built of red sandstone, from the Helsby quarries; the inside wall and piers are also of the same material. The roofs will be covered with green Westmoreland slates. The accommodation is for about 800, with room for augmenting this number on festival occasions. The nave will be 104 ft. long by 30 ft. between the arcading with small side aisles. In addition, there will be two large transepts, an organ chamber, choir vestry, clergy vestry. The choir and chancel will be 48 ft. by 26 ft., accommodating a choir of forty. The roofs are open timbered of pitch-pine, left untouched. The building is being carried out by the Building Department of the Company, under the superintendence of the architects, Messrs. William and Segar Owen, of Warrington.

HOUSE AT WOLVES NEWTON, MONMOUTHSHIRE.

THIS house is now in course of erection on a site overlooking the valley towards Abergavenny and the Sugar Loaf mountain, a distance of about twenty miles.

The entire walls are of stone and are externally covered with white rough-cast. All the external woodwork, main staircase, and interior of billiard-room (which has an open timber roof), is to be of oak. The bays to dining-room and staircase are in Bath stone. All the window frames are of massive oak construction, fitted with wrought-iron casements and fittings. The roofs are to be covered with red Bridgewater tiles.

A special feature will be made of the entrance hall, the staircase being carved to a special design, and the walls panelled to within 2 ft. of the ceiling. This ceiling will be panelled out in oak, with wrought-iron electric pendants. The first floor contains ten bedrooms, two bathrooms, and offices.

As the ground falls rapidly to the valley, it is proposed to treat the garden by a series of terraces and Dutch gardens.

The contractors are Messrs. E. Turner & Sons, of Cardiff, who are also the contractors for the other buildings and cottages in connexion with this work. The perspective was drawn by Mr. Sydney Castle.

Mr. A. Jessop Hardwick, of Kingston-on-Thames, is the architect.

SANITARY INSTITUTE CONGRESS.

THE nineteenth Congress of the Sanitary Institute was opened at Manchester on Tuesday last with a reception of the members, who in all exceed 2,000, including over 1,000 delegates of municipal, sanitary, and other public bodies, by the Lord Mayor of Manchester (Mr. Alderman Hoy). The reception took place in the Town Hall, among the leading members present being Sir Frank Forbes Adam, Sir Wm. Bailey, Professor G. V. Poore, Dr. Wynter Blyth (Chairman of the Council of the Sanitary Institute), Dr. C. Childs, Dr. Armstrong (Newcastle-on-Tyne), Mr. White Wallis (Secretary of the Institute), Alderman Rudman (Mayor of Salford), Dr. MacIure (Dean of Manchester), and others.

The reception was followed by a luncheon at the Grand Hotel, and by the opening of the Health Exhibition organised at St. James's Hall, the Lord Mayor of Manchester presiding at both functions.

Before formally declaring the Exhibition open, the Lord Mayor appealed to his fellow-townsmen to take a deeper interest in municipal affairs. Every civil community was benefited by the existence of a sound and discriminating public opinion, and nothing stimulated public opinion more than taking an interest in municipal affairs. Municipal institutions were the outcome of the general feeling of the community, and if Manchester or any other town lagged behind in good work, it was the fault of the ratepayers.

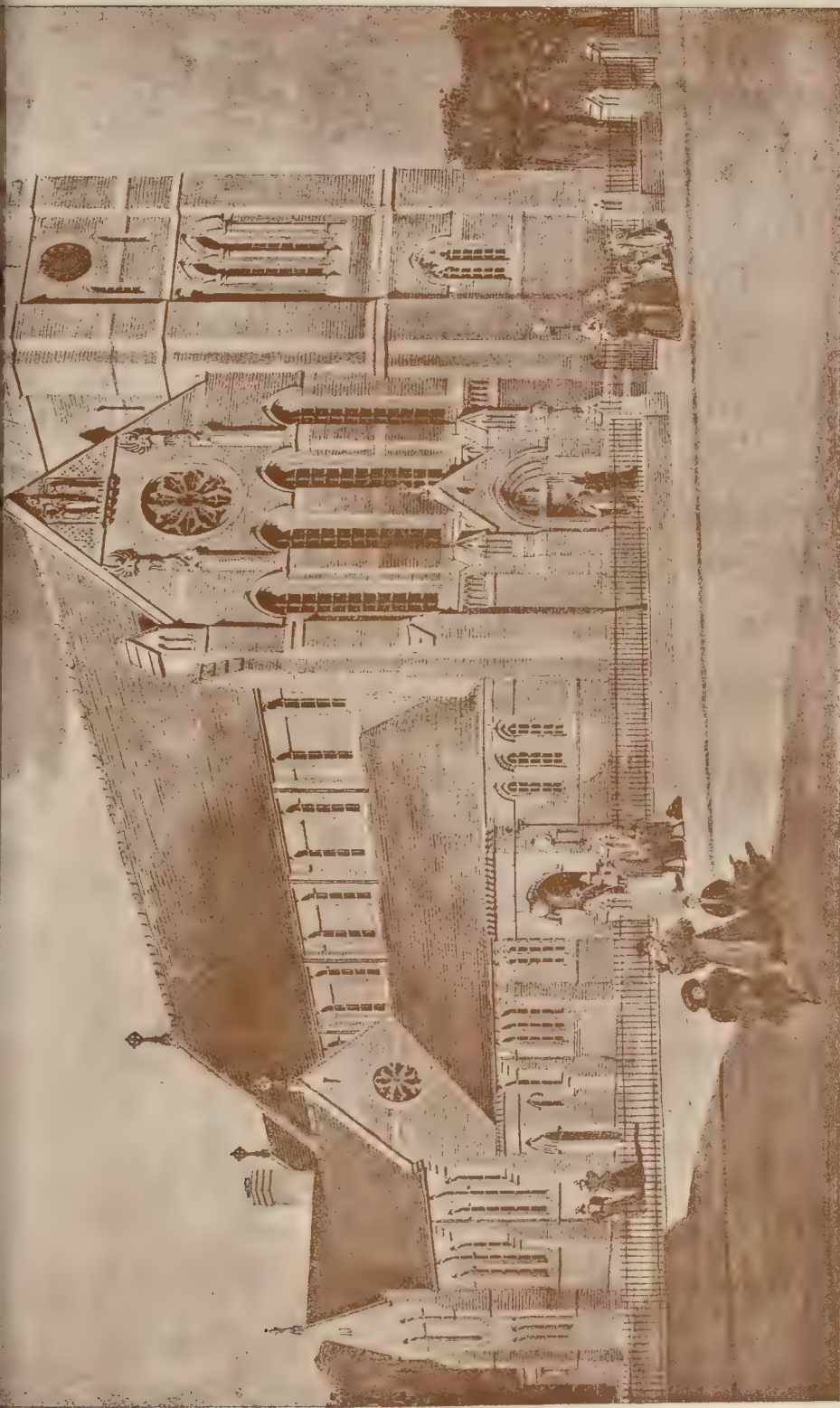
Presidential Address.

In the evening Earl Egerton of Tatton, the President of the Congress, delivered the inaugural address in the Whitworth Hall, Owen's College, before a very large gathering of members of the Congress. After welcoming the members of the Sanitary Congress to Manchester, Lord Egerton said that as a simple landowner responsible for dealing with the dwellings of the poor and the buildings and farms on a private estate he

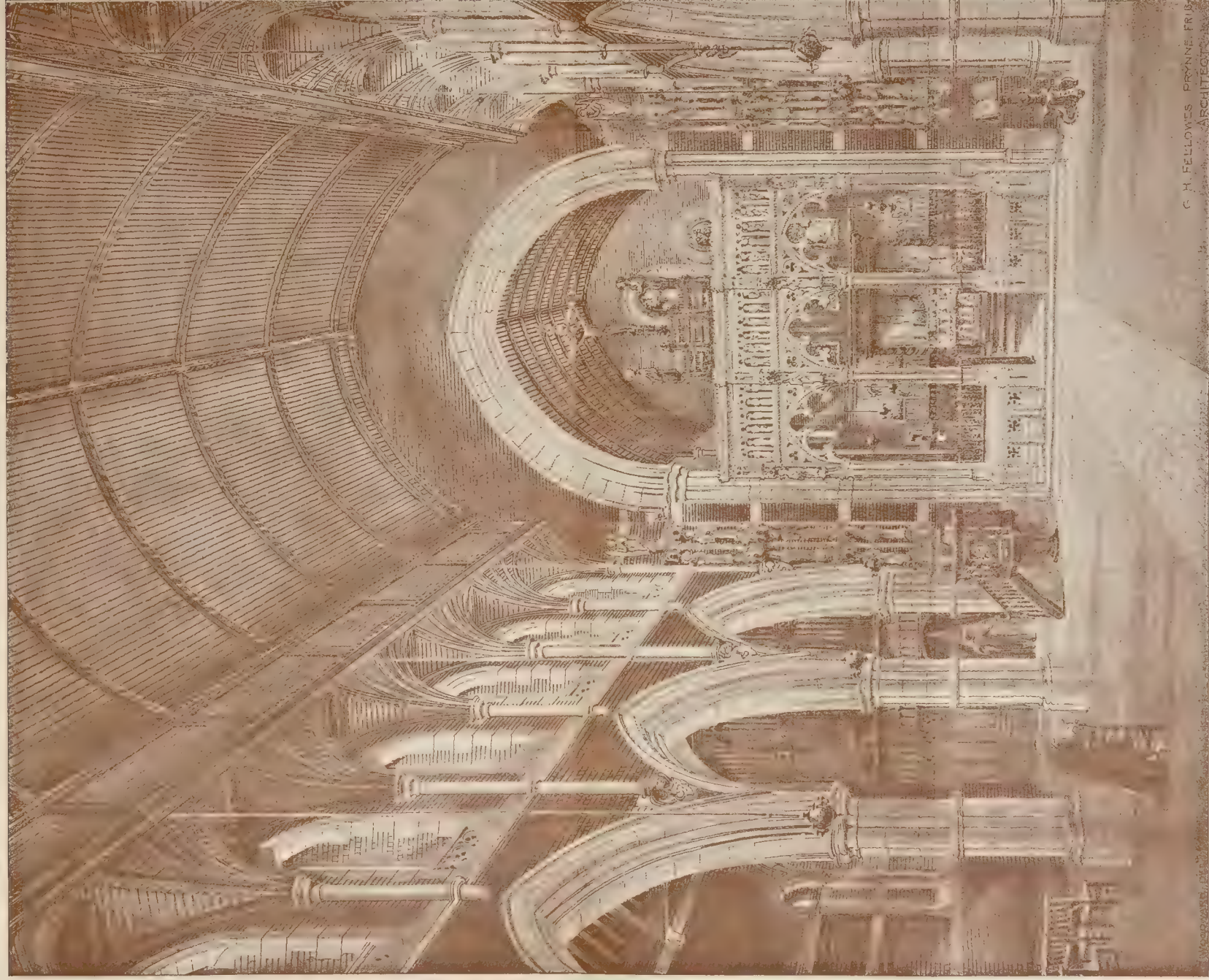


THE BUILDER, SEPTEMBER 13 1902



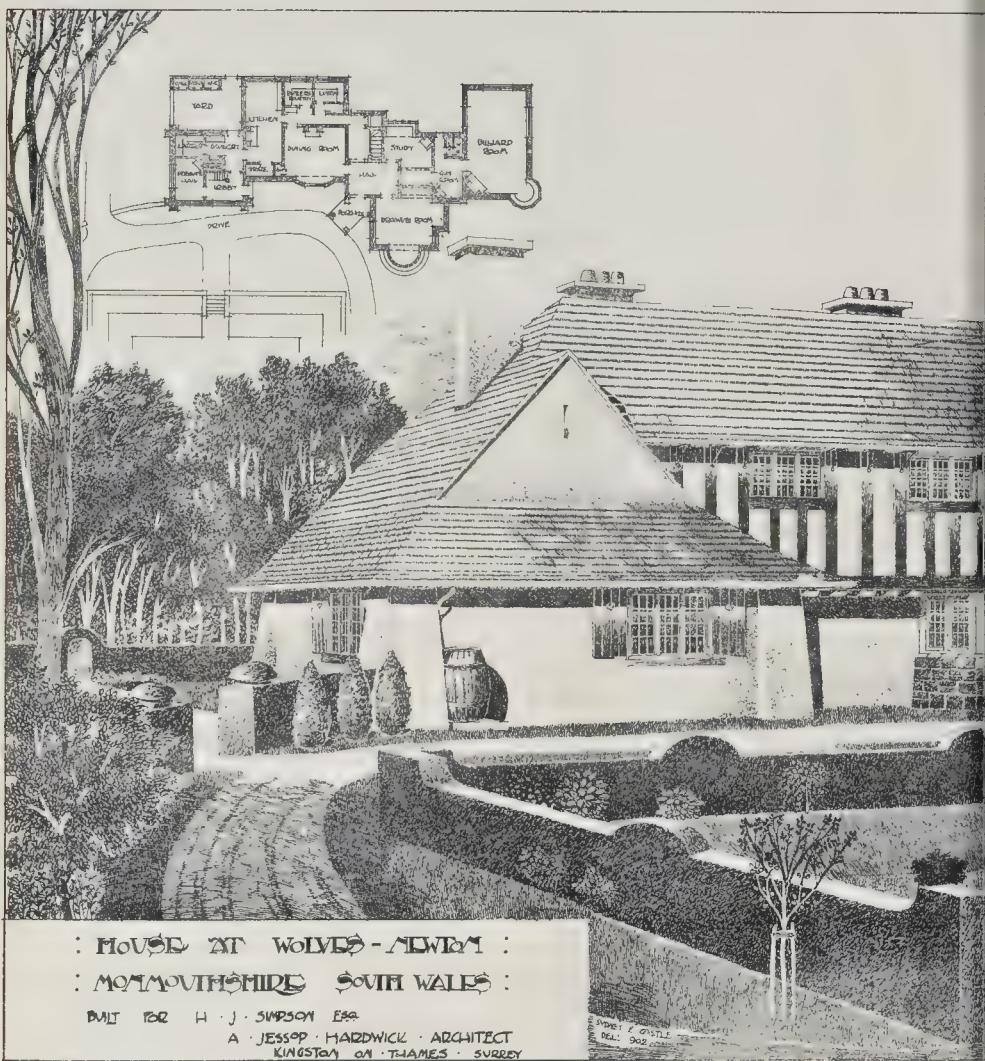


PROPOSED NEW CHURCH OF ST JOHN THE DIVINE, SIDCUP—MR GEO H FELLOWS PRYNE, F.R.I.B.A., ARCHITECT



PROPOSED NEW CHURCH OF ST. JOHN THE DIVINE, SIDCUP.—MR. GEO. H. FELLOWES PRYNNE, F.R.I.B.A., ARCHITECT.
INTERIOR VIEW, LOOKING EAST.

C. H. FELLOWES PRYNNE, F.R.I.B.A., ARCHITECT.
15, AND 17, MARK LANE, E.C. 3, LONDON, E.C. 3.



: HOUSE AT WOLVES - NEWRY :

: MONTMOUTHSHIRE SOUTH WALES :

BUILT FOR H. J. SIMPSON ESQ.

A. JESSOP · HARDWICK · ARCHITECT
KINGSTON ON THAMES · SURREY

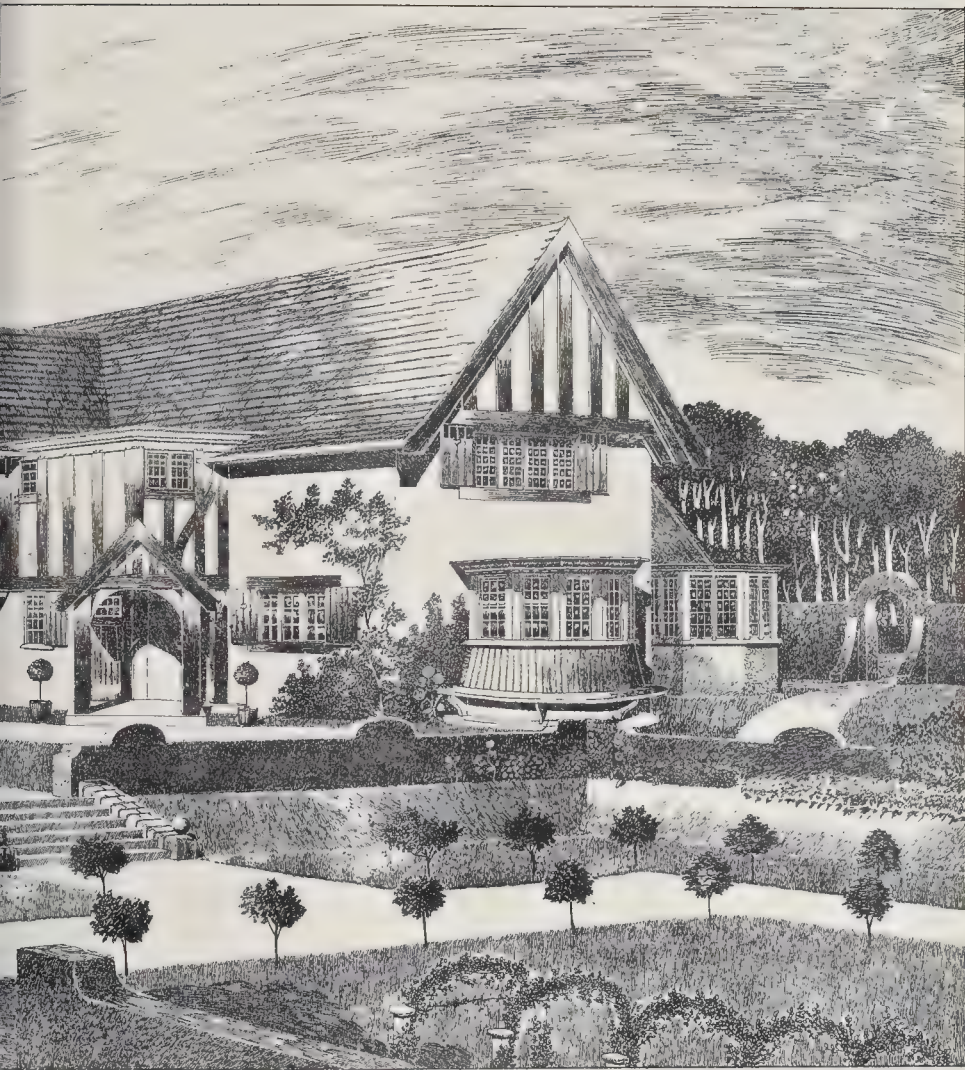
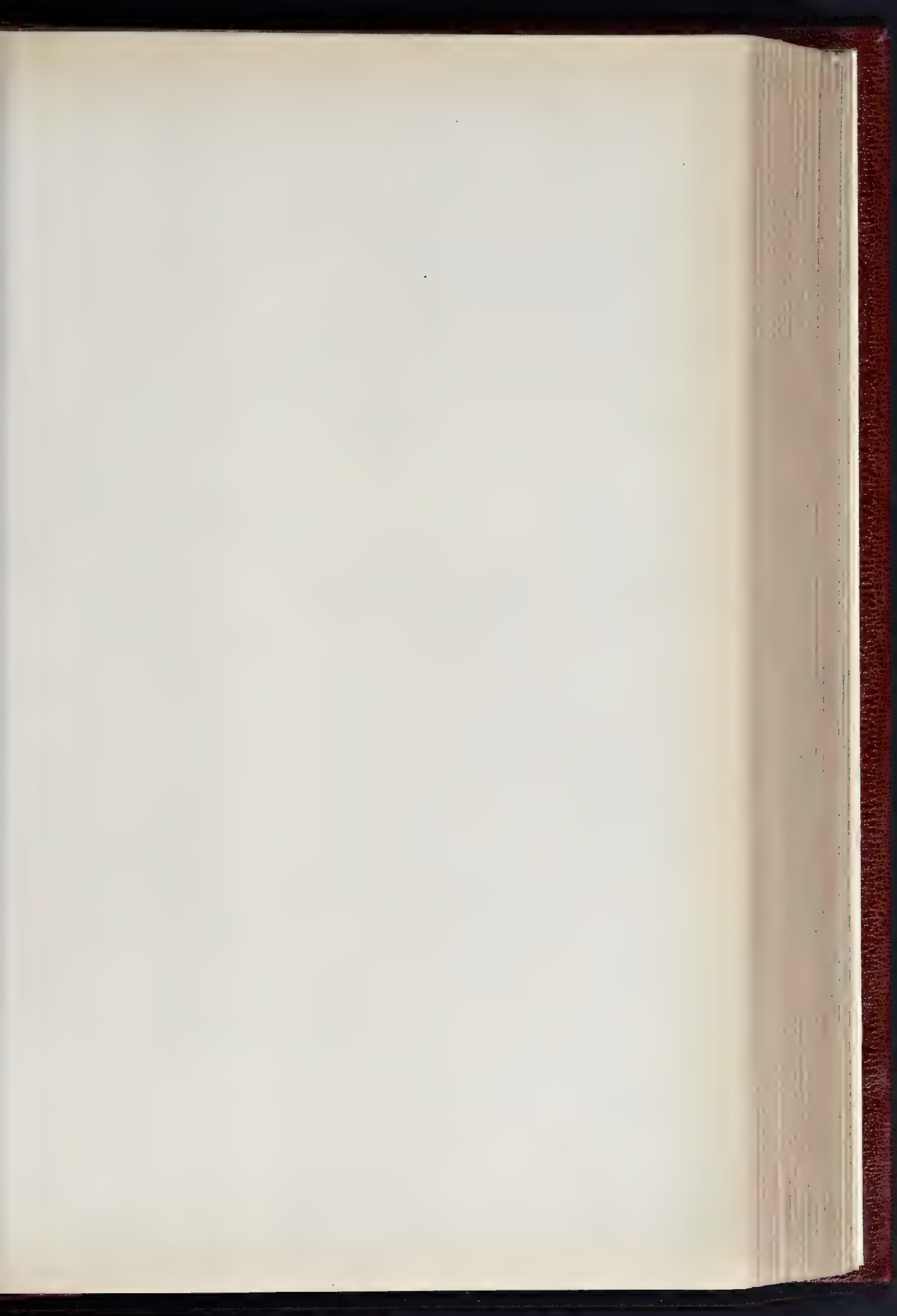


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Proposed Village Church
Port Sunlight, Cheshire
For Messrs Lever Bros Limited





William & Seagr Owen
Architects Warrington
March 1902

PHOTO LITHO SPRAGUE & CO. LTD. 4 & 5 EAST HARDING STREET FETTER LANE E.C.

could certify to the great sanitary improvements which had been made in cottages, farms, farm buildings, and water-supply, within his recollection, but he felt that we had been hardly sufficiently alive in rural districts to the straggle of our rain-water. In towns, and not least in Manchester, the water-supply, the prevention of pollution in rivers, and the measures necessary to improve their purity, had been much more effectively dealt with. Manchester, proceeding on broad and simple lines, had constructed a network of sewers the total length of which amounted to 1,700 miles, the total cost of the system, which served a population of more than 1,500,000 persons, having been upwards of 600,000. When the sewerage works and the purification works in progress were completed, the total capital expenditure would amount to 1,300,000. The outlay by manufacturers, who, through the successful efforts of the Joint Committee of Lancashire and Cheshire, had been encouraged to co-operate with local authorities, had been considerable—probably not less than 300,000, and the improvement of the river water when used for manufacturing purposes had been an important benefit. The manufacturers in those counties felt that all similar traders in the kingdom should be compelled to treat their sewage in the same way. Great as had been the triumphs of engineering of their great city, the population in fact recently made evident by the large percentage of rejections from physical disabilities among young men offering themselves as recruits to the army. To arrest this deterioration, by greater care in the physical education of the young, and by teaching them the principles of hygiene and the preservation of health, was one of the great problems with which we were confronted. He hoped that the Congress, by its deliberations, would pave the way to such a regeneration in our fellow-countrymen as would ensure their not falling behind our competitors, either in Europe or America, by any decay in our race.

The Conferences.

The sectional deliberations of the Congress began on Wednesday with a series of eight Conferences of municipal representatives, engineers and surveyors, medical officers of health, port sanitary authorities, sanitary inspectors, veterinary inspectors, hygiene (a conference of ladies), and school hygiene.

The Conference of municipal representatives was opened with an address by its Chairman, Mr. Alderman McDougall, Vice-Chairman of the Sanitary Committee, Manchester. In the address, the operations were reviewed of various committees of the Manchester Corporation charged with the water supply from the great waterworks at Longdendale and Thirlmere; the works for the interception and purification of sewage at the Davyhulme works; the utilisation of the refuse and street sweepings on the extensive estates at Carrington Moss and Chat Moss, and the works at Holt Town, and the control of the condition and the up-keep of the highways and streets; the provision of parks and open spaces and baths. Many other points in municipal hygiene were touched upon, chief among them being the prevention of pollution of the atmosphere by smoke, the Housing Act of 1890, the substitution of compulsory for permissive powers, and the substitution of electric traction for horse-power on tramways.

With regard to the latter subject the President of the Congress said that in Manchester the substitution of electric traction for horse-power on the tramways is progressing rapidly, facilitating transit from the densely populated portions of the city to the outskirts, with the additional sanitary advantage of reducing the amount of offensive matter on the streets.

The Public Health Acts.

The President of the Conference having briefly acknowledged a vote of thanks addressed to him, a paper was read by Mrs. F. Greenwood on "The Mortality of Infants under Five Years," and then Mr. W. H. Wells was called upon to read a paper on "The Necessity for Reconstruction and Consolidation of the Public Health Acts." Some of the absurdities resulting from defective definitions and omissions from the Public Health Act, 1875, particularly with regard to cellar dwellings, were set forth in the paper with the object of reawakening the desire ardently expressed in many meetings of sanitarians for a revision and

consolidation of the Public Health Acts. The Public Health Act (1875) proscribed as living rooms the use of rooms below the ground level unless the following conditions were all fulfilled:—Interior height, 7 ft.; height of ceiling above the ground outside 3 ft.; an area the whole length of the front of a minimum width of 2 ft. 6 in. In the conditions nothing is said about cellars which may have dimensions largely in excess in one direction and much more sanitary than a typical cellar that would be passed as habitable, if in some other direction the measurements fell short. Instead of 2 ft. 6 in. wide the area might be 10 ft. or 11 ft. wide, but if the ceiling was only 2 ft. 9 in. in place of 3 ft., it would not be passed, though the latter would be far more sanitary than the former. The area might therefore be widened by several feet, and much more light and air be let in, but in doing this, ground higher by a few inches might be left outside, and it might through the very improvement be taken out of the habitable class and put into the condemned class, which presented an evident absurdity. Section drawings attached to the paper showed four types of habitable cellars, and four which would be condemned, the conditions in the latter being in every case far superior. Another figure showed how the legal defect might be rectified. He also suggested the disuse of the term "cellar," in which there was no proper definition in the Act. In the 1891 Act the word "room" had been substituted, but this had not much mended matters. Another defect pointed out referred to the enormous amount of litigation and loss caused by the ambiguous use of the words "drain" and "sewer" in the Amending Act of 1890. In the case of a row of houses drained by one drain running on private premises from yard to yard, and finally discharging into a public sewer, that drain remains a "drain" if the houses are owned by more than one owner, and as such must be kept in repair by the several owners, but if the whole row belongs to one man, the drain becomes a "sewer," and must be kept in repair by the ratepayers generally. In other words, if a number of comparatively poor men each own a house, they must pay for their own drain repair, but if one rich man own the lot, his fellow ratepayers will do the work for him.

After a discussion, in which Dr. Boobyer (Nottingham), Hon. Secretary of the Conference, Alderman Huddart (Salford), Alderman Griffiths (Southport), Mr. Wells, and the Chairman joined, several amendments to a resolution suggested in the paper were brought forward, and eventually a resolution in the following form, proposed by the chairman and seconded by Dr. Boobyer, was adopted by the Conference:—"That this Conference recommends the Council to take into serious consideration the necessity for the consolidation and revision of the Public Health Acts, and to urge the Local Government Board to take immediate steps to bring the matter before Parliament."

SOME POINTS IN MUNICIPAL SANITATION.*

DURING the spring and summer, indeed all the year round, except during wet weather, the work of preventing accumulations of dust on the street surfaces and its being blown about is one that adds greatly to the comfort of the inhabitants, and, possibly, to their healthfulness. The form of paving considerably affects the quantity and nature of the dust formed. On metalled streets the quantity is much greater than it is on granite or wood paving, but the composition of the dust is different. On metalled roads the grinding action of wheels is so very much greater than on paved roadways that a proportionately greater amount of dust is formed. In this connexion, the practice of making wagon wheels for paved roads and for metalled roads of the same width of tyre is decidedly wrong: the initial pressure that granite can bear without abrasion or displacement is so much greater than the smaller stones forming the surface of a metalled road can carry, that it is only reasonable to ask that the corresponding pressure should be spread over twice the area, and that the wheel tyre should be made twice

as wide, at least, as those made for paved streets. On a wet day one has only to listen to the noise made by the crushing of road metal by the wheels of a heavily laden wagon to understand how both dust and mud are formed by the undue pressure from narrow tired wheels.

This action of light and heavy vehicle wheels during a high drying wind, on a hot day, however efficient the watering arrangements may be, makes it impossible to prevent dust being blown about in large quantities. At one time we had only the butcher to consider, or any shopkeeper who kept open house; then the streets might be made sloppy without any one making complaint, but with the march of civilisation came the bicyclist, and with him fresh complications. We may not admire the position in which he rides—like a mark of interrogation turned the wrong way—but we are compelled to listen to his protest against making the roads too wet; and his argument that the shopkeeper should expose his goods inside glazed windows to avoid damage from dust—that, in fact, the roadway is his and not the shopkeepers—has some reason in it. The bicyclist, in his mad career, may not always breathe through his nostrils, but I have known some of them breathe slaughter against the wetter of roads, after one of those most sudden of all experiences—a side slip. Someone has suggested oil instead of water for this troubled state of affairs, and doubtless before long some better medium than water may be found for laying street dust, for the necessity for so doing is greater than is generally realised.

It has been found that children, and even adults, moving from an inland town to the seaside, as is the custom during the summer, often experience throat trouble, in some cases developing asthma during the first few days of the change. This was attributed by a medical man to the irritation set up through inhaling salt particles blown about with dust, and it is but reasonable to suppose that other illnesses may be caused by the highly polluted dust from town streets.

If this subject has not already been investigated, as it probably has, it is one worthy of being done under the auspices of the Royal Institute of Public Health, when means may be found for dealing with it, for it cannot be contended that the present methods are satisfactory.

The next point is one closely related to the preceding, for the dust of to-day may be the mud of to-morrow, or *vice versa*, and the conditions are completely changed. Here, again, the form of road surface has its influence. On paved roads mud is mostly an accumulation, whereas on metalled roads it is much more; and although dust shows to some extent the wastage of such road surfaces, the quantities of mud that have to be removed from roads where there is a heavy traffic makes it much more evident.

There are more discussions in meetings of Councils on the question of mud than on almost any other: it comes up annually, but the means of its complete prevention have yet to be devised. On metalled roads, especially after fresh metalling, during the prevalence of fine drizzling rain, a thin coating of mud forms, and, however frequently it is brushed off, so long as that form of rain continues this fine mud batter is again quickly formed. This kind of mud will choke the gully gratings, and yet be too liquid to allow of its being shovelled into the mud wagon; the hoofs of passing horses scatter it indiscriminately and to considerable distances, and the offside of the pedestrian, if he keeps to his proper side of the path, is spoiled in this way. Now that the question of which century we are living in has settled itself, some time might be devoted as to how to mitigate this state of affairs, for the evil is not confined to Provincial towns.

In places like Exeter, where all the main streets have metalled roadways, and where the traffic is heavier than such roads should have to carry, the removal and disposal of the mud formed is at times a serious difficulty. The distances it has to be carried prevent its being taken up as quickly as it should, and if deposited within the district an unsightly mess is formed. It was for this reason that I tried washing the mud in an ordinary sand washing box to recover the grit removed with it, and the easier to dispose of the stuff. It was found in some cases that three loads of mud when washed left a load of grit, and in this way large quantities have been recovered. This grit is the very best for stuccoing or mortar

* Part of a paper read by Mr. Donald Cameron in the Engineering and Architecture Section at the recent Congress at Exeter of the Royal Institute of Public Health.

making, and finds a ready sale. As the formation of dust and of mud is so similar, the cure for the one might answer for the other. On sanitary considerations, mud, except for the discomfort caused by it, appears less objectionable than dust, and yet much mud is carried into houses on clothing, where it is brushed off as dust.

The last points to which I wish to claim your attention are those of sewerage and sewage disposal. The history of sewerage in this country, as shown by the earlier sewers in Exeter, should be one of great interest to the engineer who can trace the evolution of ideas on the subject. One of the most apparent changes between the sewers of sixty years ago and those made to-day is the difference in their capacities; otherwise they are much alike, except that pipes of stoneware or concrete have taken the place of brick. On these old sewers manholes are provided at intervals, and at the junction of streets, the shafts being carried to within a few feet of the surface, and there was a tradition that it was the intention to have brought them all to the surface, finishing in ventilated covers; this was not done owing to the opposition of the foreman over the city workmen, who objected, on the ground that they were prospectively likely to cause a nuisance.

The question of to-day in connexion with a sewerage scheme is whether it is to be of the combined or separate systems. Under some conditions the separate system is desirable, but it is an open question whether, all round, the sewerage that takes a definite amount of rain, and even storm water, is not the most desirable, and also if, in some cases, the separate system can always be confined to the special part assigned to it. The Local Government Board has fixed the quantities to be dealt with before storm sewage can be allowed to overflow. The whole subject is complicated, but it seems somewhat absurd that at disposal works storm sewage should have to be continued to be dealt with, while several times the volume of that treated, but of precisely the same character, should go by overflow in the water courses.

Even with six times the normal flow of sewage the contribution of each branch sewer to the intercepting main is usually only a fraction of what that branch sewer has to carry. That dilution helps in the treatment of sewage bacteriologically there can, I think, be no doubt, and for domestic sewage, were the volume increased by the addition of water thirty times it would be rendered innocuous, as was shown by Dr. Dupre, and for this reason the addition of rain water is desirable. It is also desirable that the washings from road surfaces should be kept out of water-courses, especially the washing caused by heavy rain after a spell of dry weather. The main idea is, first to deal with what is real sewage, and, in addition, with the first wash of the sewage of a heavy rain. The arrangement of the sewerage scheme should be to obtain these conditions at the disposal works.

The only system with which I will take up your time now is my own, or the septic tank, and the automatic arrangement for delivering the effluent to the filters. Looking back, and benefiting by experience, had I to do it again, another name would have been given to the system, for it is evident that the word "septic" does not find favour with medical men, although to men of that profession is due the first favourable opinions of the system.

In Exeter it has been shown that a domestic sewage can be brought into such a condition that the greater part of the solids in suspension can be broken up and liquefied, and that the resulting effluent can be filtered by artificial filters. That this filtrate can be by successive filtrations be brought to any desired degree of purity, and this without the aid of chemicals. The same thing was shown to be possible with the manufacturing sewage at Yeovil—in its way, probably, one of the foulest in the country. In Manchester, with an undoubted trade sewage, a septic tank and single filtration gave better results than when the sewage was twice filtered. The chemist and manager of the sewage works finds that higher nitrification can be obtained by treatment in septic tank, followed by contact filters, than by any other method. It has been found that with domestic sewage over 80 per cent. of the solids are liquefied, and with a trade sewage 50 per cent., and in all cases the tank deposit is in a finely divided condition, easily pumped, and although producing gas freely, it has little or no offensive smell.

When in the proper condition for removal from the tank it very much resembles China ink when mixed in the dish.

As you may be aware, there are great variations in the sewage of one town throughout the day and week, and that the sewage of no two towns is alike, and the treatment of the sewage of each town requires similar variation.

In Exeter the best results were found when the sewage remained in the tank from eighteen to twenty hours. The tank is capable of dealing with large variations in flow without injury, so much so that provision need only be made for the dry weather sewage, and a tank of that capacity will be sufficient to cope with the usual allowance of storm sewage also. Although the sewage of a town varies in composition from hour to hour, the tank has an averaging influence, or a "smoothing effect," as Dr. Rideal put it, which gives some constancy to the composition of the effluent.

There is a good deal of the product of the tank carried out by the tank effluent, as can be seen in a good light in a test tube, but so finely divided as to be difficult to see with the eye, but on careful looking it can be seen to be diffused throughout the entire liquid; the larger particles seen under the same conditions are portions of the growth in the pipes and channels. Were it possible to keep this tank product back, or from passing to the filter surface, the attention required to be given to the latter, although small now, would be much reduced.

The automatic arrangement for distributing the effluent to the filters is one of the greatest helps to the efficient and economical working of the system. It early became evident that a mechanism of this sort would be necessary, the curve of the hourly flow of the sewage being the first to show it, but it was not till in conversation with the President of this Congress, Lord Idlesleigh, at Pynes, that it took definite shape in my mind. These mechanisms, the simpler they are, the more reliable, and it must be evident that reliability is of first importance; it is better to sacrifice some of the ideas one would like to see carried out than introduce too many complications.

With the purely domestic sewage from St. Leonard's, the best period for the effluent to be in the filters was found to be one hour. This would give a longer time to the filters to drain and aerate. But although this period is much exceeded, especially at night, the filters do good work.

INSTITUTE OF SANITARY ENGINEERS.

On Wednesday evening at the Rooms of the Institute, 10, Bloomsbury-square, Mr. F. G. Rayner (Chairman of the Council), delivered his opening sessional address. Mr. H. M. Dove presided, and apologised for the smallness of the attendance owing to the bad weather, and the fact that many members were still away holiday-making.

Mr. F. G. Rayner, in the course of his address, said the subject he had chosen was that of infectious hospitals, exclusive of small-pox hospitals, for small districts. Much had been said with regard to large hospitals with pavilions and floors to accommodate patients from large populous districts, but little had been said which would help Local Authorities to provide for districts with a population of up to about 5,000 persons. Mr. Rayner first dealt at some length with the various Acts governing the subject of the provision of hospitals, and, proceeding, said that no doubt owing to local feeling and prejudice it often happened that the best site for the purpose of erecting an isolation hospital was not obtainable, with the result that secondary sites were sometimes chosen. The considerations which should govern the selection of a site should be a good elevation or a gentle slope, and there should be nothing to interfere with the free circulation of air round the buildings. Attention should also be paid to the questions of water supply, the easy means of access for doctors and patients, and the possible need of extension or of temporary arrangements being made during an epidemic. For a small district a site of two acres might be sufficient, but he thought three acres were preferable as it gave more scope for the buildings. The size of the hospital depended upon the population of the district and its probable rate of increase, but in any case accommodation should be provided at the rate of one bed per thousand inhabitants, and then

for the more perfect working of the hospital separate wards should be provided for different diseases, to be safely dealt with and properly treated simultaneously. It was not wise to construct permanent buildings of corrugated iron, although as a temporary measure they were very useful. There should be only one means of access to the hospital, controlled and overlooked by the porter's lodge. In the construction of the building, it should be divided into three parts, viz., (1) the administrative block for the staff and stores; (2) different wards for infected persons; (3) mortuary, laundry, disinfecting rooms, &c. The administrative block should be placed near the entrance to the grounds, unless a separate porter's lodge is provided instead, which should contain sufficient accommodation for nurses and staff, kitchen, store, dispensary room for the medical officer, together with all necessary appliances. This block should of necessity be detached entirely from the ward buildings and made to communicate only by a covered passage with both sides open, so that a cross current of air might pass between the buildings. Several essential points were to be borne in mind when planning an isolation hospital, viz., complete isolation of the infected buildings and thorough ventilation of all parts, allowing for cross currents of fresh air; the avoidance of dark corners; the obtaining of the largest amount of light possible; drainage, disinfection, &c. The ward buildings should be at least 40 ft. away from the administration block, which distance was required by the Local Government Board, but he recommended 50 ft. or 60 ft. at least. The walls should be composed of good sound, hard, well-burned bricks, stone, or concrete, and so arranged that each bed might have at least 12 ft. lineal wall space, 144 square ft. of floor space, and 2,000 cubic feet of air space. Provision must be made for annexes to contain closets and sinks separated from the main building by cross ventilated passages. There should be only two entrances to the ward—one for admitting patients, the staff, &c., and the other for removing the dead. If necessary, the land should be first underdrained, and the site covered with at least 6 in. of good Portland cement concrete to obviate any damp arising from the soil. A good cement concrete foundation should be placed under the walls, and for one-floor buildings the walls would be best if hollow and of not less thickness than 10 in. The damp course must be efficient, and he strongly recommended two courses of stout slates well looped by joints bedded and pointed in cement. The course of brickwork above and below, if built in cement, mortar, and slates, should go through the whole thickness of the walls. Sufficient air bricks should be provided at the top and bottom of the cavity to allow of free circulation of air. For the warmth and dryness of the building, the roofs should be covered with board and felt, and best Bangor or other slates fastened to the boarding with copper nails. In the construction of the ground floor of the wards it was best to keep them well above the surrounding ground line, and the less joints seen the better. The floor should be hard and impervious to germs, and he recommended teak laid in long narrow widths, set in bitumen on a good concrete foundation. The height of the wards should be not less than 12 ft. and not over 13 ft. in the clear. The covering of the walls and ceilings was very important, and these should be plastered in Keen's or Roman cement, with all angles and corners rounded off to prevent the accumulation of dust. He deprecated the use of glazed tiles owing to the numerous joints collecting germs. Flat roofs he considered more adaptable than pitched roofs. There should be provided in the walls and under each bed one fresh air inlet, with a sliding door to regulate the supply of air. The windows should be double, having sliding sashes, and should allow of the lower sash being raised and a current of air admitted without causing a draught. The question of the size of the window surface per cubic space should be worked out to a proportion of 1 square foot to about every 70 cubic feet. The sanitary arrangements needed careful attention, and so many classes of baths, sinks, closets, and slop sinks are in the market that he did not care to advance one pattern before another. It should be seen that in slop sinks they had washers, plugs, and overflows, and make the discharge externally over glazed channels to the gullies. They should also be well trapped and fitted with brass screw caps,

that they may be easily cleaned. Having dealt with the questions of baths and closets, Mr. Rayner said that heating and ventilation are important items. Where steam was obtainable it was better to use it, and to use radiators, as they could be placed to better advantage. He preferred heating by low pressure, and the radiators placed beneath the windows. A covered verandah added to the yards was very useful, and these should be to 12 ft. in width, and well protected from the weather. As to the lighting, that depended on the locality, but where possible electricity was the best. With regard to drainage, drains should be laid in straight lines, and one fall from point to point, with a gradient not less than 1 in 30.

They should be laid on a bed of 4 in. of Portland cement concrete, and after being set should be bedded in concrete, so that there might be no possible contamination of the surrounding soil. Where the drainage could not be connected with the main sewer, I would recommend the use of earth closets, and these, of course, did not do away with cesspools. If the soil was suitable, and there was no risk of contaminating a well, the cesspool might be constructed of open brickwork; but where there was a chance of contamination there must be 9 in. brickwork in cement mortar, clay puddled between the brickwork and soil, and a bottom of concrete. The outbuildings, consisting of the laundry, mortuary, sinecting chamber, ambulance shed, coal house, &c., should be built some distance from the ward buildings.

A short discussion followed, and Mr. Rayner has heartily thanked for his address.

BOOKS RECEIVED.

BUILDING CONSTRUCTION AND DRAWING. By Charles F. Mitchell, assisted by G. A. Mitchell. 10th edition. (London: B. T. Batsford.)
SHOERING AND UNDERPINNING. By C. Haden Cook. Third edition, revised by F. R. Farrow. (London: B. T. Batsford.)
PAPERS OF THE BRITISH SCHOOL AT ROME. Vol. I. (London: Macmillan & Co., Ltd.)

Correspondence.

THE ENTASIS OF AN OBELISK.

SIR,—Can any of your readers give me information as to the correct entasis, if any, to put on an obelisk?
The one in question is 15 ft. high, and is 2 ft. 10 in. square at the base and 1 ft. 8 in. square at the top.
X. Y. Z.

BORINGS.

SIR,—In my position as contractor's foreman I have just received instructions to put an old iron sink together to hold water.

It is composed of a number of cast-plates, which are to be bolted together and the joints made tight on borings and sal ammoniac. Can you tell me how to prepare, and the quantities of borings and sal ammoniac which are usually used for this purpose?
A. WYTON.

* The best proportions for rust-joint cement are as follows: Iron borings, 12 lbs.; powdered sal ammoniac, 2 ozs.; flour of sulphur, 1 oz. These ingredients should be mixed with water to form a paste, and, as the result is a slow-setting cement, the joints must be allowed to harden before any use is made of the tank. The approximate weight of dry borings is equal to one-fifth of the cubic contents of the joint in inches.—ED.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

II.—BRICKS AND CLAY WARE.

MANUFACTURE OF BRICKS.—Clay to be used for making bricks is first exposed in layers or small heaps to the weather for several weeks or months, either alone or mixed with breeze and chalk. All stones are then picked out, and the clay is found to be a coarse powder. If the grinding process be omitted the clay has to be weathered for a longer period than is otherwise sufficient. The clay is next tempered by being passed through a pug mill, in which the clay is thoroughly kneaded with water. The clay passes out of the pug mill in a condition suitable for moulding. The rectangular moulds

are rather larger than the finished bricks, for the clay usually shrinks to an extent equal to about one-tenth of its original dimensions.

The mould is completely filled by the operator with tempered clay, and the surface is levelled with a straight-edge, which when drawn across the top of the mould pushes off all superfluous clay. When the moulding is performed by machinery the clay is cut by wires into blocks of the required dimensions as it passes out of the pug-mill, or the clay is automatically forced into moulds. Hand-made bricks are made with a "frog" (a depression or hollow) on one side, the object of the frog being to form a key for the mortar. Wire-cut bricks have no frog, and the marks of the wire are visible on the surface of the brick.

The moulded bricks are dried by exposure to the air or by artificial heat, and are then burned either in kilns or in clamps. A clamp is a stack of unburned bricks arranged in pyramid form, with a flue. Breeze is mixed with the clay used for making the bricks, or is placed in the spaces between the bricks in the stack, to assist in the baking of the clay. Fires are lighted in the flues of the clamps, and are kept burning for several weeks.

Bricks may conveniently be divided into the following three classes:—1. Building bricks. 2. Paving bricks. 3. Firebricks.

Building bricks are usually subdivided into:—(1) ordinary building bricks, (2) underburnt and misshapen bricks, and (3) cutters or rubbers. Ordinary bricks are hard bricks of good shape and comparatively uniform colour and texture made as already described.

Underburnt and misshapen bricks, commonly known as "grizzle" or "place bricks," are defective stock sometimes used for the interior portions of walls. The use of underburnt bricks should not be permitted in any work of importance.

Cutters or rubbers are made of carefully washed clay, free from lumps, and of comparatively uniform composition. These bricks, after burning, are sufficiently soft to enable them to be readily cut or rubbed into any desired form. Inferior rubbers when exposed to the weather wear away rapidly.

Paving bricks are manufactured with clays containing a considerable proportion of iron oxide, and are fired at a higher temperature than is used for ordinary building bricks. Under the influence of the high temperature the clay becomes vitrified to a much greater extent than is usual in ordinary bricks, and becomes almost black in colour owing to the formation of silicate of iron. The bricks are stronger, harder, and much less porous than ordinary bricks.

Firebricks are most commonly made with fireclay, the composition of which was discussed in the preceding chapter, but other materials are sometimes used in lieu of fireclay. *Ganister* is an argillaceous sandstone found under some of the coal beds in the North of England and elsewhere which is largely used for lining furnaces and for making bricks. It contains from 80 to 90 per cent. of silica, and will withstand high temperatures without shrinking. *Dinas bricks* are made by grinding the Dinas rock and sand found in the Vale of Neath in Wales, adding about 1 per cent. of lime, and kneading, moulding, and firing the mixture in the usual manner.

Other earths less extensively used for firebricks are *chromium ore*, *magnesian limestone*, and *bauxite*. Bauxite consists mainly of hydrated oxides of alumina and iron, but usually contains a certain proportion of silica. When magnesian limestone is used for brickmaking, it is first heated to expel the carbon dioxide, then mixed with tar and moulded under pressure, and then fired at a high temperature.

Acid firebricks are those which contain an excessive proportion of silica. Such bricks are attacked by lime and other basic substances at high temperatures. *Basic firebricks* are those which contain an excessive proportion of lime or other basic substance. Such bricks are attacked at high temperatures by silica or other substances of a like nature capable of entering into chemical union with the lime or other base.

Glazed Bricks consist of fireclay weathered, ground, tempered, moulded, pressed, and dried in the usual manner. The dry bricks, either before or after burning, are dipped into a bath containing "body dip," and after being allowed to air-dry for a short period are dipped into a bath containing "glaze dip." The period between the dipping into body dip and dipping into glaze dip varies from a few minutes to

two hours, according to the condition of the clay, and is shorter for burnt bricks than for unburnt bricks.

Every firm of glazed brick manufacturers has its own particular formulae for body dips and glaze dips. A large number of such formulae are given in Ansell's book on the manufacture of glazed bricks and sanitary ware, but it would serve no useful purpose to discuss in detail such formulae in these columns, for they are all empirical rather than scientific.

The following may be regarded as typical formulae for body dip and glaze dip respectively, but the formula must in each case be varied to suit the character of the clay of which the brick is composed, and practical experience in the manufacture of glazed ware is at present of more importance than a knowledge of the chemical composition of the materials used for producing the enamel and glaze:—

Mixture for White Body.	Mixture for White Glaze.
White ball clay .. 20	Felspar .. 40
Flint .. 16	Stone .. 40
China clay .. 54	Flint .. 6
Stone .. 20	Whiting .. 8
—	Plaster of Paris .. 6
100	100

The only ingredient in the foregoing formulae which requires description is "stone." This material is also known as "Cornish stone" and "China stone," and is a decomposition product of the rock known as pegmatite. It consists mainly of felspar and quartz.

For the manufacture of glazed bricks or other ware, the Cornish stone is crushed in grinding mills to a fine powder. When subjected to a high temperature it fuses and forms a white glazed mass, but it requires admixture with a flux to cause it to flow sufficiently freely.

China clay is nearly always the main constituent of the body dip, but it is usually mixed with China stone, flint, and clay. The glaze dip often contains oxide of zinc or sulphate of barium. Suitable compounds of the metals iron, copper, manganese, chromium, &c., can be added to the dip when coloured glazes are required. After the bricks have been treated with body dip and glaze dip, they have, of course, to be baked in an oven irrespective of any firing to which the bricks may have been subjected before dipping.

Salted Bricks are bricks covered with a transparent glaze, produced by placing salt in the kilns while the bricks are being burnt. The salt solutiles and acts as a flux upon the clay, and a fused insoluble silicate is formed on the surfaces of the bricks.

Unglazed Earthenware is often made with the same clays as those used for ordinary building bricks. Such earthenware is of inferior quality, and is very porous. Earthenware is baked in kilns.

Glazed Earthenware is often produced by forming a lead glaze on the surface of common earthenware. The unglazed goods are dipped into a bath containing oxide of lead and suitable fluxes mixed into a paste with water. When the articles are withdrawn and reburnt, the lead oxide and other compounds fuse and completely cover the articles with an impervious glaze.

Fireclay Ware is earthenware made of fireclay instead of ordinary brick clay. It is used as a substitute for stoneware, but for most of the goods used by builders it is inferior to stoneware.

Stoneware is made with clay from the Lias formations mixed with sand and ground pottery to prevent shrinkage. It differs from unglazed earthenware in being impervious to water even when not glazed, and is stronger and more durable. Most stoneware articles are, nevertheless, glazed by placing salt in the kilns in which the stoneware articles are burnt.

Terra-cotta is refractory clay containing sufficient oxide of iron to give it a characteristic reddish colour. To prevent undue shrinkage, ground pottery, ground glass, sand, or burnt clay is added in large proportion. The mixture is carefully ground, kneaded with water, moulded, dried, baked in a pottery kiln, and then slowly cooled. The temperature employed for baking terra-cotta is much lower than that used for stoneware. The red clay for making terra-cotta articles has to be very carefully selected. If it contain more than 7 or 8 per cent. of iron oxide the clay will be too fusible. In some cases the clay used is an artificial mixture of china clay and oxide of

iron, and some of the natural fireclays make fairly good terra-cotta.

Tiles.—Roofing and paving tiles are made of moderately pure brick clays in the same manner as bricks, and are baked in kilns. The colour of red tiles is due to the presence of oxide of iron. *Encaustic or decorative tiles* of the best description are made in three parts:—(1) the face, which is a slab of good quality clay of suitable colour for the ground of the pattern; (2) the body, which is a coarser clay; and (3) the back, which is a thin layer of the same clay as the face.

Indentations or moulds of the form required are made in the face slab by means of a plaster cast, and coloured "slip" (i.e., coloured clay made plastic with water) is placed in the indentations. When dry, the tiles are baked in ovens, and in some cases are glazed by being dipped into a mixture of water and powdered glass and then reheated.

Cheap encaustic tiles are made by painting or printing a pattern on the surfaces of white clay tiles and then coating the printed surfaces with a transparent glaze.

Majolica tiles are clay tiles covered with an opaque coloured glaze.

Water Absorbed by Bricks.—Bricks which have not been sufficiently burnt are deficient in strength and durability, and are capable of absorbing a larger proportion of water than properly burnt bricks. Bricks capable of absorbing more than 20 per cent. of their weight of water should be rejected, the normal absorption capacity of bricks of good quality varying from 4 to 18 per cent.

GENERAL BUILDING NEWS.

CONGREGATIONAL CHURCH, EASTON, BRISTOL.—The opening services at New Castle Green Congregational Church, Greenbank-road, Easton, took place on the 4th inst. The building has been erected by the Bristol Congregational Church Extension Committee, acting in conjunction with the members of a small Congregational church in Hinton-road, near at hand, and with the trustees of the old Castle Green Chapel. The church has been built by Messrs. George Humphreys & Sons from the designs of Mr. Frank Wills, and the total cost has been about 5,000l. The building is of brick, and, including galleries, it will provide seating accommodation for about 800 persons. The organ, which belonged to the old Castle Green Chapel, has been renovated by Mr. W. G. Fowles, and placed in the new church.

MALMESBURY ABBEY.—It is reported in the Bristol Diocesan Magazine that good progress has been made with the restoration of Malmesbury Abbey Church. The work was commenced in 1899, and was entrusted to Mr. Harold Brakspear, F.S.A., the contractors being Messrs. Hayward & Wooster, of Bath. What has been accomplished comprises the rebuilding of some of the flying buttresses over the aisles which threatened to fall, the reinstating the destroyed upper parts of their counterbalancing pinnacles, the parapets of the north aisle, and the renewal of the perished stonework generally, the renewal of all the windows, and the renewal of all the gutters and downpipes, relaying the aisle roofs, and making all the roofs watertight. The necessary drainage has also been done, and a concrete surface gutter put round the walls. In addition to these works the missing millar at the west end of the nave on the south side has been replaced, together with the main arches, triforium, and clear-story above, as being the best means of giving the necessary support to the south-west corner of the present church, the state of which threatened ruin to the noble south porch. A further contract entailing an expenditure of about 1,300l., has been entered into for the purpose of covering the work that remains to be done at the west end, and comprises the completion of the vaulting of the two ruined bays of the aisle, the continuation of the roof over up to the original west end, walling in temporarily the two main arches that have been rebuilt, and growing into the church the two bays, the restoration of which will have been thus effected, making good the top of the west wall and turret, and repairing the remaining portion of the old west end, also completing the open parapets of the aisle and clearstory. In planning the new work the main lines of the ancient design have been followed, but care has been taken to show that it is modern, and to prevent misconception as to its date in the future.

EAST FINCHLEY BAPTIST CHURCH AND SCHOOLS.—A new Baptist church is to be erected at East Finchley. It is designed with nave, aisles, transepts, and choir, with three vestries, the seating accommodation being 700 persons. The building is planned on a circular plan from the pulpit. Accommodation is given for 704 adults on ground floor (including seventy-two in end gallery), or a mixed congregation of about 870 persons. A tower is placed at the corner of the church, which will stand at the corner of two roads, the Great North-road and Creighton-avenue. The schools, which have now been opened, are of two stories, consisting of a hall with eight classrooms at the sides, partitioned off from each other by sliding panelled partitions,

so arranged that the whole school can be thrown open into one large hall for use as a chapel until the new chapel is erected, and one at the end opposite the platform; two front entrances and two staircases up to the galleries on three sides to be used for classes; two large senior's classrooms in the rear, and a large infants' room, &c., and kitchen. The buildings are faced in front with split flints with stone dressings. The architects are Messrs. George Baines and R. Palmer Baines, Clement's Inn, Strand, London, W.C.

CHURCH, CLADDAGHDUFF, CLIFDEN, IRELAND.—The Star of the Sea new church, recently erected at Claddaghduff, Clifden, was dedicated on the 7th inst. by the Archbishop of Tuam. Within a few hundred yards of Omev Island the new church is situated. It is Gothic in style and cruciform in plan. In length it measures 116 ft., the transepts 60 ft., the width of the nave 26 ft., the height to the ridge 43 ft., and to the highest point of the belfry 53 ft. There are three stained-glass windows over the high altar, while the building throughout is pierced with a number of leaden lights. Messrs. Ryan & Sons, Dublin, supplied the stained-glass windows, and Messrs. Brooks, Thomas, Dublin, the altar rails and gallery; and Messrs. Moonan & Sons, Dublin, the stations of the Cross. Mr. Hamilton, of Galway, was the architect, and the builder was Mr. G. R. Emerson, of Clifden.

SCHOOL, HANLEY, STAFFORDSHIRE.—The New Grove School at Hanley has just been opened. The new school has cost a sum approximating 10,000l., including apparatus, and will afford accommodation for 670 boys and girls, which, with the older portion, brings up the total to 1,000 children. The contractors for the general building were Messrs. Tompkinson & Bettelley, of Longton. The whole of the work has been carried out from the designs and under the superintendence of the Architect to the Board, Mr. E. E. Scrivener, of the firm of Messrs. R. Scrivener & Sons, architects, Hanley.

SCHOOLS, STOCKPORT.—The new schools erected at Spring-gardens, Stockport, which will accommodate 600 boys and girls in the mixed school and 220 infants in a separate infants' school, were opened on the 5th inst. Messrs. Stott & Sons, of Manchester, are the architects of the new schools, and the builder is Mr. Josiah Rogers, Stockport. The principal room gives seating accommodation for about 1,000 persons. The building is faced with red brick, with buff terra-cotta dressings and half-timbered gables.

BOARD SCHOOL, VICKERS-TOWN, BARROW-IN-FURNESS.—The new Vickers-town Board School, which has been erected upon Walney Island for the children of the new town being built by Messrs. Vickers, Sons, & Maxim, was opened on the 30th ult. The total accommodation is for 648 children, and the buildings are of one story, containing a central hall 65 ft. 6 in. by 33 ft., and ten classrooms, with cloakrooms and two teachers' rooms on the ground floor, and large heating chamber and store-room to the basement. The walls are built of bricks faced externally with Askan bricks to a height of 4 ft., and above that with rough cast in cement, coloured a cream colour, and with St. Bees stone dressings. The roofs are covered with grey Walna Scar slates and red ridge tiles. Internally a dado 4 ft. high of coloured glazed bricks runs round the rooms and corridors, and the walls above this are plastered and coloured. The buildings are lighted throughout by electricity. The total cost of the work, including playgrounds, playsheds, and boundary walls, is 8,075l. The contractors for the work are: Excavator, bricklayer, and joiner, Messrs. Clark & Pocklington, Manchester; Messrs. G. Varley & Son, slater and plasterer; Mr. James Walker, plumber, painter, and glazier; Mr. James Gell, ironfounder; Mr. W. Barrett, Mr. Henry T. Fowler, of Barrow-in-Furness, is the architect.

ASYLUM SCHEME, BANGOUR, EDINBURGH.—The report by Mr. George T. Hine, architect, London, on the new Bangour Asylum scheme of the Edinburgh Lunacy Board, has recently been issued to members. The remit to Mr. Hine, of date May 14 last, was to the following effect:—"That the report of the Special Committee, as far as regards recommendations Nos. 3, 4, 5, 6, and 7, be remitted, along with the architectural plans, to the committee of the Edinburgh Lunacy Board, for their consideration (in consultation with Mr. Blanc if necessary), and with special instructions to report to the Board as soon as possible (1) whether the plans can be modified or remodelled so as to reduce the total cost to a sum representing 300l. per bed or less; (2) whether the plans can be adapted to a sum representing 300l. per bed or less; (3) whether by building with brick harled the cost would be reduced to any amount, and if so to what, extent, and generally to advise the Board in the matter." The following is the summary of Mr. Hine's report:—"First—"Whether the plans can be modified or remodelled so as to reduce the total cost to a sum representing 300l. per bed or less?" My answer to this is "Yes, subject to my correctly interpreting your meaning of price per bed." Secondly—"Whether the plans can be adapted to brick harled?" To this I again reply in the affirmative. Thirdly—"Whether by building with brick harled the cost will be reduced to any amount, and if so to what extent?" I say in answer to this that by adopting the simplest form of brick harled treatment the

cost may be reduced to something less than 300l. per bed. Fourthly—"To advise the Board generally in the matter." My advice is (a) to adhere to stone construction, but in a less expensive form, and to modify the interior treatment of the different buildings, cutting down the cost in all legitimate ways. By doing this a more suitable form of construction than brick harled will be obtained at a comparatively little extra cost, and much time and expense in other ways will be saved; (b) to commence building operations at once by erecting infirmary and administrative block. This will take the cost and suitability of the form of construction recommended, and relieve, to some extent, the urgent pressure for accommodation of a site which is required.

INDUSTRIAL SCHOOL, GLASGOW.—Lord Provost Chisholm opened on the 30th ult. a new day industrial school provided by the Juvenile Delinquency Board for the Western District of Glasgow. The premises, situated in William-street, and formerly known as St. Matthew's Public School, have been altered and adapted for the purpose of a day industrial school, the work being carried out under the supervision of Mr. J. M. Munro, architect.

SCHOOL, BEVERLEY.—Lord Wenlock, Chairman of the East Riding County Council, opened the newly-erected Beverley Grammar School on the 29th inst. The new buildings have been erected on the west side of Queen-street, and the site stretches westward towards Westwood. The principal entrance leads to a central corridor, on either side of which are the classrooms, three in number, each 21 ft. 6 in. by 20 ft., and each accommodating twenty-four boys in single desks. Two of the classrooms are divided by a movable partition, so that they can be converted into a single room. On the right of the entrance is the head master's room, and on the other side of the corridor is a cloak room and lavatory fitted with glazed stoneware basins. By the side of the cloak room is an entrance from the playground. At the west end of the building are the rooms to be devoted to science-teaching—a laboratory, 30 ft. by 22 ft., fitted with chemical working benches and a lecture-room, 22 ft. by 20 ft. 6 in., with desks on a stepped gallery. The south end of the building is planned so that a central hall and further classrooms can be added when extension is required. All the classrooms, &c., are lighted from the left side, and are warmed by ventilating registers, which supply warmed fresh air to the rooms; the extract ventilation being by flues carried up with the chimneys. The exterior is simply treated in red brick, with stone dressings, and the roofs are covered with red tiles. The latrines are in a detached building on the west side of the site. The new buildings have been erected under the superintendence of Mr. John Wilson, F.S.A., architect, of Hull, by Mr. J. Constable, builder, of Beverley.

POST OFFICE, SUNDERLAND.—A new post office is being erected at Sunderland. The site consists of over 1,200 square yds., and the main block of the new premises is a detached building, facing that portion of the shubbery which has been laid out as gardens. At this point, and about 65 ft. back towards High-street, the building is four stories high. On the first floor of the main building there are offices for the postmaster, telegraph engineer, &c., a waiting room, and a refreshment room. A vestibule leads up the centre of the main front block for light and ventilation, faced with glazed bricks. On the second floor of this block are the instrument room, 60 ft. by 25 ft., and a telephone room, 36 ft. by 21 ft. The ground floor embraces three large public halls, 60 ft. by 25 ft. There are also a postmaster's office, a waiting room, and a refreshment room. The outside letter-boxes are in West Sunnyside, but there are also letter-boxes in the public hall, so that people from the Norfolk-street side of the town will be saved the trouble of coming round. On the ground floor there is also a telegraph boys' delivery room and a registered letter office. Further back is the sorting-room, which occupies the width of the site, and measures 90 ft. by 55 ft. Behind this will be the loading platform for the mails, and then comes the yard between the Post Office and the Inland Revenue Office. The basement will contain accommodation for postmen, clerks, telegraph boys, and a store. The sorting-room, &c., of the building embracing the sorting-room, &c., stretches towards High-street for 110 ft., and is 10 ft. in height, 33 ft. above the pavement, but it can be heightened should extensions be needed in the future. The base of the building is of freestone, from the Cocklaw quarries, Chollerley, and the upper part will be of Portland stone quarries at Denwick, near Alnwick. The Inland Revenue Office is at the opposite end to the main postal block, and will be of three stories. It contains offices for the Surveyor of Taxes, Supervisors, and clerks. All the floors are of concrete, covered with wood-blocks, excepting the public hall, which will be paved with stone. The building will be provided with lifts, and lighted throughout by electricity. The architect is Mr. Henry Tansley of H.M. Office of Works, and the contractor is Mr. J. W. White, of Sunderland. Mr. Ernest J. Searefield, of H.M. Office of Works, has acted as clerk of works.

BUNESS PREMISES, BRISTOL.—Messrs. Smith, Nevill, & Co. have just opened a bakery, bread

ore, loading-up shed, stabling for fourteen horses, site of offices, and various outbuildings. The buildings have been designed by Messrs. Paul & James, architects, of Bristol. The contractors are Messrs. V. & J. Bennett.

FOREIGN.

FRANCE.—The jury in the competition for a group of school buildings at Montreuil have awarded the first premium to MM. Duménil and Grandon, of Paris. During the work of repair at the cathedral of Châlons-sur-Marne (the towers of which were in a dangerous condition), some fine sculptures of the twelfth century have been discovered, especially a font with carved bas-reliefs, which must have come from the original Romanesque cathedral built in 1149. The municipality of Bourges intend to demolish the fifteenth-century church of St. Bonnet, which is in a ruinous condition. The municipality of Vichy have voted a sum of 80,000 francs for the embellishment of the town. Works are shortly to be commenced for the improvement and deepening of the port of Algiers, at an estimated cost of 5,500,000 francs.—M. Marquette, the sculptor, has been commissioned by the Government to execute a bust of the late eminent landscape-painter Dupré. Excavations are in progress among the ruins of the celebrated châteaux of Montfort l'Amaury (near Paris), which have led to some interesting discoveries. The works have been undertaken by the municipal authorities at Montfort. The crypt of the ancient chapel has been brought to light, as well as some fine early Gothic sculptures. MM. Hubert Marie and Letort, architects, have nearly completed the restoration of the sanctuary of Notre-Dame des Arts, at Paris, which commenced five years ago. The Municipal Council of Vannes has decided on the building of a theatre, a museum, a public library, and a market, at an estimated cost of about a million francs.—A scheme is under consideration for a canal to unite the canal of the Loire with that of Bourgoigne. The scheme for the prolongation of the Rue de Rennes at Paris, together with the construction of a new bridge over the Seine, has been adjourned *sine die*, partly on account of the estimated cost, which would amount to fifteen million francs, partly on account of the opposition of the Institut de France, part of the building of which would have to be demolished in prolonging the Rue de Rennes.—M. Ernest Letroune, architect, has died at the age of twenty-five. He was a member of the Société Centrale des Architectes. He had been a pupil of Léon Vaudoyer, and till 1860 was Inspecteur des travaux at the Louvre, and was also Professor at the Ecole des Arts Décoratifs. He was well known as the architect of many important buildings in Paris.—The Simla Fine Arts Exhibition appears to be a great success, and is said to contain many water colours of exceptional merit. The number of exhibits exceeds last year's total by 103. The recent cyclone has had the effect of considerably modifying the soundings of the approaches to Karachi Harbour, and dredging will doubtless be resorted to on a large scale.—The Panbani branch of the South Indian Railway has been completed and was recently opened for traffic. The line runs from Madura to Mandapam.—The hill station of Mussoorie is to have its water-supply considerably augmented; the engineer proposes to utilise the Kempt Falls to generate power for driving pumps at some springs far from the station.—The Corporation of Calcutta contemplate widening Municipal Office-street, owing to the congested traffic.

UNITED STATES.—Building contractors in Chicago are suffering from scarcity of labour, and have to pay about 10s. a day for the services of good carriers, and the like.—The Municipal Art Society of New York, has under consideration a scheme for improving the City Hall Park, and consolidating the municipal departments. The present buildings in the park are said to be all more or less shabby and inconvenient except the City Hall itself, which, however, is very much overcrowded.

MISCELLANEOUS.

CITY SUBWAYS REGULATIONS.—With a view to obviating the constant disturbance of the street traffic, the City Corporation has drawn up a number of by-laws which will shortly come into force. In future a company wishing to bring a pipe or wire (other than a service pipe or wire) into a subway, must give, in writing, fourteen days' notice to the Corporation, together with information as to the insulation and the highest electric motive force for which they may be used. Three days before any company can put a service pipe or wire into a subway, notice must be given to the City Engineer. Fourteen days' notice must be given by any company of its intention to remove any pipe or wire. In the case of repairs, three days' notice will be necessary. No work involving the alteration or reconstruction of any part of a subway will be permitted until the expiration of forty-eight hours after notice has been given to the owner of any pipe or wire in the subway. All companies owning pipes

or wires must, within six months of the confirmation of the by-laws, deposit with the Corporation full particulars of their pipes and wires, and in the event of any company failing to carry out the by-laws or of supplying incorrect information, it will be liable to a fine of 5s., and to a further penalty of 40s. for each day during which the offence is continued.

CAPITALIST COMBINATIONS.—At the Trades Union Congress last week, Mr. Ben Cooper moved "That, in the opinion of this Congress, the growth of gigantic capitalistic trusts, with their enormous power of controlling production, is injurious to the advancement of the working classes, as by such combination the price of commodities is raised, the standard of comfort of the people can be reduced, the workman's freedom endangered, and national prosperity menaced." He accepted an amendment from the Gas Workers' Union advocating national ownership of those monopolies. He held that the trusts and combines threatened their rights as workmen and could, if they wished, starve the people into submission. Mr. Clyne seconded the resolution, which was carried unanimously.

PICKETING.—At the Trades Union Congress last week Mr. R. Bell, M.P., moved:—"That the Congress again emphatically protests against the series of legal decisions in the House of Lords and in the Courts which have thwarted the express intentions of the Trade Union Act, 1871, the Conspiracy and Property Defence Act, 1875, and which have distorted the common law of the land in such a way as to deprive workmen of the full right of combination and to seriously jeopardise the funds of the Union collected with so much sacrifice of the toilers and to heavily demand for the maintenance of the rights of voluntary association enjoyed by them under the Trade Union Act, 1871, and of which they were deprived by the Taff Vale decision in the House of Lords. 2. Legalise peaceful picketing and persuading. 3. Make it perfectly legal for men to withdraw from the employment of any employer of contract, and also for Unions to sanction such withdrawal, and for officials to advise or convey the decision to withdraw under all circumstances where men are pursuing the objects of Trade Unionism. 4. To clearly define the law of conspiracy so that what is legal for one man to do should not be either a criminal offence or an actionable wrong if done by many in combination. 5. To generally define and codify the laws of Trade Unions and industrial disputes in accordance with the principles above expressed, and hereby instructs the Parliamentary Committee to immediately take the necessary steps to give effect to this resolution. And further pledges itself to do all possible to secure legislation on these matters by bringing proposals before through all the unions upon Members of Parliament and Parliamentary candidates, both in the Lobby and at the polls." He said that all they wished was to be put on an equality with the employers of the country. Every one had believed that Trade Unions were free from the interpretation put upon the law by the House of Lords, and he was not mistaken, they would be put upon such an equality. If a man was attacked by a striker, he could be punished by the magistrate, but it was absurd to hold the whole union responsible for the act of the individual.—Mr. Brace seconded the resolution, which was carried unanimously.

WAGES.—At the Trades Union Congress last week it was resolved to adopt the following series of resolutions:—"That the Parliamentary Committee be instructed to approach the Admiralty with a view of getting them to agree to pay to the various trades and grades employed in the building of Government vessels in His Majesty's Dockyards not less than the rate of wages as is mutually agreed upon between employers and workmen in the early part of the forthcoming Session, 1903, on the question of labourers' wages in all Government factories and dockyards, such discussion having for its object the raising of wages for labourers to a minimum of 30s. per week, and the payment of trade union rates of wages to all trades in such factories and dockyards. That this Congress is of opinion that in order to assist the better working of the Fair Wages Resolution of February, 1891, it is necessary that a list of all Government contracts given out by the separate Departments should be published monthly in the Labour Gazette, with the names and addresses of all contractors; and that a firm shall be taken to be an unfair firm that employs any workmen below the recognised standard, and instructs the Parliamentary Committee to at once take steps to bring this matter before the various Departments of the Government, and also obtain from Parliament a clearer definition or amendment to the Fair Wages Clause resolution respecting prices as well as wages, and what is a district for the purposes of the Clause."

CROMER ELECTRIC LIGHTING.—A Local Government Board inquiry was held by Major C. E. Norton, R.E., at the Town Hall, Cromer, on the

5th inst., into the application of the Cromer Urban District Council for sanction to borrow 25,000l. for purposes of electric lighting, and 2,500l. for the provision of a store yard on the north side of the Beach (Midland and Great Northern Joint Railway) Station in the town. There were present Mr. J. K. Frost (Clerk) and Mr. A. F. Scott (Surveyor), Mr. Edward H. Cozens-Hardy (Messrs. O'Gorman & Cozens-Hardy, consulting engineers), and others.

EDINBURGH MASTER BUILDERS.—The second annual excursion of the Master Builders' Association and Building Trades Exchange of Edinburgh took place on the 4th inst. to Alloa. A company numbering about eighty travelled from the Waverley Station to Alloa, thence in brakes to Rumbling Bridge. Rain fell heavily during the greater part of the day, but the weather cleared up in the afternoon, and the drive back to Alloa was made under pleasant conditions.

NATIONAL ASSOCIATION OF MASTER HOUSE PAINTERS AND DECORATORS.—A convention of the National Association of Master House Painters and Decorators of England and Wales is to be held in the Grand Assembly Rooms, Newcastle-on-Tyne, on the 23rd, 24th, 25th, and 26th insts. Mr. J. D. Grace, President of the Institute of British Decorators, will open an exhibition. The President of the convention is Mr. J. Graham Cole. Various papers are numbered about eighty travelled from the Waverley Station to Alloa, thence in brakes to Rumbling Bridge. Rain fell heavily during the greater part of the day, but the weather cleared up in the afternoon, and the drive back to Alloa was made under pleasant conditions.

OPEN SPACES.—By the purchase of Brandehow Park, on the western shore of Lake Derwentwater, a tract of beautiful pasture ground and woodland, which had been threatened with spoliation for building purposes, is permanently preserved for public enjoyment. The National Trust undertook negotiations for acquiring the property in the course of last summer, and in response to an appeal made by Canon Rawnsley the stipulated price of 7,000l. was subscribed in a shorter period than five months.

Bishop's Park, by the riverside at Fulham, which was recently acquired for 35,000l. (including a contribution of 17,500l. from the London County Council), is to be enlarged by the inclusion of the adjoining Fielders Meadow, a space of 8½ acres, at a further cost of 10,957l., to cover the laying-out of the land and the embanking of the river front. The Local Municipal Authority provide 4,957l. towards that amount, and the remainder will, under certain conditions, be defrayed by the Council.—Mr. W. P. Griggs, a member of the Essex County Council, has presented to the public a bridge which has just been built across the river Roding, and supplies a direct access to Wanstead Park from Ilford, where the Urban Council have purchased, as pleasure-grounds, 20 acres of the Cranbrook Park estate, to Wanstead Park. This new public resort constitutes the fifth public park in the Ilford district.—On July 15 Princess Christian opened the Alexandra Gardens by the riverside at Windsor, on a site acquired by the Town Council, and which have been tastefully laid out, with fountains and a band stand, mainly at the charges of Sir Francis Trevelyan, M.P. for the borough.—At Eastbourne was opened, on August 12 last, the Hampden Park, consisting of an estate of 82 acres, within 1½ miles distant from the sea, which Mr. Freeman Thomas, M.P. for Hastings, has made over to the Corporation for the nominal sum of 3,000l. Mr. Griggs, landscape gardener, laid out the park, in which a lake 4 acres in extent has been formed out of an old decay for wild ducks.—The Corporation of Stockport are about to lay out the Cale Green Park, 6 acres, which Mr. Henry Bell has presented to the burgesses.—Mr. Councillor S. Turner, Mayor of Rochdale, having bought Mount Falinge Park from the late Mr. E. A. N. Royd's trustees, will present it to the borough upon certain stated conditions for ensuring its enjoyment in quietude by the public. Mr. Turner will, in addition, expend in the laying out and planting of the park a sum of about 2,500l., and the Corporation agree to build the walls and otherwise adapt the grounds for the uses intended at an estimated outlay of 6,500l. Within the grounds, of nearly 10 acres, is a large mansion, which would serve for an art gallery or museum.—On August 30 was opened a public garden near the northern entrance into the new Blackwall Tunnel, acquired for about 4,500l. mainly at the charges of the London County Council. Of the two portions into which the playground is divided, that for girls and infants has a sand-pit; skirting the east side is a high wall of the East India Dock, along which a private road is let at a nominal rent by the London and East India Docks Company, and forms a gravelled terrace overlooking the two playgrounds.

CAPITAL AND LABOUR.

BURTON MASONS' STRIKE.—The masons' strike at Burton-on-Trent, which began five months ago for 8½d. instead of 8d. per hour, has practically come to an end. The men agreed to accept whatever the Board of Trade arbitrator might decide.

FENRHYN QUARRY DISPUTE.—The following is a copy of a letter sent by Lord Penrhyn to Mr. Henry Jones, Bethesda:—"Sir, The copy of a resolution forwarded by you as chairman of a meeting of some of my 'late quarrymen,' held at Beth-

eds on Saturday last, has been received by me. In replying to the inquiry as to whether I would be prepared to accept the services of the Right Hon. A. J. Balfour or the Right Hon. Lord Rosebery or both as conciliators, I must beg to point out that the chief ground of complaint made against myself by the strikers (and emphasised by your own primary reference to it at the Bethesda meeting) has throughout appeared to be based on my refusal to recognise a certain committee described as "The Quarry Committee," but my refusal on that point does not deprive the men of their right of combination for the representation of grievances, &c., as was clearly defined in Clause I. of the terms of settlement dated August 18, 1897, and I cannot admit that the matter is one for outside interference. I have always held, and for sufficient reasons still hold, the opinion that I have acted justifiably in refusing to recognise the authority or to sanction the pretensions of the said Committee; and I regret I must decline to accede to the suggestion that I should avail myself of the services of either of the gentlemen named in the resolution. (Signed) PENRYN."

LEGAL.

TYNEMOUTH BUILDING BY-LAWS.

AT North Shields, on the 3rd inst., Mr. J. T. Alexander, architect, was summoned for breaking a certain by-law made by the Tynemouth Corporation with regard to the level, width, and construction of new streets, and the provisions for the sewerage thereof, in that he laid out and formed a new street, to wit, King Edward-road, of a less width than 40 ft., as required by the by-law. Mr. H. A. Adamson, the Town Clerk, appeared on behalf of the Corporation in support of the summons, and Mr. G. R. Duncan represented the defendant.

Mr. Adamson said that in May last year Mr. Alexander submitted plans for some villas proposed to be erected in front of Holy Saville's Church at Tynemouth. It was observed, however, that the buildings were brought further forward than was shown by the estate plan. A new sketch plan was therefore sent in by Mr. Alexander, whose attention had been drawn to the matter, showing that he was going to leave a 40 ft. street. That plan was subsequently approved by the authorities, but in building the boundary wall, instead of leaving 40 ft. the width had been narrowed down in one part to 37 ft. 4 in.

Mr. J. F. Smillie, Borough Surveyor, gave evidence bearing out the above statement.

Mr. Armstrong, Assistant Surveyor, also gave evidence.

Mr. Duncan, for the defence, contended that Mr. Alexander had only built up to the boundary of the land conveyed to him from the Duke of Northumberland.

Mr. Alexander, in his evidence, said the boundary wall was built exactly on the site of the old wall, and did not encroach upon the footpath or highway.

The magistrates having conferred in private, Mr. S. O. Morrison said they had decided that there was an infringement of the by-law, and the defendant would be fined 20s. and costs.

THE KENT BRICKMAKING INDUSTRY.

A CASE of considerable interest to the Kent brick-making trade was heard on the 8th inst. at the Sittingbourne Petty Sessions. Messrs. Smeed, Dean, & Co., Ltd., of Sittingbourne, were summoned by the Sittingbourne Urban District Council, under the Public Health Act of 1875, by reason of a nuisance arising from a large accumulation of London refuse upon their brickfield. On July 1, this heap of refuse, which was 40 yards long, 30 yards wide, and 2 yards high, and is about 1,200 yards or 1,300 yards from the Town Hall, became ignited, and the fumes beat down into the town, causing much discomfort to the inhabitants. Mr. S. G. Lushington prosecuted on behalf of the Sittingbourne Council, and Mr. G. D. Lynch was counsel for the defendant company. The evidence showed that correspondence had passed between the Council and the firm upon the subject, but no attempt had been made to put out the fire. Proceedings then followed. The London refuse, it was stated, consisted of the garbage and filth of the Metropolis, and the smell emitted from it when burning was unbearable. It was contended that this refuse was the rough stuff which had been sifted after the ashes used in the burning of bricks had been taken from it, and that for purposes of brickmaking it was useless. It was suggested that the defendants might have put up a destructor, as had already been done by one local firm, with success, or they might have cut a trench through the heap and separated the burning portion, extinguishing the same with water or smothering it with earth. To all of these suggestions it was stated that those methods had been tried on previous occasions, and that the remedy was worse than the disease. Evidence in support of the prosecution was given by Mr. W. L. Grant (Surveyor), Dr. H. G. Sutton (Medical Officer of Health), Drs. F. Grayling and R. M. Boode, and Mr. F. G. Gibson (Chairman of the Council), who spoke of

the acrid, pungent nature of the smoke emitted from the refuse, which carried a long distance. The principal witness for the defence was Mr. George Andrews, the manager, who said that his firm employed 1,400 hands and paid from 70,000l. to 80,000l. every year in wages. For the past fifty years the firm had burnt "rough stuff" without any prejudicial effect to health. What the public suffered from was, he maintained, the smell of the open sewer discharging crude sewage into the creek, of which complaints had been made by his firm to the Council for years. No attempt had been made by the defendants to put out the fire, as it was impossible to do so. It was stated that men working among the "rough stuff" had not suffered in health, but they had done so in consequence of the foul exhalations of the open sewer. The Court held that the case had been proved, and the defendants were fined 20s., were ordered to prevent a recurrence of the nuisance, and were mulcted in costs to the extent of ten guineas. Notice of appeal to the Quarter Sessions was given.—Times.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

9,308.—ROAD SCRAPING AND SWEEPING MACHINES: A. Schmidt.—Brushes mounted upon cross-bars attached to a base of a machine, engage with recesses in discs, sweep mud and dust up pivoted shovels to buckets that are pivoted on to lugs of a toothed band passed around recessed discs and, just before their contents are discharged into a receiver, are bent backwards against the force of springs. Chain-gearing from one of the vehicle wheels drives two elevators. If shovels are employed, the bottom of the elevator is enclosed within a chamber that runs upon wheels, and has pins that engage with slots in the sides of the machine. A T-shaped brush elevator is adapted for cleaning the grooves of street-railway lines.

9,317.—APPARATUS FOR OPENING AND CLOSING VENTILATORS, DOORS, &c.: H. C. Price.—For the valve-mechanism of pneumatic cylinders is provided a three-way cock to direct compressed air from the supply-pipe to two pipes which are connected to the closing and opening cylinders respectively, right and left-handed screw plugs that are worked with cranks work the exhaust valves, a rod joining the cranks is reciprocated with a pivoted lever which is joined to a crank upon the three-way cock so that the exhaust-valve of the one pipe will be opened when compressed air is turned by the cock into the other pipe, and vice versa.

9,383.—MECHANISM FOR ROPES OF LIFTS, &c.: C. Becker.—One winding-rope is passed around one lower and two upper sheaves and also around a tension-pulley acted upon with a weight, whilst the other and larger rope is carried over upper and lower sheaves in turn and thence to a sheave mounted upon an adjustable trolley and so around two sheaves, one above the other, to the second cage.

9,366.—MEANS OF ESCAPE FROM FIRE: C. Schmidt.—For use, the ends of two ropes are taken out of their casings and fastened to the ends of a stout rope which is secured to the roof-structure. The ropes are passed around pulleys at the top of the building. The apparatus will serve for firemen's use as well.

9,376.—PLATES OF IMITATION MARBLE: J. Czernak.—On to a glass plate is applied a thin layer of cement, plaster of Paris, and so on, as a paste, which has been coloured to represent the ground of a natural marble. When the layer has become set, it is broken and the pieces are shifted about, the fissures are filled with a liquid cement coloured as marble veins, and more cement is then laid on. Strongly curved veins are formed by making the thin layer with a varying thickness, and for differently-coloured veins the plates of cement should be broken several times.

9,437.—SHAFT KILNS AND OVENS: F. Crandall.—For calcining cement, lime, gypsum, &c., the kilns are formed with their interior oblong set in cross-section, and sinuously, in order to give a similar course to the products of combustion, and to cause the material to roll over as it falls. The major axis of one cross-section at the top should be disposed at a right angle to the major axis of a section through the apertures for supply of gas, the intervening sections being inclined at corresponding angles between.

9,471.—SPIGOT, AND SOCKET, AND EXPANSION PIPE-JOINTS: G. F. Ryan.—The joints, which are especially intended for metallic and non-metallic articles, comprise an expansion joint for an earthenware sewer-pipe, and a metal soil-pipe, and a joint for the cleaning out connexion of a sewer pipe. In the latter instance, a metallic collar, which surrounds the socket flange, is fashioned in two portions that are to be bolted to one another, a closing lid which is bevelled at the end of the flange is bolted on to the ring. An outwardly curved flange constitutes an enlargement of the socket, and takes the jointing portion, and is surrounded by a metallic collar upon which are logs for screw-bolts. The flattened flange of the ring presses against an annular seal, packing being interposed. Another ring is forced against the gasket, and is bolted on to lugs upon the

collar. In another form, a metallic socket is bolted on to the straight or plain earthenware pipe.

9,485.—A VALVE FOR VENTILATION APPARATUS: C. Weiss.—The invention is for maintaining in positions parallel to its seating the regulator valve of dampers of ventilation openings, heating flues, and similar passages. The remoter ends of parallel motion links are pivoted on to the inner side valve-framing to which the links join the valve whilst the outer ends of the links are pivoted on the back of the valve-plate, the joints being stiff enough to retain the valve in its place as in another adaptation the valve is provided with counter-sunk seating, and the frame has a moulded section.

9,523.—FITTINGS FOR SINKS, LAVATORY-BASINS, &c.: L. Kosol and S. F. Randall.—The piston of the lower end of the pull-rod for the waste-socket is fashioned with an annular port through its round flange beneath is trapped in a bowl which is mounted upon an extended piece from the lower end of the pull-rod which will slide against the force of a spring fitted within the piston. A pressure of the rod forces the bowl on to its seat, whereby the annular flange will be closed against the bottom of the bowl.

9,527.—FUSE CASES OR BOXES AND THEIR FITTINGS: D. & W. Fuse Co.—The fuse is mounted in one of the two parts that constitute the box, the live terminals are mounted on the other part, the closing of the box completes the connection. In one shape a trough of some insulating material for the live terminals is placed in the box, a forked contacts are made secure, an insulating block having terminals with blade contacts is attached to the lid of the box, these pieces from the lid and those terminals, otherwise some subdivisions, the several fuses are made in the box and its lid.

9,552.—WOODEN FLOORING AND PAVING BLOCKS: H. Cooley.—The inventor devises means of allowing for contraction and expansion of wooden blocks inserting channel irons and springs alternately between the blocks and concrete or wood; one channel iron may be fashioned at its upper end with a flange that will take the flange of the other iron, and drainage can be facilitated by indenting the bottom of the angle-iron.

9,555.—FREEZING-TUBES FOR USE IN DRIVING TUNNELS AND SIMILAR WORKS: A. Gobert and J. H. Merivale.—For the driving of tunnels and the sinking of pits through quicksands by the freezing system the liquid is caused to flow through iron tubes which are disposed in series instead of parallel, and are so spaced apart as to be nearer to one another where they are more remote from the centre. The current may flow from different tubes in turn, or its direction may be reversed. The outer pipes are fitted with thermometers, and, in modification, any tube of a group of three can be removed out of the series, the valves being arranged accordingly.

9,595.—ATTACHMENTS FOR TELEGRAPH, TELEPHONE, AND SIMILAR WIRES: Q. Austin.—The wires are secured to insulators and so on by means of a plate which constitutes a fixed jaw with gripping surfaces, and there is a sliding jaw-plate to be worked with a pivoted case and a lever. As the jaws grip the wire the fastening is retained in position through the similar action of the lever exerted through a wire or spring.

9,607.—ROLL-CAPS AND OTHER FITTINGS FOR ROOFING PURPOSES: F. Green.—The curled edge of the roll-caps slide over the flanged edges of metallic sheets, and screws or nails driven through tongues and extensions secure flanged weather-pieces to the ends of the wooden battens or rolls. Each weather-piece is turned upwards against the upper roll, and nailed, after a screw has been driven through the tongue and cap into the lower wooden roll, and it is so indented or dished that it will cover the screw-head. The sides of the sheets are attached with clips to the rolls, and curled or welted joints join the upper and lower edges of the sheets to one another and also to the end-caps, which can be either left to slide freely or made fast with welted joints; otherwise, the end-piece has wings that are turned so as to clip the flanged end of the cap.

9,617.—PROCESS OF MOULDING ARTICLES OF CEMENT: A. C. Davis.—A hopper feeds the material to between rollers, water being supplied from a tank within the hopper, whence the cement is conveyed by means of rotating mixing-blades to the mould underneath; when the die or plunger has pressed a block a loose and lever-worked bottom ejects the block from the mould; provision is made for regulating the amounts of relative part of cement and water for the making of standard blocks or samples for testing purposes.

9,624.—BATHS (DOMESTIC): T. Pickup and D. Brantley.—Trunnions and standards support the bath, which when not needed for use can be turned up out of the way so as to enclose the heater or be itself enclosed; a socket on the top of the waste-pipe takes the outlet; for a water-heater the inventors place the upper part of the boiler in communication with an annular cone-shaped chamber, and connect the inner sides of the boiler by means of transverse tubes; between the boiler and the outer casing is a passage for heated air, tubes from that space are inserted through the boiler.

0.730.—PROCESS OF SLAKING LIME: F. A. Beny and J. Heinrichs.—A worm conveys the lime to a container, wherein it is stirred with agitators and slaked with water and steam. It is then transferred into tapered receivers to be completely slaked and dried by its own heat. After the draw-plates are pulled aside, the lime is screened in a cylindrical chamber, and all impurities are discharged.

0.793.—DRAWING COMPASSES: L. Myers.—Flaps that will form a three-sided socket for the end of the leg are fashioned on the socket, which is stamped out of a blank. A tongue which engages with a hole in the leg fastens the holder or socket. Two discs, between which the legs are pivoted, are hung from the middle handle, and projections from the nut prevent it from being turned.

0.811.—SIPHONICAL DISCHARGE: E. Jones and J. H. Moore.—The starting of the siphon, which is trapped, is effected by the opening of a valve at the lower end of a curved pipe which passes through the tank into the crown of the siphon, and will allow the escape of air from the crown. A spring that moves inside a cylinder retains the piston of the valve upon its seating, and there are openings through which the air can escape. The valve is opened by pulling down a handle against the action of the spring that is coiled around it within the cylinder.

0.828.—A SUBSTITUTE FOR BOILED LINED OIL: S. Amundsen.—The substitute for boiled lined oil is intended for use in the mixing of paints and also in the coating of metals and damp surfaces. It is compounded of soap solution, casein, slaked lime, water, oil of turpentine, with the addition, it may be, of ammonia, in order to obviate the setting out of the casein and lime.

0.891.—CONSTRUCTION OF CONCRETE BUILDINGS: T. C. Farrell.—In building walls, piers, columns, &c., the concrete is retained with planks that are held together by means of flanged shoes that have the shape of H in the cross-section, and in their plan are either forked, angular, straight, or T-shaped. Rounded transverse ribs, fashioned upon the webs of the shoes, are pierced for connecting-bolts, and the planks are kept in position by spikes upon the cross-ribs.

0.892.—MANUFACTURE OF ARTIFICIAL STONE: H. E. Carter.—The blocks are described as being available for building, paving, flooring, wall-lining, and cognate uses. They are formed of an admixture of either cement or sand, broken stone and brick, clay, loam, and so on, with sodium, potassium or other alkaline silicate, and water. The dried blocks are then treated with a solution of calcium chloride.

- MEETINGS.
- SATURDAY, SEPTEMBER 13.
- Architectural Association.—Sixth summer visit, to view Church and Monastery of St. Francis, Bocking Bridge, Essex, by the late Mr. J. F. Bentley.
- Incorporated Association of Municipal and County Engineers.—Yorkshire District meeting, Shipley.
- WEDNESDAY, SEPTEMBER 17.
- Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members, 8 p.m.
- SEPTEMBER 13 TO SEPTEMBER 20.
- British Archaeological Association.—Fifty-ninth Annual Congress, Westminster and Home Counties.

SOME RECENT SALES OF PROPERTY:

- ESTATE EXCHANGE REPORT.
- August 28.—By ALEXANDER BERRYMAN (at Penance).
- Sennen, Cornwall.—The Skeviack Estate, 200 a., 1, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256, 1/512, 1/1024, 1/2048, 1/4096, 1/8192, 1/16384, 1/32768, 1/65536, 1/131072, 1/262144, 1/524288, 1/1048576, 1/2097152, 1/4194304, 1/8388608, 1/16777216, 1/33554432, 1/67108864, 1/134217728, 1/268435456, 1/536870912, 1/1073741824, 1/2147483648, 1/4294967296, 1/8589934592, 1/17179869184, 1/34359738368, 1/68719476736, 1/137438953472, 1/274877906944, 1/549755813888, 1/1099511627776, 1/2199023255552, 1/4398046511104, 1/8796093022208, 1/17592186044416, 1/35184372088832, 1/70368744177664, 1/140737488355328, 1/281474976710656, 1/562949953421312, 1/1125899906842624, 1/2251799813685248, 1/4503599627370496, 1/9007199254740992, 1/18014398509481984, 1/36028797018963968, 1/72057594037927936, 1/144115188075855872, 1/288230376151711744, 1/576460752303423488, 1/1152921504606846976, 1/2305843009213693952, 1/4611686018427387904, 1/9223372036854775808, 1/18446744073709551616, 1/36893488147419103232, 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COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiura.	Designs to be delivered
*Technical Schools and Free Library	Raingate Corporation	50l., 25l., and 15l.	No date

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Diversion of Shooters Brook	Manchester Corporation	The Secretary, Rivers' Department, Town Hall, Manchester	Sep. 16
*Cottages, Iron Shed, Gates, Fencing, &c.	Hendon U.D.C.	Council's Engineer, Dyne-road, Kilburn, N.W.	do.
*Wood-paving Works	Willesden District Council	C.W. Hunt, Architect, 132, Station-road, Ilkeston	Sep. 16
*Laundry, &c., Henric-road	Ilkeston Hospital Committee	J. Cowgill, Engineer, Pearl Assurance Buildings, Bradford	do.
Road Works, Northfield, Wibsey	Pontypriid School Board	A. O. Evans, Architect, Pontypriid	do.
Schools, Traillu	Crewe Town Council	W. E. Shore, Surveyor, Earle-street, Llew	do.
Sewerage Works, &c. (500 ft.)	Dover Town Council	H. L. Sturge, Civil Engineer, Biggs-street, Dover	do.
Sewerage Works, Liverpool-street	Aldershot U.D.C.	J. V. Edwards, County Hall, Wakefield	do.
Receptacles, Pumping Stations, &c.	Tatbury R.D.C.	N. F. Dennis, Civil Engineer, Council Offices, Aldershot	do.
Gravities and Quatities	Ilkeston Hospital Committee	W. H. Sturge, Civil Engineer, Biggs-street, Dover	do.
Making-up Roads	Tatbury R.D.C.	C. J. Brown, Architect, Cathedral Offices, Norwich	do.
Sewerage Works, near Burton-on-Trent	Poulton (Morecambe) Sch. Bd.	C. W. Tilly, 5, Morecambe-street, Morecambe	do.
Schools, Thorpe Hamlet	Ilkeston Hospital Committee	C. W. Hunt, Architect, 132, Station-road, Ilkeston	do.
Wrought Iron Railings, &c., Bare	Frimley U.D.C.	F. C. Uren, Surveyor, High-street, Camberley	do.
Additions to Ho-stre	Tynemouth Corporation	J. F. Smilie, Surveyor, Town Hall, Tynemouth	do.
Drainage Works, High-street, Camberley	Croydon Town Council	E. Mawdesley, Town Hall, Croydon	do.
Pipe Sewers, Preston, North Shields	Aldershot U.D.C.	N. F. Dennis, Civil Engineer, Council Offices, Aldershot	Sep. 17
Road Works, Lodge-road	Commercial Gas Co.	Lhos. Stokes, Architect, Thirsk	do.
Sewerage Works, Wellington-street	Barley Corporation	Company's Offices, Stepney, E.	do.
Nurses Home, Ripon	Barley Corporation	T. & C. Hawksley, Engineers, 30, Great George-street, S.W.	do.
*Disposal of Breeze	Barley Corporation	Borough Surveyor, Town Hall, Eccles	do.
Supply of Lime	Barley Corporation	J. Urquhart, Architect, Bank-street, Carlisle	do.
*Fitter Beds, &c., Upper Midhope	Barley Corporation	The Clerk, Union Workhouse, Leytonstone, N.E.	do.
Street Works, Beach-street, &c.	Barley Corporation	Borough Surveyor, 29, Ker-street, Devonport	Sep. 18
Waterworks, Collingford	Barley Corporation	A. S. Munting, 21, Eilston-place, Newcastle-on-Tyne	do.
*Oscillable Iron Railing, Oak Cliff, Fencing with Gates	Barley Corporation	Stevens & Dunsell, Architects, 35, Parliament-st., Westminster	do.
*Buildings at Gas Works	Barley Corporation	J. F. Burns, Borough Surveyor, 29, Ker-street, Devonport	do.
*Buildings at Gas Works	Barley Corporation	Bowen & Winslow, Engineers, Town Hall, Reading	do.
Paving Works, seaton, Dehval	Barley Corporation	G. B. Sheddley, Gas Office, Swadlow, Burton-on-Trent	Sep. 19
Buildings at Gas Works	Barley Corporation	A. Mounsey, C. E., Town Hall, West Juddbury, Lancs.	do.
Guidings at Gas Works	Barley Corporation	W. Phillips, Paints, Pontiffrith, Tredegar	do.
Tramways Materials	Barley Corporation	S. Edmondson, Surveyor, 18, Nicholas-street, Burnley	Sep. 20
Engine and Boiler House, &c.	Barley Corporation	R. Berry, Architect, Commercial-street, Halifax	do.
Road Works, Wilbraham-road, Charlton-cum-Hardy	Barley Corporation	R. M. Kilip, Borough Surveyor, 12, Tay-street, Perth	Sep. 22
Twenty Cottages, Pontiffrith, Wales	Barley Corporation	H. W. Jukes, Surveyor, Owen-street, Tipton	do.
Sewerage Works, &c., Huncoat	Barley Corporation	Borough Surveyor, Bridge-street, Walsall	do.
House, &c., Spring-gardens, Eiland, Yorks	Barley Corporation	R. Decker, 10, Newhall-street, Birmingham	do.
Artisan's Dwellings, Victoria-street, &c.	Barley Corporation	W. Banks, Civil Engineer, Council Offices, Heaton Moor	do.
Granite Road Metal (300 tons)	Barley Corporation	Walker & Collinson, Architects, Swan Arcade, Bradford	do.
Four Houses, Laly-lyly, near Brecon	Barley Corporation	Borough Engineer, 15, Great Alie-street, E.	do.
Schools, High Brooms	Barley Corporation	Council's Engineer, Dyne-road, Kilburn, N.W.	Sep. 23
Sewerage Works, &c., Parsonage-road	Barley Corporation	Council's Surveyor, Town Hall, Wood Green	Sep. 24
Additions, &c., to House, Oak Tree-lane, Selly Oak	Barley Corporation	do.	do.
Sewerage Works, &c., Parsonage-road	Barley Corporation	do.	do.
Semi-detached Villas, Birkenhead	Barley Corporation	do.	do.
*Stores, Cart & Van sheds, Lodge, & Public Urinals	Barley Corporation	do.	do.
*Wood Fencing and Gates	Barley Corporation	do.	do.
*Making-up Roads	Barley Corporation	do.	do.
*Making-up Asphalt Paving, &c., of Terrace	Barley Corporation	do.	do.
Two steel Girder Bridges, Redond, Kingston-on-Hull	Barley Corporation	do.	do.
Electric Plant, &c.	Barley Corporation	do.	do.
Laboratories in Duke-street, Chelmsford	Barley Corporation	do.	do.
*Accession of Turkish Bath, adjoining existing Baths	Barley Corporation	do.	do.
Turkish Bath Buildings	Barley Corporation	do.	do.
Sewerage Works	Barley Corporation	do.	do.
Making-up Roads	Barley Corporation	do.	do.
Schools, Normanton-road	Barley Corporation	do.	do.
Granite Road Metal	Barley Corporation	do.	do.
Additions to sewage Outfall Works, Appledram	Barley Corporation	do.	do.
Road Making and Paving Works, Tottenham	Barley Corporation	do.	do.
Water Supply Works, Louththorpe, Maton	Barley Corporation	do.	do.
*Dining Hall and Laundry buildings at Workhouse	Barley Corporation	do.	do.
*New County Offices, Chesham	Barley Corporation	do.	do.
Accession of Hotel, Nymouth, Devon	Barley Corporation	do.	do.
*New Offices & buildings for County Surveyor, Hertford	Barley Corporation	do.	do.
*Weights & Measures Testing Office, &c., Greenwich	Barley Corporation	do.	do.
Pipes, Valves, Excavating Irons, &c.	Barley Corporation	do.	do.
Three Shops and House, Larkow	Barley Corporation	do.	do.
Two Houses, Larkow	Barley Corporation	do.	do.
Read, Mount Hadfield Estate	Barley Corporation	do.	do.
Sewerage Works	Barley Corporation	do.	do.
Additions to Grove Hospital, Leighton Buzzard	Barley Corporation	do.	do.
Additions to Brewery, Coughton, Lancs.	Barley Corporation	do.	do.
Two Houses, Thornhill Lees, Dewsbury	Barley Corporation	do.	do.
Four Cottages, Dewsbury	Barley Corporation	do.	do.
Two Houses, Cadcott, Mon.	Barley Corporation	do.	do.
Schools, Beverley, Yorks.	Barley Corporation	do.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Manual Training Instrs. & Asst. Instrs. in Metal Work	London School Board	100l. and 50l.	Sep. 16
Clerk of Works	Tottenham U.D.C.	22 3s. per week	Sep. 18
Assistant Lecturer in Civil Engineering	Hartley College, Southampton	150l. - 150l.	Sep. 24

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv, vi, viii, & x. Public Appointments, xxi.

LONDON.—For the erection of new warehouses, Dard-well-street, Whitechapel, for Messrs. Kearley & Tonge, Ltd. Messrs. William Eve & Sons, architects, 10, Union-court, Old Broad-street, E.C. 1:—

Substructure.	
Foster & Dicksee .. £2,575	F. & H. F. Higgs .. £1,624
Holloway Bros. 1,785	Patman & Potbering ..
Perry Bros. 1,637	ham
Kilby & Gayford .. 1,652	Harris & Wardrop .. 1,623
Nightingale	1,630
	Limehouse, E.C. 1,549

LOWESTOFT.—For Baptist schools, Grove Park, Lowestoft. Messrs. George Baines & R. Palmer Paines, architects, 5, Clement's Inn, Strand, London, W.C. 1:—

W. Knights .. £2,040 12 0	Bedwell &
J. Welham .. 1,814 10 0	Parker .. £1,600 0 0
R. C. Todd .. 1,799 0 0	C. R. Cole .. 1,670 0 0
G. Elsey 1,710 0 0	C. E. Earl .. 1,466 17 0

OXFORD.—Accepted for addition to, and reconstruction of, laundry at Radcliffe Infirmary. Mr. J. Augustus Souttar, architect, 42, Bishopsgate-street Within, E.C. 2:—

Kingler & Sons, builders, Oxford £1,225
D. and J. Tullis, Ltd., London, laundry engineers

PARKESTONE (Essex).—For the erection of new schools for 570 children and alterations to the present schools, boundary walls, playground, &c., for the Ramsey School-Board. Messrs. Start & Rowell, architects, Colchester. Quantities prepared by the architects:—

The Oak Building .. £5,875	E. West .. £4,959
Society	Grimwood & Son .. 4,885
A. E. Symes .. 6,670	E. Saunders .. 4,799
C. & J. Ambrose .. 6,050	Theobald .. 4,582
A. W. Robins .. 5,786	Dupont & Co. 4,156
McKay	5,720
F. Bennett .. 5,181	Smith & Beaumont, Harwich .. 4,096
F. Chambers .. 4,097	

RYTON-ON-TYNE. For road improvement works, also construction of a culvert, Spen Burn, for the Urban District Council. Mr. J. P. Dalton, Engineer, Council Offices, Ryton-on-Tyne. Quantities by Engineer:—

Hardy & Atkin .. £714 0 8	B. Firth .. £370 10 0
son	M. A. Armstrong 259 13 4
W. Cumming .. 460 0 4	A. Trench, Blaydon ..
G. Wells	330 15 2
	don't .. 232 10 1

[Engineer's estimate, £350.]

SHEFFIELD.—For new Board School, Greystones, Sheffield, for the Sheffield School Board. Messrs. Hemmell & Paterson, architects:—

Ash, Son, & Biggin, Furnival-street, Sheffield, £10,795

SHIRLEY.—For tar-paving Shirley (Southampton) Board Schools. Mr. John H. Bizard, Architect and Surveyor to the School Board:—

North of Eng-land Asphaltic Co. £1,043 12 0	Bradshaw & Son £849 0 0
J. Brook	1,015 7 0
Jenkins	330 15 2
Sons, Ltd. 865 0 0	

SWANSEA.—For the erection of a house at the Olchfa, Sketty, Swansea. Mr. Glendinning Moxham, architect, 39, Castle-street, Swansea:—

Lloyd Bros. £2,970	Walters & John .. £2,600
J. & F. Weaver .. 2,650	John Davies .. 2,576
David Jenkins .. 2,645	Bennett Bros. 2,547
Henry Billings .. 2,630	

[All of Swansea.]

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SWANSEA.—For the erection of new chancel, St. Barnabas, Waunarlwyd, Swansea. Mr. Glendinning Moxham, architect, Swansea:—

John Davies .. £2,320 10	Walters & Johns .. £460 0
Thomas Richards .. 532 1	Bennett Bros. 459 0
Henry Billings .. 517 0	

[All of Swansea.]

SWANSEA.—For rebuilding shop, 19, High-street, Swansea. Mr. Glendinning Moxham, architect, Swansea:—

Henry Billings, Swansea .. £380

SWANSEA.—For additions to Brynbiaru, Swansea. Mr. Glendinning Moxham, architect, Swansea:—

H. Billings, Swansea .. £250

SWANSEA.—For a pair of cottages, Merton, Swansea. Mr. Glendinning Moxham, architect, Swansea:—

H. Billings .. £596	T. Davies, Swansea .. £520
---------------------	----------------------------

TALYBONT (Wales).—For the erection of water supply works for the Brecknock R.D.C. Mr. B. L. Pritchard, surveyor, 8, Castle-street, Brecon:—

David Willis .. £791 0	E. Fryer Bros., F. Martin .. 474 11
	Brecon .. £460 0

[Surveyor's estimate, £450.]

WREXHAM.—For widening road, &c., Pentre Broughton, for the Rural District Council. Mr. A. Woolley, surveyor, 2, Temple-row, Wrexham:—

E. Jones, Wrexham .. £467 0 0
R. S. Roberts, Broughton .. 210 18 9

[Surveyor's estimate, £450.]

YSTALYFERA.—For new shop at Ystalyfera, for Mr. Luther Lloyd. Mr. Glendinning Moxham, architect, Swansea:—

Marles Bros. £710 0	D. Rees, Ystalyfera .. £512 10
Benjamin Lewis .. 610 0	

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The Builder.

VOL. LXXXIII.—No. 3111.

SEPTEMBER 20, 1925.

ILLUSTRATIONS.

The Nile Dams:—

Barrage Across the Nile at Asyût: (1) Views of Work Completed and in Progress; (2) Elevation and Section. Reservoir Works, Aswân: (1) General Plan and Sections; (2) View of Buttress and Sluice.

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The Nile Dams.



LAST month witnessed the completion of the great dam at Aswân, a work that is not only worthy to rank among the highest achievements of modern engineering skill, but must also be classed with the most beneficent undertakings that have ever been inaugurated by men for the help of their fellows. Although we say this work has been completed, we do not mean to imply that it stands alone as a record of what has been accomplished by British energy in connexion with the engineering control of the Nile, nor that it marks the limit of what should, and probably will, be done in the same direction.

On a previous occasion we pointed out how vastly the condition of Lower Egypt has been ameliorated by the repair, or more correctly the completion, of the original barrage, so that it was for the first time made strong enough to perform the duty for which it was designed. In the same article we considered the general nature of the problem presented by the peculiar physical characteristics of Egypt, and while discussing the scope of the great scheme formulated by Mr. Willcocks, then Director-General of Reservoirs to the Egyptian Government, we showed that the dam at Aswân, the barrage at Asyût, and the subsidiary works recommended, could not secure the water supplies necessary for the whole of Egypt. Lower and Middle, and Upper Egypt are now reasonably assured of water in adequate quantity, even during the most unfavourable years, but the Soudan still depends on the variable supplies afforded by natural conditions. Improvement of the Upper Nile, and control of its head waters will, no doubt, come in process of time to afford relief to the provinces lately rescued from the tyranny of barbarism.

Our present object, however, is not to deal with the future, and attention will therefore be confined to the important works already completed. These works are not to be looked upon as isolated units, for the influence of one may be felt by another situated at a distance of hundreds of miles. So we find that the Nile Reservoir at Aswân

enables the administration to maintain a higher level at the Barrage in Lower Egypt. Additions 1½ metres high have been fixed to the 122 upper gates of this well-known structure, and a third winch has been provided for lifting the gates at each branch of the river. Hence the top of the gates when down is now at R.L. 15.50 metres*, instead of R.L. 14.00 metres, as before. As all the structural difficulties in connexion with the barrage were caused by the nature of the foundations, it was decided to construct auxiliary weirs below the barrage to reduce the stress, which, of course, would be increased by the greater depth of water held up. The system adopted was a novel one, for which Major Brown, Inspector-General of Irrigation in Lower Egypt, deserves every credit. His object was to minimise the employment of plant and skilled labour, and this was attained, without attempting to dry the bed of the river, by grouting rubble dropped from rafts into a movable timber caisson. Thus solid masonry blocks were formed one after another, extending across the river. In this way both branches of the Nile were dammed, and a navigation lock was provided for each at a cost of about half a million sterling. These works have attracted little attention in this country, but their value to Lower Egypt is not to be overlooked. People are very apt to forget the usefulness of the barrage feeding the six main irrigation canals below Cairo. Even in exceptionally dry seasons, the central canal carries a volume of water one-fourth greater than the Thames in mean flood; two canals on either hand of the two branches of the river carry together one-half more than the Thames; and the Ismailieh Canal is approximately double the size of the Thames. Consequently, as the whole flow of the Nile, during the summer months, is held up and passed into the canals mentioned, the old barrage will always be the most important work connected with the irrigation of Egypt. In addition to improvements at the Barrage, auxiliary works for controlling supplies of water have been carried out, one of the most important being the Ibrahimiyah Canal regulator and lock. The regulator, consisting of nine bays of 5 metres each, is designed to regulate the supply entering the canal during high floods, so as to prevent danger to the canal

itself, or to the different regulators and canals at Deirut.

The most notable work for the advantageous utilisation of water stored up in the great reservoir at Aswân is the newly made barrage across the Nile at Asyût. This extensive work, situated about 250 miles above Cairo, was commenced in the winter of 1898, and completed during the early part of the present year. By the aid of the barrage the perennial irrigation of lands in Middle Egypt and the Fayoum will be improved, and it is estimated that by throwing more water at a higher level into the Ibrahimiyah Canal, the intake of which is immediately below the barrage, fully 300,000 additional acres of land will be brought under irrigation.

A general view of the structure is given in one of our plates, from which it will be seen that in general principle it resembles the barrage at the Delta, though in constructional details there is no similarity. The Asyût barrage is an open weir of 111 bays, each 5 metres wide; abutment piers 4 metres thick occur after every ninth opening, the intermediate piers being 2 metres thick; and the piers are spanned by arches carrying a roadway 4.50 metres wide. Each opening is provided with two regulating gates, one upper and one lower, each 2.50 metres high, and these are capable of holding up from 2.50 to 3.00 metres of water during the summer months. The length of the barrage is 833 metres (2,750 ft.) and its height from the floor surface to the roadway is 12.50 metres.

On the western side a lock is provided, 80 metres long by 16 metres wide, large enough to permit the passage of any steamer used on the Nile. As the bottom of the river at the site of the barrage consisted of sand, a foundation had to be artificially made upon which the superstructure might be raised, and in order to avoid trouble such as followed the Delta barrage so persistently, the greatest care was bestowed on the design of the foundation. From the drawings we publish it will be observed that the floor is a platform of masonry, which extends from shore to shore. It is 26.50 metres wide by 3 metres thick, and is protected up and down by a continuous line of cast-iron grooved and tongued sheet piling, with cemented water-tight joints. This piling extends into the sand bed of the river to a depth of 4 metres below the under side

* i.e., 15.50 metres above mean sea-level at Alexandria; "R.L." standing for "Reduced Level."

of the floor, thus cutting off the water, and preventing any undermining action of the kind that proved so disastrous to the Delta barrage.

In order to afford protection against erosion, the river bed is covered for a width of 20 metres up stream by stone pitching with a bed of clay puddle to check infiltration, and down stream for a similar width by stone pitching with an inverted filter-bed beneath, as a precaution against the removal of sand by springs that might possibly be caused by the head of water above the sluices. The original intention was that the floor should be a combination of concrete and brickwork, and the superstructure entirely of brickwork. As the clay obtainable near the site of the works was found to be unsuitable for brickmaking, it was decided to employ Isawiyah stone instead of bricks. The concrete and masonry of the floor are in cement mortar, and in the walls and piers above floor level, the mortar is of lime and homra.

By reference to the cross-section of the Asyut barrage it will be readily seen that the profile is proportioned suitably for the conditions prevailing both in winter and summer. At the time of high flood the head of water is only 15 centimetres, and in summer it is not more than 300 metres. Hence the barrage requires very little batter on the down-stream face, and its general appearance very much suggests a causeway thrown across the broad expanse of waters. In deciding upon the system to be adopted in the construction of the barrage, the peculiar, and to some extent advantageous, conditions of the river were duly considered. There is only one flood in the year, and within small limits the time of its occurrence can be foretold. Between November and July the state of the Nile is favourable for the execution of below-water work; and the mode of procedure followed was to enclose the site of the work to be done in one season by temporary dams, or "sadds," and then to pump out the water and to carry the work above low Nile level before the end of June. In the season following the upper portion of the masonry could be completed without difficulty. The wisdom of this system will be recognised when it is remembered that the construction of sadds would be unnecessarily expensive, without any counterbalancing advantages, if attempted when the river was at a higher level than that prevailing in November, and that it would not be possible at any reasonable cost to prevent the sadds from being carried away by the flood in July. So the programme was to dam off a portion of the site, to pump the bed of the river dry; then by crowding on the men, to excavate, drive the cast-iron sheet piling, build the masonry floor and piers, and so to get the work up to such a height that the temporary dams would not want rebuilding in the season following.

The work undertaken during the first season was confined to the western side of the river, and consisted in laying the floor forming the foundations of the lock, together with the floor under the site of twenty-nine regulating gate openings—representing about one-quarter of the length of the barrage—and building the lock walls and piers up to a height just above the summer Nile level. Temporary damming was started on December 1, 1898, the sadds including 96,228 cubic

mètres of material, and requiring the use of 289,332 sandbags. Pumping was commenced early in February, 1899, the area drained being about 13 acres; and for the purpose of keeping the water down, ten 12-in. pumps and several smaller centrifugal were kept at work until the end of July. Pile-driving, begun on March 2, necessitated the use of 693 lineal mètres of cast-iron piles, weighing more than 1,110 tons, in addition to 12,120 cubic feet of timber piles. Concreting and masonry work were commenced during the first week of May, and continued for a great part of the season, by night as well as day, until August 6, the sadds enclosing the site of the season's work being cut through on the next day. Numerous springs burst up through the sand over practically the whole site of the foundations, but grouting pipes were left over all important springs, and on completion of operations for the season, all cavities formed by the water were grouted up through the pipes. The amount of work performed during the season 1899 may be realised by the statement that the chief items included the following quantities:—Excavation and filling, 359,432 cubic mètres; pitching and clay puddle, 30,147 cubic mètres; concrete and masonry in floor, 28,929 cubic mètres; and masonry above floor level, 8,307 cubic mètres.

A very low flood in 1899 afforded favourable conditions for the early commencement of preliminary works in the ensuing season, but from soundings taken during and after the flood, it was found that some alterations had taken place in the bed of the river, making the conditions less favourable for work than in the previous season. The deep channel had moved towards the east bank, the sand-bank on the west side had increased in width, closing up the narrow deep channel previously existing near the bank and completely covering with silt the end of the previous year's work on the floor of the barrage. In the second season, sadd-making was commenced on the west side about November 23, and on the east side on December 5. By January 10, new sadds were completed, enclosing a further length of 150 mètres on the west side, and 140 mètres on the east side. Pile driving was commenced at the west side on January 23, and at the east side on February 10, concreting being started about a month later in each case. At the same time, masonry in continuation of the previous season's work was commenced, on the lock wall in the latter part of December, and on the piers about the middle of January. The construction of the new sections of flooring and pier masonry was pushed forward under the highest possible pressure until July 23, when the rising flood burst through a weak point in the sadds, submerging pumps and machinery, and stopping all further work. As the accident occurred only about five days before the date fixed for the termination of work, and as most of the plant was recovered by the aid of divers, the immediate inconvenience was not very serious. The after results were more important, for although the piles on the up and down stream sides of the floor had been driven right across the river, a length of 20 mètres of floor remained wholly unbuilt, and a further length of 140 mètres only partially built. Hence the reconstruction of sadds was inevitable in the next season of

work. Bad springs were again encountered over the greater part of the site, all of which required special treatment as before described. During the season the sadds enclosed at various times the whole width of the river bed commencing from the end of the previously completed work. Navigation was carried on through the deep channel on the east side until the end of May, when the channel was closed by joining up the sadds from the west side, with a cross sadd enclosing other sadds starting from the east side of the river. A new channel for navigation was provided by cutting the up and down stream sadds, and the new waterway then ran over the finished floor on the east side, two of the masonry piers having been left unbuilt for the purpose. This was the only navigable channel until the end of July, when the rising flood made navigation practicable through the lock and over the tops of several unfinished piers. The extent of the work executed may be realised from examination of the following quantities, which merely relate to the season of 1900:—Sadds, 233,100 cubic mètres; sandbags used on sadds, No. 1,462,000, excavation and filling, 421,870 cubic mètres; dredging, 92,000 cubic mètres; cast iron piles, 1,246 lineal mètres; concrete and masonry in floor, 46,126 cubic mètres; masonry above floor level, 26,320 cubic mètres; pitching and clay puddle, 52,183 cubic mètres. The average daily number of men employed from January to April was about 8,000, but in May and June nearly 13,000 men were engaged daily. Seventeen 12-in. and several smaller centrifugal pumps were constantly at work throughout the season for keeping the water down. The work done during 1900 represented nearly one-half of the whole, and with the amount done in the previous year, three-quarters of the entire structure. The navigation channel, of which we reproduce two photographic views, was practically completed, twenty-seven piers were carried up to their full height, forty-three up to three-quarters their full height, and nineteen up to a little more than summer water level, leaving only twenty-one piers to be built. As we have before said, the barrage was finally finished in the spring of the present year, thus providing the second great regulating valve in the immense conduit that supplies the land of Egypt with water.

The great dam at Aswân is 350 miles above Asyût, and 600 miles above Cairo, and the site is clearly favourable for the establishment of a reservoir such as that which has now become an accomplished fact. Fully forty years ago Sir Samuel Baker suggested the same site, saying:—"The great work might be commenced by a single dam above the first cataract at Aswân, at a spot where the river is walled in by granite hills. By raising the level of the Nile 60 ft., obstructions would be buried in the depths of the river, and sluice gates and canals would conduct the shipping up and down stream." In more recent times, the question of barrage was studied in an exhaustive manner by Mr. Willcocks, in accordance with the instructions of Sir William Garstin, Under-Secretary of State. Mr. Willcocks occupied four years in preliminary investigations and in the preparation of alternative schemes relating to the construction of dams at different points along the Nile. He unhesitatingly decided that

the Aswân site was the best, and this opinion was shared by Sir William Garstin, who proposed, however, that the whole question should be referred to an International Committee consisting of Sir Benjamin Baker, Signor Giacomo Torricelli, and M. Auguste Boulé. As a result of this reference, it was decided to construct a dam to hold up water to R.L. 114, across the head of the Aswân Cataract to the north of the Island of Philæ, the Commission being of opinion that this was the only site offering the necessary conditions of solid rock foundations, width of waterway, facility of construction, and sufficient storage capacity. The original plans prepared by Mr. Willcocks were generally described in our previous article, and would have resulted in a reservoir with a storage capacity of 1,700 million cubic metres of water. Unfortunately, it happened that the scheme involved submersion of the temples on the island of Philæ, and so, finally, the decision was made that fresh designs, incorporating modifications proposed by Sir Benjamin Baker and Signor Torricelli, should be prepared by Mr. Willcocks. It was also settled that the maximum water level should be reduced to R.L. 106, thus giving the reservoir a storage capacity of 1,065 million cubic metres, much less than one-third the original quantity. The project represented by these designs is the one that has now been carried into execution. As our readers will see from the general plan included in one of our plates, the succession of independent curved dams in the original scheme is replaced by a single dam, stretching in an unbroken line—1½ miles in length—from shore to shore of the river. No doubt the single dam constitutes a more imposing monumental work than a series of independent dams, at the same time offering better facilities for organisation of the contractor's work and for rapid construction. Further, it is the opinion of Sir Benjamin Baker that the straight dam is better able to resist temperature stresses from extreme heat without cracking. Various other alterations were adopted in the final plans, relating to the dimensions, construction, and arrangement of the sluices, and to the dimensions of the dam itself. After the appointment of Sir Benjamin Baker as consulting engineer, some difficulty arose from the nature of the financial arrangements proposed by the Egyptian Government, but these were smoothed away by the timely help of Sir Ernest Cassel, and in February, 1898, a contract was signed for the execution of the works, the date of completion being fixed as July 1, 1903.

As already stated, the dam is designed to hold up water to a level of 106 metres above mean sea level, and as the lowest level on the down stream side is about 86 metres above mean sea level, the maximum head on the dam will not exceed 20 metres. The reservoir will be filled up every year between December and March, after the flood has passed, and will be discharged during May, June, and July, when the normal supply of water is small and the need of the cultivator is great. At that season of the year the flow of water contributed by the reservoir will be equal to a river double the size of the Thames in mean annual flood condition. For proper regulation of the flow the dam is pierced by 140 under sluices,

each of 14 square metres area, and by forty upper sluices, each of 7 square metres area. During flood time the sluices will be kept fully open, so that the red water may pass freely through without deposition of the fertilising silt. After the flood, when the water has become clear, the sluices will be gradually closed. In ordinary years the reservoir will be filled by the beginning of March, when some of the upper sluices will be opened to permit the discharge of surplus water, the level in the reservoir being maintained at R.L. 106. In May, when an increased quantity of water is demanded for summer crops, the sluices will be opened so as to supplement the supply in the river, and the reservoir will be discharged until about July 1, when all the sluices will be fully opened to pass the waters of the annual flood.

Bearing in mind the immense volume of water stored, it may seem that its judicious addition to the natural summer flow should abundantly satisfy all needs. It is true that the supply will be reasonably assured, and that freedom from water famine may be anticipated even when the supply is most deficient. But the supply will not be abundant. Water must still be husbanded and doled out, as rations are to a shipwrecked crew, all receiving a fair though strictly limited share at appointed times. It is a revelation to the average Englishman to read the elaborate regulations that fence round the use of water in Egypt. The most elaborate systems of rotation are drawn up by Government, so that crops in different districts may be watered at intervals, and even the drawing of water from the channels in buckets is under strict supervision. We do not propose to enter into details concerning the problem of irrigation in Egypt, but those to whom they are familiar will be able to appreciate the regret felt that reasons existed for curtailment of the storage capacity of the reservoir at Aswân.

One of our plates gives a general idea of the dam, and the country in which it is situated. The total length of the structure is about 2,000 metres, and the height from the deepest part of the foundations is about 40 metres. Where the dam is solid the width at the top is 5 metres, but where pierced for sluices, an additional width of 2 metres becomes necessary, and the width of the base at the deepest part is 25 metres. The masonry of the dam is of local granite set in British Portland cement mortar. The interior masonry is of rubble granite set in 4 to 1 cement mortar, which forms about 40 per cent. of the whole, while the facing on the up and down stream sides is squared granite rubble in 2 to 1 cement mortar, pointed with mortar of similar strength. Some of the sluice openings are lined with finely dressed ashlar, and others with cast iron. The foundation course is also laid in 2 to 1 cement mortar. Commencing at the Thirmosia Channel on the eastern side, the sluices extend at regular intervals right across the river to the western bank, where a navigation channel has been cut, including a "ladder" of four locks, each 70 metres long by 9.50 metres wide. The five lock gates were designed by Mr. Wilfred Stokes, engineer to Messrs. Ransomes & Rapier, and vary in height up to over 18 metres. They are hung from the top on rollers, and when opened or shut are moved on sliding ways. This

method was adopted for safety, as over 1,000 million tons of water are stored behind the gates, and each of the two upper gates is of sufficient strength to hold up the whole of the water. A close examination of the general plan will reveal the variations of width at the base of the dam, and the downstream buttresses separating the groups of sluices. Speaking in very general terms, the foundations vary in depth according to the surface level of the site, but there is really no uniform relation between the two lines, owing to the variable quality of the granite outcrop at the site of the dam.

Although the preliminary investigations of Mr. Willcocks and other Government engineers extended over a considerable period, there were financial and other reasons preventing the sinking of trial borings to ascertain the actual character of the granite, but appearances led to the conclusion that sound rock would be found everywhere at a convenient level. On the commencement of operations, however, it was found to be rotten at several points to a considerable depth, and to contain schistous micaceous masses of very friable nature, which made it absolutely necessary that the foundations should be carried down much deeper than was originally contemplated, or provided for in the contract. The serious trouble caused by this unexpected state of things will be realised from the following figures, which show the approximate depth of the foundations at some of the principal channels of the river:—East Channel, R.L., 85; Thirmosia Channel, R.L., 87; Bab-el-Kebir, R.L., 70.25; Bab-el-Sughaiyar, R.L., 76.70; West Channel, R.L., 74.49. Bearing in mind the normal thickness of the dam and the predetermined batter, as shown on the cross sections, it is clear that every metre of unexpected depth meant a large increase in the quantity of the masonry, to say nothing of the cost involved by additional foundation work. The sluices are closed by steel gates, designed by Mr. Wilfred Stokes. Of the gates, 130 are on the "Stoney" principle, with rollers suspended in frames, so that the gates may be easily worked when subject to heavy pressure. The larger of these, although weighing 14 tons, can be moved by hand under a head of water giving a pressure of 450 tons against the gate. The remaining fifty gates move on sliding surfaces. One of our plates shows a buttress and sluice opening on the down-stream side of the dam, and the view is further interesting owing to the fact that, besides other well-known men, it includes what we believe is the last photograph taken of the late Cecil Rhodes.

Upon the signature of the contract, the general contractors, Sir John Aird & Co., with Messrs. Ransomes & Rapier as sub-contractors for the steelwork, immediately took possession of the site and of as much adjoining desert as they thought necessary for the construction of railways, dwellings, offices, mechanical workshops, stores, and hospitals, and for the installation of sanitary arrangements, water supplies, and other conveniences incidental to the establishment of a busy industrial centre in the midst of a wild desert. Preliminary works were started in April, 1898, and while the necessary plant and materials were being accumulated, a commencement was made with excavation on the east end of the dam and in the navigation channel. Before the

end of the year thousands of native labourers and hundreds of Italian granite masons were hard at work, with the result that 21,399 cubic metres of excavation was performed before the end of the season. Although the actual amount of permanent work executed during the first year's operations was comparatively small, much valuable information was gained by observations and surveys of the different channels and the surrounding country. The foundation-stone of the dam was laid on February 12, 1899, by the Duke of Connaught, and after this pleasant function some of the most difficult work in the whole undertaking was seriously commenced, namely, the preparations necessary for the formation of foundations in the boiling channels of the Aswân Cataract. With reference to this part of the undertaking Sir Benjamin Baker wrote:—"It would not be too much to say that any practical man standing on the verge of one of the cataract channels, hearing and seeing the apparently irresistible torrents of foaming water thundering down, would regard the putting in of foundations to a depth of 40 ft. below the bed of the cataract, in the short season available each year, as an appalling undertaking." The severity of the task was aggravated by the previously mentioned unreliable character of the rock. Many plans were discussed by the engineers and contractors for making foundations in the roaring cataracts, and ultimately it was decided that the best method would be to construct sads across the channels, up-stream and down-stream of the site of the dam, so that the area between might be pumped dry. Even with the comparatively small flow of water during the springtime, a depth of at least 30 ft., and a velocity of some fifteen miles an hour, had to be reckoned with, and it will therefore be realised that the sads had necessarily to be of the strongest possible construction. Besides, it must be remembered that they had also to resist displacement by the Nile flood. So it was settled that one of the sads in each channel should be built of stone, and on the down-stream side of the site. The idea was to get these barriers finished before high Nile, so as to obtain still water above them early in the following season, in order that sand-bag sads could be commenced on the up-stream side immediately the water-level fell to the top of the stone barriers. Three of the five deep channels of the river were selected for the first attempt:—the Bab-el-Kebir, Bab-el-Harum, and Bab-el-Sughaiyar. The fall through these for a distance of about 100 metres on either side of the axis of the dam was approximately 3 metres at low Nile. To form the sads, stones varying in weight up to about four tons were dropped one by one into the cataracts by means of cranes, but sometimes the largest stones were carried away by the rush of the water. In some cases wire nets full of stone were tipped in, and when the net did not move after falling, this method proved effective. But if movement took place, the netting was generally cut and the stones fell out. Great difficulty was experienced in closing the sad in the Bab-el-Sughaiyar, but the engineers made up their minds not to be beaten. So they cheerfully ran in bodily large railway wagons filled with stone in wire nets, and tied round with steel ropes. Each wagon with its contents weighed 25 tons, and

formed a toe against which large stones were successfully lodged. At last the pertinacity of the engineers was rewarded by the appearance of the expected dam above the surface of the waters. Finally, the three sads were finished in the month of July, 1899, to a level about 5 metres below high Nile, and when the flood descended they stood fast and were not moved. As a general rule, the stone sads were 7 metres wide on top, with slopes of about one to one; the greatest depth was 15 metres, and the R.L. of the top was 93.50.

Simultaneously with the work we have briefly described, extensive operations were carried on at other parts of the site. During the year excavation was completed for a length of 685 metres from the east end of the dam, and for a length of 55 metres in the Mohammed Ali Island, while excavation was in progress elsewhere over an aggregate length of 600 metres, the total quantity of excavation for the year being 100,212 cubic metres, the total quantity of masonry laid during the year was 74,703 cubic metres. In the month of November the water level fell low enough to allow the sand-bag sads to be commenced, and the three channels mentioned were completely closed by the end of 1899. The sand-bag sads measured 5 metres wide on top, with slopes of about $1\frac{1}{2}$ to 1, and the greatest depth was 17 metres, the top being kept to R. L. 93.50. These sads were made staunch by throwing sand and small fragments of stone on the up-stream side, where the slope eventually became 2 to 1.

A consultation was held in October for the purpose of settling a programme for further operations, and it was decided that, if possible, the foundations of the dam in the three closed channels should be got in during the year. In view of the unusually low flood of 1899, and the subsequent rapid fall of the river, it appeared likely that the foundations in the central channel might be laid in addition to those in the other channels mentioned. Consequently, the sads were continued across this channel, with the result that it was closed by the end of February, and the entire flow of the river was diverted to the west channel. The effect of this treatment proved to be eminently satisfactory, for the bed of the river below the line of sads was left dry, except in a few places where small sand or clay sads sufficed to hold back the water. Even before the construction of the up-stream sads, the stone barriers exercised an unexpected influence, checking the flow sufficiently to cause a difference of over 3 metres in the level of the water; but when the up-stream sads were made, the average difference was about 6 metres, the maximum being 10 metres; so the down-stream subsidiary sads were of comparatively small dimensions. Sir Benjamin Baker says that the most exciting time in the whole stage of the operations was at the commencement of pumping, for no one could predict whether it would be possible to dry the river-bed, or whether the water would pour through the fissured rock in overwhelming volumes. A large number of 12-in. centrifugal pumps was held in readiness, so that very ample power might be available; but, happily, the sads were found to be remarkably tight. Six 12-in. pumps were started in the Bab-el-Kebir, and the channel was pumped dry the same day, after which one of the pumps,

working about quarter time, served to deal with all leakage. One 6-in. pump removed all the water from the Bab-el-Harum, and only two 6-in. pumps were required in the Bab-el-Sughaiyar. This easy solution of the problem made it possible for excavation in the three channels to be put in hand by the end of January. On February 28 everything was ready for pumping out the central channel, and the water was rapidly removed by a 12-in. pump, leakage being subsequently dealt with by one 8-in. pump.

Having surmounted preliminary difficulties, the contractors had excavation in full swing along all four channels by the first week of March, 1900, by which time masonry had been commenced in the Bab-el-Harum. The next trouble to be got through was the unsound rock, which was particularly bad in the Bab-el-Kebir and the Bab-el-Sughaiyar. March, April, and a good part of May went by before rock of reliable quality was reached. As the time remaining before the occurrence of the Nile flood was then exceedingly short, as compared with the large amount of work to be done, it was feared that the expense and delay of rebuilding sads would be necessary in the next season. In the Bab-el-Kebir the foundation level was $11\frac{1}{2}$ metres below the level shown in the contract drawings, and a period of only ten weeks was available for building the masonry to a height of 24 metres across a channel about 65 metres wide. At the Central Channel unsound rock was found in so many places, that masonry could not be got in before the beginning of May. Things were a little better on Mohammed Ali Island, as some excavation had been done during the previous year. In June a tremendous effort was made to push forward the masonry. Work was carried on every day of the week, and in the Bab-el-Kebir it was continued through the night by the aid of electric light. Masons to the number of 353 were employed daily, and during thirty days no less than 45,000 cubic metres of stone were laid. Nightwork was stopped after the end of June, for it was then evident that everything could be finished in good time. On July 12 the sad in the central channel was cut to relieve pressure on the sads in the other channels; and a week or two later the remaining sads were opened, so that the river flowed freely through the sluices. As water did not reach to the top of the masonry, work was continued until the first week in August. The flood then rose above the masonry except on high ground at the east bank, where building was continued. Excavation in the navigation channel was nearly finished during the same year, and masonry was commenced in the month of June. After the flood had subsided, masonry work was resumed in the channels, and all necessary preparations were made for closing the West Channel, the only portion of the site in which the foundations had not been laid. So ended the work of the most momentous year in the history of the undertaking. At that period, 577,515 cubic metres of excavation and 239,468 cubic metres of masonry were complete, representing respectively 78 per cent. and 45 per cent. of the whole.

Subsequent operations offered much less difficulty, but no efforts were spared by the engineers, contractors, and sub-contractors to push forward the work, and the very unusual result was achieved of completing

the great barrier considerably earlier than the date specified in the contract.

There now remains to be dealt with a consequence of the immense lake formed at Swan, which is of special interest to our readers. We refer to the partial submersion of the island of Philæ during the three months in each year when the new reservoir will be full. Although at such times the buildings on the island will not be entirely covered, the highest water-level will rise to the floors of the Temple of Isis; the Nilometer will be totally submerged, as will the Temple of Hathor and the Nectanebian arch. When the water is at its maximum height little more than the temple pylons and a few of the loftier ruins will be visible on the face of the lake. Much as we regret these things, the time has gone by for further expostulation, and the fact that Egypt must gain far more than the rest of the world will lose must be our consolation. One practical point in connexion with this part of our subject deserves notice. As our readers are probably aware, the temples of Philæ are partly founded on loose silt and mud, and the saturation of dry material of the kind would undoubtedly cause settlement, if not the ultimate collapse, of the ruins. It is therefore satisfactory to learn that measures have been taken to safeguard the more important buildings by supporting all the important parts on steel girders, or underpinning them down to rock, or where this has been impossible to the present saturation level. Considering the shattered condition of the columns and entablatures, the friability of the stone, and the unstable nature of the foundation, the process of underpinning cannot have been other than a peculiarly arduous and anxious task. One of our illustrations is reproduced from a photograph taken during the progress of this work, which we are pleased to be able to say was performed to the satisfaction of Sir Benjamin Baker, and of Dr. Ball, who had charge of the works at Philæ.

Sir Benjamin Baker, to whom we are indebted for the photographs and drawings illustrating this article, says it would be invidious to single out for special acknowledgment the services of any members of a staff where all have worked with so much enthusiasm for the accomplishment of the great work projected and patiently persisted in by Lord Cromer and his well-tried lieutenant, Sir William Garstin. That the same spirit also animated the general contractors and sub-contractors is amply evidenced by the fact that a largely increased amount of work has been completed in less than the contract time, to the entire satisfaction of every one concerned.

NOTES.

Municipal Trading. THE British Association last week had under discussion the subject of municipal trading; a question of national importance to which we have frequently drawn attention. The discussion as reported seems not to have been prolonged, and we regret that more attention could not be given to this subject. The Hon. R. P. Porter, Director of the Eleventh United States Census Paper, who read the paper, seemed on the whole averse to municipal trading; but Sir B. Leech, speaking for the important English centre Manchester, expressed unlimited approval.

The objections raised by Mr. Porter to the system were the injurious effect on other work directly within the sphere of operations, the tendency it created to cause municipalities to neglect their unproductive undertakings (which we may point out means the functions they were called into being to perform), the tendency to discourage private enterprise and development, the ill-feeling engendered when the tax-payer was competing with himself, the difficulty of securing an equality of burdens on the taxpayers, and the difficulty of drawing a line within which municipal trading should be restricted. These objections are weighty enough, but hardly seem exhaustive. Trading municipalities are not affected by the laws of supply and demand; they carry on undertakings at little profit or even at a loss, and pay wages independently of loss or profit, which unreasonably affects the scale of wages and hours of labour, in undertakings they cannot engage in, and on which the foreign trade, and consequently the prosperity, of this country depends; and one of the reasons urged in their favour, viz., that they are able to borrow money at less interest than private companies, directly tends to encourage this. The second point put forward in support of municipal trading by Sir B. Leech appears also to us to be a false one, as he advocated any system which necessitated breaking up the streets being placed within their operations. This can hardly be for the public advantage when a municipality is immediately interested in securing profits, as the direct gain becomes the one consideration, and not the public convenience. Lastly, we may point out that if municipalities are to become trading companies, legislation is very necessary. Having regard to the public duties such corporations were alone created to carry out, the law has protected them in certain ways, giving them protection on the analogy of the advantages enjoyed by Government undertakings; but such protection becomes the cause of injustice when it is applied to the commercial undertakings of a municipality. The conversion of the taxpayers into quasi-shareholders in companies with unlimited liability, and practically unlimited borrowing powers, is a startling innovation, and one likely to be most prejudicial to the commercial prosperity of this country.

The Loudwater Tunnel Collapse. COMPARATIVELY little useful information is afforded by the proceedings at the inquest into the Loudwater tunnel accident.

From the evidence given, it appears that the tunnel, in course of excavation through the chalk, was shored up as the work proceeded, no part of the roof being left without support. Yet, in spite of this, the roof of the tunnel fell in suddenly, the timber supports having either slipped out of place, or broken under the unexpected weight of a loosened mass. No particulars are given as to the nature and strength of the timbering, and no expert witnesses were called to speak as to the engineering aspects of the case. It transpired, however, that blasting had been practised, thus presumably showing the chalk to be of the quality locally known as "rock." Consequently the inference might not unreasonably be drawn that the strength of the shoring was proportioned suitably for holding up comparatively small masses of material, and that considerable reliance was

placed upon the self-sustaining nature of the chalk formation. It seems that a very extensive movement took place, for a depression was afterwards observed at the top of the hill. No evidence was forthcoming to show whether any connexion existed between the collapse and the presence of water observed in the tunnel, but it appears that gravel had been found in the chalk formation. Hence it is extremely likely that water may have contributed to the settlement of so large a mass of the chalk as to crush the timber supports. The sub-contractor stated that the fallen material was mostly gravel, and expressed the opinion that if it had been chalk all over the roof the accident would not have happened. This appears to be tantamount to admitting that the timbering was strong enough to support rock, but not to hold up looser material. No railway engineer and no contractor's engineer has appeared on the scene to tell the public just those technical details which should be known. Therefore, every one is left to draw his own conclusions, and we cannot avoid the inference that the precautions taken were inadequate from an engineering standpoint, although we fully admit that this view by no means implies culpable negligence on the part of the contractors or of their employees.

The Education of Engineers.

A CHARACTERISTIC address, delivered by Professor Perry, at the meeting of the British Association, expresses some views on the educational requirements of the engineer which are worthy of note. The subject is one upon which a great deal has been said of late, and of which the importance is becoming recognised even by such ultra-conservative bodies as the older universities. Professor Perry holds extremely practical opinions on the question, and these he frequently expounds in vigorous and picturesque language. In his latest address, it is said that our methods of education are wrong, including, as they do, "the ordinary abominable system of mathematical study"; the teaching of mathematics, physics, and chemistry "in water-tight compartments as if they had no connexion with one another"; the undue preferment of Latin; the neglect of English; and the suppression of independent thought. There is considerable justification for this criticism, even after making reasonable allowance for possible exaggeration, but the remedy proposed by Professor Perry, of "scrapping" our present system so as to start afresh on a consistent and simple plan, is one that cannot be taken seriously. Of course, in any old-established country there are many things and institutions that earnest reformers would like to see "scrapped." But it would be inconvenient to apply the remedy without the most careful preparation. For instance, a city full of tortuous streets and undesirable slums could not be wiped off the face of the earth until a new city, or at least temporary habitations, had been provided for the populace. Similarly the present educational edifice, however rambling it may be, cannot be destroyed until a new one has been drawn up and got into action. Novelties in education, as in all other things, must be introduced gradually, and extended when results prove them to be good. As a matter of fact, Professor Perry and those who sympathise with his aims are already working

in this very way, to which they will be wise to adhere.

Radio-Activity
Universally
Diffused.

PROFESSOR J. J. THOMSON gave a very remarkable lecture on "Bequerel Rays and Radio-Activity," last week to the British Association audience at Belfast. The discoveries made in this department of physical research have recently been very numerous, and the lecturer could refer to many phenomena which strengthened the foundations of his corpuscular theory. It will be remembered that when he stated some five years ago that cathode rays were formed by streams of material corpuscles very much smaller than the hydrogen atom, and moving with a velocity of thousands of miles a second, nearly every one thought that this was incredible. Now we look upon this as almost a scientific commonplace. Substances of the most ordinary appearance are continually emitting streams of material particles which travel with a velocity comparable to that of light. These streams make sensitive screens brilliantly fluoresce in the dark; they show the bones in the hand; if sufficiently intense they produce very severe burns on the human body, and they are always emitting streams of negatively electrified particles into space with a velocity of about 100,000 miles per second. But although the radio-activity of substances like radium and thorium is so intense, it would require thousands of years before the loss of weight would be appreciable on a chemical balance. The energy that must be stored up in these substances is exceedingly great, and the lecturer gave some striking illustrations. A notable recent discovery is that substances can be made radio-active by hanging them in the open air and charging them negatively. By this means a piece of paper can be made as radio-active as a piece of metal, but it loses its activity after a few hours. Since the earth is negatively electrified, all pointed objects like the leaves and spines of trees acquire this kind of activity. In fact, it is now believed that there is hardly a patch of ground on the earth's surface which is not continually emitting these rays—rays which have only recently been discovered by the help of the most elaborate apparatus.

Electric Traction
on American
Canals.

EXPERIMENTS on the Erie Canal, although not absolutely satisfactory, have sufficiently demonstrated the benefits that may be ultimately expected from the introduction of electric traction on canals. It seems to be quite clear that the system should show much greater efficiency than haulage by horses or mules, and even than steam-propelled canal boats, especially when the natural advantages of America are borne in mind. The new power-house at Niagara Falls, when completed, will add 50,000 h.p. to the present establishment of the Niagara Falls Power Co., giving a total of 100,000 h.p. for transmission and distribution, with a further possibility of 100,000 h.p. from the same tunnel as a tail race. The power canal passing through the city from Niagara Falls renders available an additional supply of 10,000 h.p., while the completion of the plant in progress for the Canadian Power Co. will add 200,000 h.p. more. Altogether 500,000 h.p. is already in prospect for electrical power

transmission in the neighbourhood of Niagara Falls, Western New York, and Canada. Consequently it is not unlikely that the Erie Canal, in the United States, and the Welland Canal, in Canada, will become large users of electricity for canal haulage. This agency would undoubtedly increase the carrying capacity of the waterways in question, and so encourage a considerable augmentation of ore and coal traffic from the mining districts bordering the Great Lakes.

Kidsgrove
Urban District.

This district seems to have been for a long time in a very unsatisfactory state. Dr. Wilfred Fletcher's report to the Local Government Board states that though most of the houses are drained to sewers, many of these sewers are very old, there is no complete plan of the sewerage system, no adequate ventilation, and no arrangement for flushing. There are very few water-closets in the district. Privies with cesspits, the latter frequently beneath the floors of the privies, are in general use. In some cases the cesspit is covered outside the privy by a stone flag, which is raised for purposes of removing the filth; to other cesspits access for cleansing purposes is obtained from within the privy by removing the seat, often so constructed as to be usable by two persons at one time. The sides of the cesspits are constructed of brickwork, frequently uncemented; the bottoms in some instances are not bricked. They are emptied, however, by the Local Authority, on notice being given by card, which is better than leaving it to private contractors. The district seems to have suffered first from an incompetent Inspector of Nuisances (dismissed two or three years ago at the instance of the Local Government Board), and then from the resignation of a competent man, who found the duties incompatible with attention to his private practice. Now another Inspector has been appointed at a salary which must leave him to depend largely on private practice, so that probably the same difficulty will recur.

Disregarded
Signals on
Railways.

AN extraordinary instance of the way in which the most elaborate precautionary measures may be rendered entirely futile was brought to light in the course of an inquest held last week at Hastings. The driver of a train which had run over and killed a plate-layer in the Bopeep Tunnel admitted that, although the steam from the engine obscured the signals, he ran past them—in spite of the Company's rule that trains should be stopped when the signals are uncertain—"taking it for granted that they were favourable!" The unfortunate plate-layer, who had stepped out of the way of a train travelling in the opposite direction, was justified in "taking it for granted," that he ran no risk in so doing, as only one train is allowed in this tunnel at a time—a rule which should have afforded him complete protection. It is quite conceivable that the signals might have been against the driver on account of some obstruction on his line in the tunnel, and it is clear that no amount of care in the framing of rules provides absolute immunity from danger. These, fortunately, rare cases go to remind us that we are, after all, dependent upon the correct working of the "human machine."

Carpenters'
Company
Training
School.

THE Report of the judges on the work done at the Trades' Training Schools in Great Titchfield-street, in connexion with the Carpenters' Company, shows that a great deal of important practical training is being given in these schools, with general good results. The Report is illustrated by photographs of various specimens of the work done during the session 1901-2. Among these, the model in wood of a compartment of a fan vault appears very good, also the specimen of wood-carving, though in the Report the general work of this class is said to be rather disappointing. The Painter-Stainers' Company is congratulated on the improvement shown in this department of the school, and the example of a wall-paper design given is very good. The Bricklayers' class also is well spoken of, and appears to be doing good work. We would suggest that in future Reports the name of the student and of the class should be given under each illustration.

The
Photographic
Salon.

THE Exhibition of the Photographic Salon, now open at the Dudley Gallery, professes to represent "examples of contemporary photography which give evidence of personal artistic feeling and motive, apart from the purely scientific and technical considerations with which it was felt that the pictorial possibilities of photography had too long been confused." We have often expressed the opinion that the idea of elevating photography to the rank of a fine art is for the most part a delusion; it seems in many cases to resolve itself into an effort to render a photograph, by losing focus, employing very rough paper, and other contrivances, as like a monochrome washed drawing as possible. But the personal element of touch and handling which gives interest to a water-colour drawing can only be attained in a photograph by subsequent manipulation, and it then ceases to be in a true sense a photograph. We can hardly believe, for instance, that "The Incoming Tide" (198) represents the photographed forms of breaking waves; lights have surely been worked into it for the surf, in part at all events. Nevertheless, the Photographic Salon of this year includes works of which the interest mainly arises from the choice of view and arrangement of composition by the photographer. Examples of this are Mr. Henneberg's two photographs, "Villa Adriana" (13) and "Villa Torlonia" (149), in both of which the effect consists in the view of a building in light seen through an avenue of dark masses of trees. In "The Return of the Flock" (123) Mr. Charles Job has contrived to get a kind of realised Mauve picture, seizing also a moment when the light in the evening sky was just what was wanted for pictorial effect; the sheep are not as parallel in their movement as Mauve generally shows them—perhaps the difference between nature and art. In "A Silenced Highway" (21) Mr. Burkinshaw has got a beautiful snow effect. Architectural subjects, as usual in photographic exhibitions, receive much less attention than they should, considering how well such subjects lend themselves to photography; but there are one or two admirable ones; notably "Ely Cathedral" (8), the interior seen "through a chantry door," which is

ceedingly delicate and precise in its representation of detail, while avoiding any mechanical hardness of effect; and Mr. Steichen's little street scene, "Minuit" (143), is a most successful example of a photograph apparently taken by the light of a street lamp, which we had hardly supposed to be possible. In the class of objects in which an ideal treatment of nature is aimed at—rarely successful, since nature in pictures owe so much to the artist—Mr. Blount has certainly succeeded better than usual in his "Lady of Shalott" (142), in which there is really a poetry of expression and composition. Mr. Steichen studies nude figures, with which much might be done in photography but for the fact that the photographer is necessarily restricted by considerations of decorum which a painter can evade, and so is induced, as in some of these cases, to giving the figure in a kind of mist; but his "Reflections" (212), a figure seated on the ground with her back to the spectator, is a good picture; so is Mr. Dyer's partially draped figure, "The Model" (145). M. Dyer's "Etude pour un Geste" (157) is an amusing example of the plain prose of the nude, with the pinched-in waist of a figure customised to tight lacing; an example which shows again how much we owe to the painter in many an idealised nude figure. Mr. Steichen's portrait of M. Bartholomé, the sculptor of the "Monument aux Morts," leaning against a fluted column, is finely composed and very effective. As a whole, there is much to interest in the exhibition, though, as observed, it does not raise photography to the level of a fine art.

THE BRITISH ASSOCIATION.

THE annual meeting of the British Association, held this year at Belfast, although largely attended, cannot be said to have been a great success from a scientific standpoint. The fact that the innumerable societies now formed by specialists take away from the Association that originality that it once possessed; and the apatience which scientists now exhibit to bring to light any little discovery they have made makes it impossible for the Association meeting to do more than air a few scientific topics relating to the *locale* of the meeting, or to mere generalities mostly of a discursive character. The time was when, for instance, Sir Roderick Murchison would come specially from the confines of Siberia to attend the meeting to give the members the results of his recent investigations, or Sedgwick would return from Cambria and lecture; but these things are all changed, and in their place we have, this year, the melancholy spectacle of teachers teaching teachers how to teach—for that is the sum and substance of the principal orations. The fact of the matter is that the principal grievances aired at this Belfast meeting are not born of experience at all; they are too theoretical. It is perfectly correct on the part of Presidents to extol the German methods of teaching certain subjects, but how many of those presidents understand German, and have, or themselves, followed up the effects of that teaching? The pursuit of a science, no matter of what kind, must be carried out on general lines first of all; otherwise the mind of the student becomes too contracted and incapable of appreciating anything outside his particular sphere. We suppose the Education Bill has had something to do with this epidemic on the part of presidents, but the less they keep away from politics and the more they deal with purely scientific subjects, the better they will serve the purposes for which the Association was formed. We hear a great deal about "economics." A school has recently been founded in London for economics. What is the object of it? It would be a difficult matter for even the founders of it, eminent as they are, to really give a clear answer to that question. Yet matters of this sort have occu-

pied more attention this year than any other, except, perhaps, lantern entertainments and excursions to tourists' resorts. A considerable amount of money is given every year by the Treasury to the Association for the assistance of those who are deserving of help in the prosecution of their researches in the different departments of science. We do not begrudge it, but we think that if the money were more evenly distributed over the "different branches of science," it would be all the better, and it would certainly be refreshing to find that the recipients of the Government bounty did not, on the whole, regard the grants as domestic expenses.

The *raison d'être* of the British Association is to give an epitome of the past year's work, and to encourage further research; it does not fulfil that ideal in its entirety. It has degenerated to a mere tourists' outing with a few scientific observations thrown in during the excursion. That has long been known, but it is getting worse and worse. However, amid all this incongruity we do find a little leaven. The President's address, for instance, is a conspicuous example of it. Professor Dewar did not, however, especially deal with his favourite subject, and he failed to altogether please his audience in consequence. References to the progress of Belfast, and to the late Lord Dufferin, serve their purpose no doubt, but we should have thought that "Tyndall and evolution" was worn out. The endowment of education seems to have been misunderstood by the President. He said that in these days of "munificent benefaction to science and education it may be doubted if we take into account the change of the value of money, the enormous increase of population, &c." Education has so long been left to take care of itself that it is impossible that private benefaction can do anything worthy of it, and since education is so much governed by the man in the street, we doubt whether the higher branches of it will be able to be satisfactorily conducted. Again, the payment to professors is absurdly inadequate; a year might do very well for a City clerk, but it is of little use to the professor at a university, who must either have private means, or a capacity for doing some other work. The London University, as Professor Dewar knows, is unable to pay anything at all to the professors attached to it, and unless "munificent benefaction" is to be created on a much greater scale than hitherto, other means must be adopted to bring about anything approaching real progress. A demand is made that professors must do some original work, but no fund is available to enable them to do so, much as they would like to pursue their work unhampered by pecuniary responsibilities. It is much easier to get money for elementary education, especially now that different local bodies vie with each other as to who shall take charge of this or that establishment.

Turning to the addresses of the presidents of the various sections, Professor John Purser, of the Mathematical and Physical Science section, selected for his topic a historical sketch of the Irish school of mathematics. The sketch was restricted to those who founded the school. In the section devoted to chemistry, the President, Professor Edward Divers, dwelt on the "Atomic Theory without Hypothesis." He remarked that Dalton, instead of being the founder of the chemistry of to-day, was little more than the discoverer of the law of multiple proportions. When the atomic theory is expounded in the usual way, it is commonly and correctly stated that, on the assumption that substances consist of minute indivisible particles having weights or masses bearing ratios of the combining numbers assigned to them, the laws of chemical combination by weight necessarily follow, and are thereby explained.

In the Geology section, the President, General McMahon, discoursed on "Some Aspects of Rock Metamorphism," having a special reference to certain parts of the Himalayas with which he is well acquainted. The address was of a rather commonplace character, like most of the other communications to the geology section. After the address, Professor Grenville Cole delivered a lecture on the geology of the country in the neighbourhood of Belfast, which had no pretence to originality. Mr. Joseph Wright contributed a paper on the "Marine Fauna of the Boulder Clay," which appears to be an unfortunate title, seeing that the author dealt

almost exclusively with the foraminifera found, though the paper is a substantial contribution to our knowledge concerning the more recent deposits. Mr. R. J. Usher read the report of the committee appointed to explore Irish caves. The report dealt with the exploration of the Kesh caves in county Sligo. Mr. Horace Woodward read a short paper on the "Occurrence of Bagshot Beds at Combe Pyne, near Lyme Regis." His observations were based on certain cuttings on the new railway between Axminster and Lyme Regis in the neighbourhood of Combe Pyne Hill. Beds of fine white sand, white pipe-clay, and white, red, and mottled stony clays, with much rough flint and chert gravel, have been found.

Professor G. B. Howse spoke to the zoologists, in his presidential address, on the "Morphological Method and its progress." It was a retrospect of the achievements of zoology since the Association last met in Belfast. The President of the Section of Geography, Colonel Sir Thomas Holdich, took as his theme the importance of thorough geographical surveys. In the section devoted to Economical Science and Statistics Mr. Edwin Cannan, the President, told his audience that the teaching and study of the theory of economics is a thing of very great practical utility.

The engineers were addressed by their President, Professor John Perry, and to his remarks we make some reference under the heading of "Notes" on another page. In the Economic Science section, after the President's address, the Rev. Dr. Cunningham read a paper on the "Localisation of Industry," in which he remarked that the conditions which have led to the concentration of a given trade are partly physical conditions, as in the case of coal mining, or of favourable circumstances for growing some crop; but the transport of material is so easy that industry is less bound than was formerly the case to the area where it can be obtained.

After the presidential address the Engineering section was occupied in hearing a paper by Mr. H. A. Humphrey on "Recent Progress in Large Gas-engines." In the course of his lecture the author traced the development of gas-engines and pointed out the remarkable manner in which the size and power of this type of prime mover has grown, especially within the last few years; a development which has few parallels in the history of engineering enterprise. Gas-engines of 1,200 and 1,500 horse-power were already working, and others of 2,000 to 4,000 horse-power were being constructed. At the conclusion of the reading of the paper the members adjourned to visit the Belfast harbour works.

The anthropologists listened to the address of Dr. A. C. Haddon on "Totemism," and he had to explain the meaning of the word before the anthropologists could understand what he was talking about—at least, he did so. "Spirit helpers," "daimons," and "guardian spirits" were called to give evidence during the course of the address, which proved to be very interesting, if it was not scientific. Professor Cunningham read a paper in the same section on "Cornelius Magrath," who was a giant 7 ft. 5 in. in height, and born in Tipperary in the year 1736. The skeleton of the giant was exhibited before the meeting to show that there was no deception.

Professor Halliburton, President of the Physiology section, took as his subject the present position of chemical physiology. He claimed that this branch of science is rapidly becoming an exact science, and pointed out the increasing importance attributed by physiologists to the study of inorganic chemistry and their applications to doctrines of physical chemistry, such as ionisation, to the explanation of physiological phenomena. He emphasised the necessity of bold experiment and of bold theorising from the data obtained, and illustrated his position by reference to the work of Pavlov on digestion and of Ehrlich on immunity.

Professor J. Reynolds Green occupied the chair of the Botany section, and chose for his subject the field of vegetable physiology. The Educational Science section had for President Professor Henry Armstrong.

Very few of the papers read before the sections are of interest to our readers. The members did very little on Saturday, for none of the sections sat; they preferred to roam about the vicinity of Belfast and to attend numerous social festivities. In the evening a lecture was given by Professor Miall to work-

ing men on "Gnats and Mosquitoes." On Monday garden parties were the order of the day, except in a few sections. The geologists were told something about the geological structure of Ireland, which most of them must have known before; but the day was productive if only on account of the lively discussion on a paper by Mr. Barrow on the prolongation of the highland border rocks into county Tyrone. The engineers were enlightened by Mr. J. E. Kingsbury respecting the "Future of the Telephone," and there were some papers on electrical instruments and aluminium.

In the Engineering section an interesting paper was read by Mr. W. H. Booth on "The Smokeless Combustion of Bituminous Fuel." The author pointed out the difference between long and short flaming coal, and discussed the refrigerating effect of volatilising solid hydrocarbons in its effect on the distribution of temperature in a furnace, and the production of heat at and beyond the grate furnace. Another good paper was by Mr. J. S. Raworth on "The Prevention of Smoke," which described a system for the prevention of the formation of smoke in a boiler furnace by injecting a mixture of air and nitrate of soda solution on to the fire.

The different sections concluded their work on Wednesday, but several excursions have been arranged for those who want to see more of the North of Ireland.

EXHIBITION OF COMPETITION DRAWINGS FOR NEW MUNICIPAL OFFICES, CREWE.

The forty-four sets of designs submitted in competition for the new municipal buildings to be erected at Crewe have been on view this week at the Co-operative Hall, Crewe. The schedule of requirements and the instructions to architects competing were laid down in a straightforward way, and the assessors' recommendations and report seem to have been accepted *in toto* by the Corporation. The sum to be spent is 14,000l. The drawings required were as few as they could well be; no perspective drawing was allowed. Except that the drawings had to be shown on the scale of 6ft. to 1 in., architects had nothing to desire. We wonder sometimes why committees or assessors who draw up competition regulations will choose unusual scales; 16ft., 8ft., and 2ft. to 1 in. are the usual scales by which work is the most easily realised, and until the metric system is introduced it cannot be bettered. The site for the proposed buildings has practically only one frontage, that to Earle-street; the back faces on to what is called Corporation-yard, and cannot be seen; on either side are party walls, so that entrances have to be obtained either from the front or back; this applies also to lighting, except for areas, at the competitors' discretion.

The result of the competition should be satisfactory to everybody concerned for there can be no doubt that Mr. Hare has won with the best design, and, indeed, there was no serious competition for the first place. The form of the first premiated design is simple, the site occupied by the building being square; it is divided into halves by the entrance vestibules from Earle-street in the front, to Corporation-yard in the back, and divided again longitudinally by the hall, grand staircase, lavatories, and two areas; the four compartments, which this arrangement divides the building into, are occupied respectively by the Borough accountant and the Weights and Measures on the right, balanced on the left by the Rates Collector and the Sanitary Inspector. The first floor is quite a masterly little bit of planning; the grand staircase, ante-room, lavatories, and areas occupying the central space as below, the front to Earle-street containing a convenient suite of reception and committee-rooms, the front to Corporation-yard lighting the Council-chamber and Town Clerk's offices. The Borough Surveyor's offices occupy the whole of the second floor to Corporation-yard; the school attendance officer and medical officer's department facing on to Earle-street. The elevations are in the correct but rather dull adaptation of the Classic Renaissance, which Mr. Hare has made peculiarly his own. It is, perhaps, not uncomplimentary to say that the back elevation is the more restful and dignified of the two. It is the planning that is irresistible, without profusion and without waste; the lighting, ventilation, and heating are likely to be most satisfactory, as the means to

the end require neither explanation nor contrivance.

Turning to one of the second premiated designs under the name of Messrs. Banister Fletcher & Sons, we find the same form of plan on the ground floor as that adopted by Mr. Hare; the similarity is startling, and it is only on closer examination that the solution of the requirements is seen to be inferior; to make use of borrowed light in the public offices of Rates and Borough Accountant is a confession of weakness at the outset, enough in a keenly contested competition to place the design out of court. The first floor is occupied by the same departments as in the first premiated design, but the comparison can go no further; there are no less than four sets of lavatories shown where one over those on the ground floor would have been ample, and saved much of the littleness of the plan. Another of the second premiated designs, that by Messrs. Rodney & Denning, loses claim to attention, which other respects it merits, by the inadequate lighting arrangements for the centre of the building, comprising the hall and staircase, and numerous passages, including the entrance vestibules, which are long and narrow. The elevation is elegant and in good taste, reminiscent of Mr. Belcher's Municipal Buildings at Colchester. We are surprised at the assessors including the design by Mr. A. E. Dixon, of Leeds, among the three second premiated designs; both on the first and second floor he shows important rooms lit from the west side, where no light is, avoiding conditions in a way to make planning easy; in other respects the design is sane and workmanlike.

A capital design is that by Messrs. Armstrong & Wright, of Newcastle-on-Tyne; the entrances and corridors, it is true, are too narrow, and the areas too small; but in most respects it is superior to any of the designs awarded second premiums. The elevations are simple, and would have been very pleasing in execution.

Of the remaining designs it is impossible to speak individually. Most of them show ability to deal with the problem before them. We noticed a design by Mr. W. E. Devlin, of London, very good in parts, but too disconnected for public offices to run smoothly in the working. A design by Messrs. Butler, Wilson, & Oglesby, of Leeds, was also noticeable.

We congratulate the Corporation of Crewe on getting Mr. Hare as their architect for their Municipal Buildings. Incidentally we may mention that in a set of conditions for a competition shortly to take place, in which Mr. Hare is assessor, it is laid down that the design is to be the actual work of the architect under whose name it is submitted, and a declaration to this effect is to be signed and delivered with the design. The general adoption of such a condition would tend to put a stop to the system of competition designing by proxy, an abuse which is far more prevalent than the public imagine.

THE SANITARY INSTITUTE CONGRESS.

The Conference of Municipal Representatives resumed its sitting on Thursday last week when two papers were presented and read before the Conference of Municipal Representatives on the Housing Question—the first by Councillor Fyans (Wigan), entitled "The Housing Problem," the second by Dr. J. F. Sykes (St. Pancras), on "The Housing of the Working Classes."

Councillor Fyans said Medical Officers of Health and Sanitary Inspectors had repeatedly brought to the notice of Local Authorities throughout the United Kingdom the appalling circumstances under which some of the poor lived—in hovels unfit for human habitation. Even where earnest attempts had been made to improve the conditions of dwelling and living very little had been effected compared with what required to be done. Many municipalities were ready to enter on schemes of improvement and development where there was some prospect of eventual profit, but remained dormant when it was a question of housing the very poor. In other cases schemes of demolition had been hastily conceived and carried out with disappointing results, the poor unhoused either being driven to seek shelter with other poor families, by which the evil of overcrowding became aggravated, or forced to seek houses in districts

where sanitary regulations were less vigorously enforced. So long as private property in land was recognised to its present extent, so long would the difficulty remain of purchasing land for building cottages upon, and it was the difficulty which prevented the success of the earlier attempts of Municipalities in carrying out their schemes. In some instances it had been found possible to carry out beneficial building schemes where a resolute policy had been adopted to use all the powers at present possessed by Local Authorities with courage and perseverance, but in the majority of cases public bodies had been deterred from using their powers by the legal difficulties they had to encounter.

Dr. Sykes attributed the congestion of the population, towards which the greatest tendency was shown in the largest towns, to a number of causes, which drew to them constant accession of immigrants from the country and from abroad. This increase from without and the natural increase found in large population went on until the pressure of the population caused the demand for houses to outstrip the supply, and then a process of overcrowding set in which multiplied the dwellings without increasing the number of existing houses. The number of rooms in each dwelling became reduced, leading to the overcrowding of domestic conveniences, and then to an increase of the number of persons living in a room, which led to the overcrowding of air space. At this stage the building regulations ceased to become effective, and the control of the Authorities became insufficient. Unfortunately there was no statutory definition of overcrowding for dwelling-rooms, and no definition of the requirements of a dwelling apart from a house as a whole. There were statutory regulations which protected men awake and engaged in workshops and factories, but none to protect them in their homes while resting and sleeping. Among the numerous remedies proposed were, for rural districts, the provision of less costly dwellings, for which it would be necessary to modify the building regulations regarded as necessary in towns, and to obtain financial facilities which would enable Local Authorities, landowners, or companies to erect cheaper cottages. For large towns the remedies were more numerous, for the problem was more complex. Houses were being multiplied in the suburbs and means of cheap transit were being established, but that did not entirely meet the case. The two objects to be attained were sufficiency and efficiency of accommodation. Insufficiency could be overcome by the erection of new dwellings, and if the provisions of the Building Acts and the by-laws were properly enforced, then efficiency would be more or less secured. It was necessary to control the proper usage of new houses in order to prevent deterioration, but in maintaining control the Authorities were hampered by a labyrinth of legal decisions. An Authority could not at present condemn a room or a part of the house which might have become unfit for habitation without condemning the whole house, a proceeding often so obnoxious that the existence of nuisances, so long as they were only partial, was tolerated rather than that odium should be incurred by condemning a whole house because of one insanitary room. The Authority should have power to deal with individual rooms without reference to the rest of the house. The house duty which during fifty years had caused endless trouble with the Inland Revenue Department should be abolished and some other Imperial tax should be substituted. Why not put a definite tax on all separate dwellings which could not show that they were possessed of such domestic and sanitary conveniences as would satisfy the Medical Officer of Health? The decision of a case in May last year (Weatheritt v. Cautley), which defined the dwellings in a collection of dwellings in one large building as not only "separate dwellings," but "separate houses," had cleared the way, and was of extreme importance as showing the inevitable course of future events. We might now treat as a "separate house" each dwelling in a collection of dwellings upon which the landlord did not reside nor have control over the front door. Legislation should distinguish houses let as single dwellings from others let in separate dwellings; between those that had water supplied from the mains and those that had not; and between those having a water-carriage system for excreta and those having dry systems. The Public Health Act should

mit of the condemnation as a nuisance any dwelling-room having less than 100 cubic feet of air space for each inmate or ten, or which was so damp as, in the opinion of the Sanitary Inspector, to be prejudicial to health. Rooms which have no window, or have window-space of less extent than one-tenth of the floor space, should be condemned, or any dwelling not possessing proper means of warming and cooking in at least one room of the dwelling. Dr. Sykes would amend the Public Health Acts so as to include as nuisances separate dwellings where a house-house accommodation was not sufficient for each family to use at least once a week, and if the common staircase had not through ventilation into the open air.

In the discussion which followed, Miss Charnie (St. Neots) said the condition of many villages, particularly in the South of England, was deplorable in respect of dwellings, sanitation, and water supply. There was great need for more efficient inspection by both sanitary inspectors and medical officers.

Mr. F. Filides said the sanitary inspector in Manchester had power to go into the houses in the performance of their duties at any time, day or night. In Manchester they were doing their best to relieve the centre of the city, and the slums would be found much less objectionable than formerly. In the Corporation dwellings, and particularly in the scheme being carried out at Blackley for the better housing of the people, they had hopeful auguries for the future. With regard to the "garden cities" movement, it had his full sympathy, but he feared its promoters had a difficult task before them. Working concerns were carried on as matters of business, with a view to profit-making, and people who engaged in business could not be philanthropists, as they must be if they took their workshops out into the country districts simply for the sake of housing the people.

Dr. Boobyer (Honorary Secretary of the conference) wound up the discussion. He said that in all their discussions of these questions they were constantly confronted with the necessity for a reform of the Acts dealing with these matters. A consolidation and revision of the Acts would solve the difficulty. In his experience of a town of 250,000 inhabitants he could tell them of some things that were very startling. Several towns had had their fingers burnt to a painful extent in attempting to carry out the Acts. After obtaining a Provisional Order under Part II. of the Housing of the Working Classes Act, a scheme had been proposed which would cost £6,000, but they afterwards found that the actual cost would be £106,000. It was true, as Dr. Sykes had pointed out, that before they could correct a nuisance in a single room of a house they must close the whole house. They might obtain a closing order under Part II. of the Housing of the Working Classes Act, but the Health Committee could not make an order for demolition until they could satisfy the magistrate that the houses were a nuisance. He knew a case in which thirty-six houses were condemned and shut up, but they could not satisfy the magistrate that as they stood empty they were a nuisance, and they remained standing, and were afterwards rehabilitated and let as new dwellings. Then they came to the extraordinary action of the Local Government Board in demanding that the new dwellings should be of such a class as to be beyond the means of the working classes. In that city 1,600 houses were to be cleared for the extensions of the Great Central Railway, some of the oldest in the city letting at rentals of from 1s. per room to 5s. 6d. for the better-class house. The Local Government Board would not approve, to replace them, of houses worth less than from 7s. to 8s. 6d. a week rent. The consequence was that other houses in the neighbourhood became terribly overcrowded, and some of them were made into tenements of the worst description. The only course was to make private dwelling-houses into lodging-houses. They could deal much more effectively with these various evils if they could secure the revision and consolidation of the Public Health Acts, which should include the Housing Act and the Food and Drugs Act.

After some further discussion as to the terms of a resolution to be submitted to the meeting, in which Alderman Griffiths (Southport), Alderman Hobson (Sheffield), Mr. Harding (Roberts) (Holywell), Mr. Prince (Connah's

Quay), and other gentlemen took part, the following resolution was adopted:—

"That in the opinion of this congress the period for the repayment of loans under the Housing of the Working Classes Act should be extended to 100 years for land and eighty years for buildings, and that the Local Government Board should be empowered to authorise loans at a low rate of interest."

SANITARY INSPECTORS' CONFERENCE.

Mr. Wm. Bland opened this conference, which was very numerously attended, with a presidential address, in which the leading questions interesting to Sanitary Inspectors in particular, and to sanitarians in general, were touched upon. Among the latter the new Report of the Joint Select Committee on Housing the Working Classes was referred to, and in the former class of questions references were made to the duties of Sanitary Inspectors in regard to the treatment of persons suffering from infectious diseases, the disposal and treatment of refuse, and inspections under the Food and Drugs Act. The President urged the necessity of union among all Sanitary Inspectors throughout the United Kingdom. Complete union would give every inspector in the kingdom opportunities to advance, so that year by year they might hold their place in the front rank of the sanitary army.

After a vote of thanks to the President, Mr. F. J. Rowe (Manchester) was called upon to read a paper on "The Workshop Inspector," in which the working of the Shop Hours Act and the Shop Seats Act, as well as of the Factory and Workshops Act, was treated of. Factories were defined as places used for manufacturing purposes where motive power was employed, while workshops were places where only manual labour was employed for manufacturing purposes. The latter category included bakehouses, and it was contended that it ought to include restaurants. The overcrowding, defective ventilation, and insanitary conditions prevailing, especially in tailors' workshops, were vigorously denounced in the paper, and the Shop Hours and Shop Seats Acts were described as worthless. The author contended that the danger of discord in the administration of the Acts lay in the attempt to apply arbitrary rules and definitions to elastic and more or less varying circumstances. Personal tact on the part of the Inspector would effect much more than official coercion, which was apt to result in needless irritation.

An animated discussion followed in which Mr. Kirley (Bristol), Mr. Fyfe (Glasgow), Mr. Peers (Wolverhampton), Mr. Robins (Oldbury), Mr. Shawcross (Withington), and other gentlemen took part.

Mr. Fyfe (Chief Sanitary Inspector, Glasgow) said one or two important points of principle had been raised in the paper. The first was whether in the opinion of Inspectors the tendency should be towards flexibility or rigidity. It was certain that workshops in the centre of slumland were in a very different position from those in the country, and it might be awkward if the Home Office insisted on a hard-and-fast rule being applied in all cases. The rules as to the cubic feet of space to be allowed were sometimes absurd, and there could not in many cases be carried out. There ought to be substituted a standard for pollution of air that might be allowed as a maximum. Glasgow had tried to get restaurants included as bakehouses. In many the temperature ranged from 100 deg. down to 80 deg. It should not be over 75 deg. Fans might be employed to reduce the temperature.

A paper by Mr. Peers (Wolverhampton) on "Some Factors affecting Public Health" was then read, in which pure air was set down as health's greatest factor. An inquiry, extending over two years, instituted by the Medical Officer of Health of Wolverhampton (Mr. Maley) clearly showed the appalling difference in the death-rate in a crowded court, where the air was impure, and the normal death-rate. In a town in the Midlands, where 4,501 persons were residing in 163 courts, the density rate per acre ranged between 400 and 900 souls per acre. This gave about 8 sq. yds. per person in places from which the free air was jealously excluded and sunlight could only penetrate through narrow passages or over the roofs of surrounding houses. The death-rate in these courts was found to be nearly double that of the more open parts of the town. Other factors prejudicial to health were the black polluting smoke, the

ineffective control over the meat and milk supply, and the virtual immunity enjoyed by the adulterators of drugs and many articles of food.

The third paper read was upon the "Abolition of the Privy System," by Mr. E. Nuttall (Chief Sanitary Inspector of Stretford). The paper contrasted the best practice of large towns, where refuse is got rid of by water carriage through good drains and sewers, with the practice still common in rural districts, where privies in the most appalling condition of neglect are to be met with in close proximity to living rooms, wells, or other sources of water supply. Some horrible instances of sanitary ignorance and neglect in rural districts were given by the author in advocating the conversion of privies, even in country places, to the water-closet system. Dr. Boobyer, of Nottingham, compiled a remarkable table, which showed distinctly that there was a direct relation between typhoid and the method adopted of disposing of excreta. In districts where the privy-system prevailed, the typhoid cases averaged 1 to every 37 houses; where the pail-closet system prevailed it was 1 case to every 120 houses; and in districts where water closets were the rule only 1 in every 558 houses. The worst obstacles that a progressive Corporation had to encounter in trying to bring about this salutary conversion of privies into water-closets were the legal difficulties. A number of cases were cited where Councils and Health Committees had been defeated before magistrates, quarter sessions, and even in the House of Lords, one of the most remarkable cases being that of *Barnett v. Laskey* (Sanitary Inspector of Eccles), in which the late Lord Russell had decided against the Corporation of Eccles, where they seemed to have a very strong case. In a group of five houses belonging to Mr. Barnett there were nine cases of typhoid, and the owner was served by the Inspector with a notice to convert the privies into water-closets. The owner failed to comply, and the Corporation did the work and sued for the cost. The magistrates rejected the suit, and their decision was confirmed on appeal to the House of Lords. The author concluded his paper by advising Local Authorities who desired to get rid of these foul privies to obtain powers for that purpose by private Act of Parliament. He suggested that the conference should pass a resolution in favour of consolidating and amending the Public Health Acts.

In the discussion which followed, Mr. Laskey said that in 1895 Dr. Bruce Lowe, representing the Local Government Board, told the authorities at Eccles they had full power to deal with this matter. The Health Committee might not have power to issue a general order, but they would have no difficulty in exercising their powers when a house had been proved a nuisance. The Health Committee, relying upon the advice of Dr. Lowe, had issued separate notices, and in a large number of cases they had been complied with, and closets had been substituted. The necessity for this substitution would be admitted in the case of towns which had an adequate water supply and adequate sewerage, but in certain country districts where there was no water supply a privy might not be the worst form of sanitary convenience. Cess-pools were quite as bad, if not worse. Privies should undoubtedly be abolished in towns and crowded areas, but in country districts where they did not pollute the water supply they might be allowed to remain. The Local Government Board still persisted in obstructing certain local authorities who were trying to get powers which had been obtained by other districts. Why did not the Local Government Board itself obtain an amended Public Health Act applicable to the whole country? Eccles, Stockport, Southport, and many other towns must spend thousands of pounds to obtain private powers, but the cost would be infinitesimal if divided over the whole country.

The discussion, which at this point was adjourned for the day, was resumed on Thursday by

Mr. Lowe (Widnes), who described a modified form of privy which had been tried at Widnes, and which was peculiar to Widnes thirty years ago. It failed because bricks, cans, and other things got in and choked the outlet. What would be the cost of getting a Provisional Order to convert?

The President (Mr. Bland) said Mr. Laskey had stated that it would cost from 1,500l. to

2,000*l.* He would like Mr. Nuttall to tell them how far that would go in promoting conversion.

Mr. Spears (West Bromwich) and several speakers protested against the payment to owners of property out of public money of any part of the cost of conversion of privies to water-closets. They invariably put up the rents after such conversion. Owners ought to be called upon to convert without any offer of compensation.

Mr. Drow (Oley) sketched on the blackboard a form of makeshift or modified closet he devised twenty-two years ago for a district that had no satisfactory water supply and no system of sewage disposal.

Mr. Priestley (Nelson) said that ten years ago there were in his district from 2,000 to 3,000 cesspools, but they had got rid of them all. They never had any difficulty in putting the law into force. They had had full powers for sixteen years, and he was surprised that any district should remain without them. He thought in these cases there must have been some remissness. There was an idea that waste-water closets were more economical than ordinary closets. He thought this was a mistake. With waste-water closets the sewage was more concentrated and more expensive to treat. Water companies should be made to understand that waste-water closets did not effect any saving. The taps were apt to be kept open, particularly in winter, and more water was thus consumed.

In reply to a question whether, in a case where there was only one water-closet to three houses, the Local Authority could compel the owner to provide one to each house, the President quoted Section 36 of the Public Health Act, which gives power to the Local Authority to compel owners to provide sufficient water-closet accommodation.

Mr. Nuttall, on being called on to reply, said he had not advocated conversion in all cases. Where there was no water supply and no sewage disposal system available privies might be allowed to remain, but even then there should be a thorough inspection, and where a privy was found to be too close to a building it should be condemned. He thought the central authorities were more favourably disposed now than formerly. Mr. Lowe, of Widnes, asked how they were to proceed to get rid of the privies. He had written himself to Widnes, and found they had taken no action. In his own district they had succeeded in getting many owners to convert, and in other cases they had assisted owners by paying a part of the expense of conversion. From 1808 to 1900 they had got from 700 to 800 privies converted to water-closets, and up to date they had 200 more. In reply to Mr. Bland, he said if there was not too large a number to be converted it would no doubt be more economical to assist the owners than to incur the expense of getting a private Act. He did not approve of Mr. Drow's modified closet, and in reply to Mr. Priestley, he said a Provisional Order had the effect of an Act of Parliament. It was necessary to send a separate notice for each house, and every case had to be dealt with on its merits.

Mr. J. J. Elliott was called upon to read a paper on "House Drainage and Sanitary Plumbing from an Inspector's Point of View." He said the control of drainage and plumbers' sanitary work was of the utmost importance, and good and thorough work should be enforced by legislation. Drains inside premises were often broken into for cleansing, or altered, or reconstructed without any responsible official being acquainted with the fact, the result being that the drains are probably left in a very imperfect condition, and what may previously have been a drain as defined by the Public Health Acts may have been converted into a sewer by the junction of some branch drain from an adjoining premises belonging to the same owner, thus increasing the responsibility of the Authority. It should be imperative that no drain or sewer be laid, reconstructed, opened, or uncovered without the consent in writing of the Authority or their representative, penalties being imposed for non-observance. The same should apply to all sanitary plumbers' work, and all such work should be tested and passed by the Local Authority's inspectors. Drains should be tested periodically at least once in three years, and the Local Authority should be kept informed of all changes taking place in the drains in its jurisdiction. If certificates were granted to owners of property stating the date of the testing of

their drains, much good might accrue. The registration of plumbers was a step in the right direction, but it would not stop bad work. A uniform system of drainage and sanitary plumbers' work is a thing very much to be desired, and many advantages would accrue if such a system existed. It would be hailed with delight not only by property owners, but by contractors, manufacturers, and inspectors alike. In concluding his paper, the author suggested that a council of experts in drainage and plumbers' work should be organised, preferably by the Sanitary Institute, to devise a suitable system of testing drains, and to recommend it for consideration to various Corporations and Councils with a view to its ultimate adoption.

Mr. Cowderoy (Kidderminster), in opening the discussion, maintained that builders and drain-makers, as well as plumbers, should be registered. The testing of drains should be renewed from time to time. He might pass a drain, but he would not give a certificate. He would put nothing down in black and white. If owners wanted certificates, let them go to the professional surveyor or architect for them.

Mr. Laskey (Eccles) said when bad plumbers' work was done it was not always the plumber that was to blame. More often it was the fault of the property owner. In their private Act they had a clause inserted to prohibit the opening-up or altering of any drain without the sanction of the Local Authority and without giving notice. The Public Health Acts ought to contain such a clause, which would benefit the whole country.

Mr. Bradley (Rawtenstall) said they had appointed in his Borough an Assistant Surveyor who did nothing else but draw plans of the drains and keep them for reference, so that when a fault occurred they could always go at once to the spot to repair it.

Mr. Fyfe (Glasgow), Mr. Robins (Oldbury), Mr. Hudson (Cheltenham), and Mr. Johnson (Wimbledon) continued the discussion, and Mr. Wilkinson (Derby) proposed the following resolution, which after some further discussion was carried unanimously: "This conference is of opinion that the time has arrived when no person should be allowed without permission of the Local Authority to open up, alter, add to, or otherwise deal with the drainage or sanitary appliances of any house or building or premises, and that all drains and sanitary appliances be constructed and required to stand the hydraulic or other equally satisfactory test to be applied by the Inspectors of the Sanitary Authority before such work be covered from view or passed."

Mr. T. G. Dee (Sanitary Inspector, City of Westminster) read the last paper, which was upon "The Sale of Food and Drugs Acts." The conference adopted a resolution in favour of the creation of a "court of reference," which should have power to prepare a standard for every article of food used by man—a tribunal which the author demanded as a pressing necessity.

CONFERENCE OF ENGINEERS AND SURVEYORS.

On Wednesday a numerously attended conference of Engineers and Surveyors was held at the School of Technology, with Mr. C. Jones (Borough Engineer, Ealing) in the chair, at which, after an address from the Chairman, papers were read on "Sewer Ventilation," by Councillor Dr. Dearden (Manchester) and Mr. A. M. Fowler, M.Inst.C.E.; on "Refuse Disposal," by Mr. W. H. Hamblett; and on "A New Sewer Scouring Machine," by Mr. J. Corbett (Borough Engineer of Salford).

Dr. Dearden classified the plans for ventilating sewers under three heads, viz., natural ventilation, artificial ventilation, and deodorisation systems. Of sixty towns from which he had received information twenty-eight pinned their faith to surface grids, but twenty of these had a few shafts to accommodate special circumstances. They were objectionable from the general belief that proximity to a street grid might induce zymotic disease. With the view of testing the soundness or fallacy of this belief, the Manchester Committee intended to have fresh bacteriological experiments to obtain a comparison between the air of the sewers and that of the streets outside. High shafts were adopted by twenty-three of the sixty towns as a means of ventilating the sewers in combination with surface grids. The mathematically precise experiments carried out at Leicester by the Borough Engineer (Mr. E. G. Mawbey) had proved of the greatest service. In four towns the drains were disconnected and the high

shafts of mill chimneys were utilised, but the results did not seem very satisfactory. Ventilating lamps, water jets, fans, and other mechanical contrivances were in use in a few places, about the efficacy of which opinion greatly differed. The chief deodorisation plans were the Reeve's system, the use of suspended blocks of pyrozone, and Mr. Calkin's combined air-filter and deodorant. All these appeared to be more or less good palliatives, but there was a liability to have the supply-water cut off which might be advanced against the Reeve's system."

Mr. Alfred Fowler briefly referred to the contributions to our sanitary knowledge made by the late Captain Veitch, R.E., the late Sir Robert Rawlinson, the late Sir Joseph Bazalgette, the late Mr. Thomas Waring, of Cardiff, and Dr. Robinson (now of Dover), who, in conjunction with the author, had made experiments on sewers on the upper levels in Leeds and other towns. The author refrained from expressing any opinion on the merits of the systems now before the public. In concluding his paper, he said it would be seen that a great deal can be done to prevent the accumulation of vitiated air, and to shut off the sewer air from discharging at any particular point, especially in cases where sewers are of steep inclination. The attention required for all systems of ventilation is more particularly necessary in the case of street gullies, as it is not always an easy matter to keep the water-traps sealed in time of drought, when they sometimes emit foul emanations from the sewers into the streets, and at such times would also prevent the extraction of sewer air from a distance by mechanical power.

A cordial vote of thanks was given to the readers of the two papers, which was supported by Dr. S. Rideal, Dr. Nash, Mr. Mawbey (Leicester), Mr. Brodie (Blackpool), Mr. J. F. Price (Birmingham), Mr. Parker (Hereford), Mr. Grimshaw (Manchester), and other gentlemen who joined in the discussion.

Mr. J. F. Price said that an artificial system of sewer ventilation would cost 125,000*l.* introduced in Birmingham, and its perfect success in a town like that, where there were many old sewers of which there was no knowledge, was somewhat doubtful. Difficulties of other kinds were pointed out by other speakers. The great difficulties at Grimsby, for instance, arose from the fact that one-fifth of the town was below high-water mark.

The conference then concluded.

ENGINEERING AND ARCHITECTURE.

The first sitting of this section, which took place on Thursday, and over which Sir Alexander Binnie presided, was occupied with the presidential address and papers by Mr. E. G. Mawbey, Mr. H. D. Searles-Wood, Mr. Clayton Beadle, Mr. Louis Hanks, Dr. Henry E. Armstrong, and Mr. J. A. Paskin.

In his address Sir Alexander Binnie referred briefly to the advances made in sanitary science during the forty years of his professional life, and congratulated the Sanitary Institute on the great success that had followed their efforts during the last twenty-six years to promote the health and happiness of the people of this country. After referring to the successive difficulties met with in their efforts to dispose of the refuse and sewage of towns, and the various methods by which we have endeavoured to overcome them, the President referred to the paramount importance to the public health of an ample and sufficient supply of pure and uncontaminated water. The purification processes we were now adopting drove him to conclude that "either our large towns, such as Edinburgh, Glasgow, Manchester, Leeds, Liverpool, Bradford, Birmingham, and many others, have unnecessarily expended millions of money in obtaining an ideally pure water supply, or that the people of London are running a great risk in continuing to depend almost entirely on the waters of the Thames and the Lea, which received the more or less clarified sewage effluent of over a million and a quarter persons." With regard to pure air, the President charged against the open fire-grate—the most wasteful mode of utilising fuel—a great deal of the contamination of the air of London. With electricity for the interior of our houses, gas instead of crude coal for heating and cooking, and incandescent gas-lamps for the streets, a great improvement could be made in the air of our towns. In concluding his address, the President, as an old municipal officer, advocated the devolution by Parliament of matters of purely local interest into the

hands of our local governing bodies and County Councils. It would be much more effective to give to these local bodies a free hand than to spend energy and valuable time in the Legislature in attempting to devise measures which, unfortunately, too often appeared to hinder instead of expediting the objects in view.

On the motion of Professor Robinson, a cordial vote of thanks was given to Sir Alexander Binnie for his address.

Mr. E. G. Mawbey (Borough Engineer, Leicester), then read a paper on "The Sanitation of Road Traffic." The author advocated the substitution of hard, impermeable stone paving, common to our best-cleansed towns, for the permeable stone paving and the ordinary macadam of our roads. The paving recommended by Mr. E. P. Hooley, County Surveyor of Nottingham, was an excellent step in the right direction. The replacing of horses by electric traction and automobile cars must effect a substantial improvement in the road and street sanitation of towns.

In the discussion, Mr. A. M. Fowler pointed out the nuisance to business in Manchester caused by the hard paving of the streets, the noise in which was so great that in offices adjacent to the streets it was often impossible to dictate a letter to a clerk. It might be cheaper for the Corporation to stick to paving that would last ten or fifteen years, but it was subject to the drawbacks of greater noise and greater wear and tear of horseflesh.

The next paper read was by Mr. H. D. Searles-Wood on "Means of Escape in Case of Fire." He detailed the history of the first enactment in this matter, and quoted from various Factory Acts and the regulations of the London County Council as to the provision of means of escape in case of fire. He also quoted and dealt with the fire-escape regulations in New York and Vienna, and also the rules for standard fire-resisting buildings of the Fire Officers Committee.

The remainder of the sitting was occupied by the reading of the papers on "The Abstraction of Underground Water and its Local Effect"; "Sanitary House Decoration," by Mr. Louis Hanks; "The Working of a New Sanitary Appliance used by the Health Department at Newcastle-on-Tyne"; and "The Pollutions of the River Calder."

The sitting was adjourned, there being no time left for the discussion of the papers.

Sanatoria for Consumptives.

A combined meeting of Sections I. and II. (Sanitary Science and Engineering and Architecture) was held on Friday, for the purpose of a joint discussion of papers by Mr. Edwin T. Hall, F.R.I.B.A., on "Sanatoria for Consumptives"; on "The Provision and Construction of Sanatoria for Tuberculosis," by Mr. W. Cecil Hardisty, and Mr. W. S. Cross, F.R.I.B.A., and Dr. Welsford; and addresses from Dr. J. Milson Rhodes on "The Provision of Public and Private Sanatoria"; Dr. Scarfield on "Suggestions for the Employment of Consumptives after leaving Sanatoria"; and by Drs. Moritz, Cooper Patlin, and Veterinary Surgeon Hunting on "The Prevention of Tuberculosis from the Clinical, Municipal, and Veterinary Points of View."

Mr. W. Cecil Hardisty, architect, Manchester, in his paper on "The Provision and Construction of Sanatoria for Tuberculosis," said: We can adequately provide for the treatment of tuberculous cases as we do for all varieties of infectious fever, for the epileptics and the insane, it is better that we should do so, rather than be obliged to send such cases far away in search of cure, and the possibilities of this cure "at home" should be open to the very poor as well as to the rich. Though sites of the altitude of many of the continental sanatoria are not available, altitude is not everything, provided the principal requirements of dryness and shelter be complied with. Out of twelve British sanatoria for paying patients only three are at a greater altitude than 400 ft. above sea level, and good results are recorded at all of them. In the planning of the sanatorium large wards are not desirable, but rather a liberal provision of single bedrooms for the patients; and to avoid the extravagance which the provision of single rooms for all would entail it is well to have a few small wards for four or six beds each. The six-bed ward is about as large as will be found desirable. Open balconies at the upper-floor levels in front of the bedroom windows, which

should in all cases open down to the floor, are better than verandahs in front of the ground-floor windows; they need not be more than 4 ft. in projection from the wall, as this is ample to allow of the bed or couch being laid longitudinally thereon if the patient be too weak to enjoy outdoor exercise. The balcony is much more "airy" than the covered verandah unless the latter can be arranged somewhat after the manner of those at Ruppertschahn, in Germany, where they are lateral extensions to the east and west of the main building, and, of course, offer no obstruction to the free circulation of light and air. But of more importance still is the ample provision of small shelters in the grounds at a reasonable distance from the building. These compel the patients to enjoy a little walking exercise, and induce them to indulge fully in the "open-air" treatment, and the shelters should be so arranged as to screen the occupants from the cold winds. Large and well-lighted, cheerful, and bright sitting-rooms should be provided, for, though the "open-air" treatment is the chief object of the sanatorium, there are times when a little social intercourse amongst the patients is advantageous and beneficial. Due attention, of course, must be paid to the plain upholstered furniture, and the entire absence of heavy pile carpets and tapestry curtains. The dining-hall should likewise be as light and cheerful as possible, and it is of great importance that it should be entirely isolated from all other parts of the hospital, and equally isolated by means of a well-ventilated corridor from the kitchen. The kitchen should be lofty and well ventilated at the roof, no rooms, of course, being placed over it. Special attention should be paid to the proper planning of the sanitary adjuncts. The baths and water-closets should be placed in turret, in themselves well ventilated, and should be completely isolated by means of cross-ventilated connecting corridors, entirely detaching them from the main building. The further adjuncts of a well-planned and equipped sanatorium will readily suggest themselves, such as ample provision of patients' clothes stores, where garments not in general daily use can be put away, thus relieving the bedrooms of superfluous furniture, of which the less there is the better. Boot-rooms and boot-cleaning-rooms are likewise useful accessories, and, of course, in addition to the nurses' duty-rooms, servants' rooms must be provided, where the sundry domestic articles for cleaning, &c., can be kept. The nurses and domestic servants should be provided for in a "Home" at some little distance from the main building.

A part of the paper by Messrs. Cross and Welsford will be found on another page.

In the discussion which followed,

Dr. J. Milson Rhodes said that if the public only knew the vast amount of money spent annually on the treatment of phthisis they would do something to prevent the enormous number of cases that existed. We spent from the rates over a million sterling annually on this disease alone, which produced 43,000 widows and 33,000 other paupers, making a total of 76,000 paupers to be provided for out of the rates because we had neglected to provide decent homes for the poor. The provision of sanatoria would be a real saving, but what he would most like to see was "every man's house a sanatorium."

Dr. Nocard (Delegate of the French Government), who spoke in French, described some remarkable experiments made by professors at Geneva, Berlin, Amsterdam, and other Continental centres, tending to disprove the declaration made a year ago in London that animal tuberculosis could not be transmitted to man.

Dr. Glover Lyon (London), in reference to the question of the construction of sanatoria, said they did not require ornamental or architectural structures, but simply groups of shelters. To be built on the right line they should have a south-easterly direction, because the south-east and north-west winds were the rarest in this country. If built with a southern aspect, all the beautiful evening sunlight would be lost.

Dr. Bostock Hill, Dr. Alfred Hill, and Dr. Niven all strongly urged the necessity of better education in sanitary matters. The education should begin in the cradle, and be continued in the elementary school. Better than getting Acts of Parliament for closing and rebuilding dwellings would be to endeavour to teach the people how to select good

houses, and reject the houses that were insanitary.

The President, in closing the discussion, commented upon the most salient points brought out in the papers and the discussion. He was particularly struck with the remarks of Dr. Alfred Hill upon the educational side of the question. "I hope," said Sir James, "that tuberculosis will become the bogey of our schools."

The following resolution was subsequently adopted on the motion of Dr. James Armstrong, seconded by Dr. J. F. J. Sykes:—"That this congress request the Sanitary Institute to prepare and issue, in a condensed form, a summary of the present knowledge on the treatment of tuberculosis, as obtained at the recent International Congress and elsewhere, and that the Committee of the King's Sanatoria be invited to join in the publication."

CLOSE OF THE CONGRESS.

On Friday afternoon a general meeting of the congress took place, at which Sir James Crichton Browne presided, and at which the reports of the hon. secretaries of conferences and sections were presented. The secretary of the Sanitary Institute (Mr. E. White Wallis) made a brief report of the Congress, which had proved in every respect successful. The total number of members attending had been 2,100, made up of members of the Sanitary Institute, delegates from the French Government, from the Secretary of State for War, Army Medical Department, and the leading Corporations of Lancashire and the surrounding counties, and Local Authorities throughout the kingdom. Votes of thanks were accorded to Earl Egerton of Tatton, the President of the Congress, the Principal and Senate of Owens College, the local committees and secretaries, the honorary officers of the Congress, and the numerous gentlemen and ladies who had contributed to the hospitalities and entertainments.

In closing the proceedings, the Chairman said the Congress had been one of great usefulness, enjoyment, and interest. Abundant proof had been given that in Manchester the sanitary spirit was very active, and that most admirable work was being carried on.

A vote of thanks was accorded to Sir James Crichton Browne, the Chairman, on the motion of Dr. Sykes, seconded by Mr. E. G. Mawbey.

We shall print in our next issue an article on the Health Exhibition which was opened at Manchester last week in connexion with the Sanitary Institute Congress.

ASSOCIATION OF MANAGERS OF SEWAGE DISPOSAL WORKS.

AN extraordinary meeting of this Association was held on Saturday, September 13, at the School of Technology, Manchester, for the purpose of hearing an address from the President of the Association, Dr. S. Rideal, who was unfortunately unable to be present. Mr. J. Ashton (Chairman of the Manchester branch of the Association), and Mr. C. H. Ball (Newmarket, honorary secretary), were present, and members from Bolton, Barnsley, and other towns in Lancashire, Yorkshire, and the adjacent counties.

Mr. Ashton, who presided in the absence of the President, called upon the Secretary to read the names of fourteen candidates for membership, all connected with sewage treatment works at Barking, Grays, Edmonton, Barnet, in the metropolitan area, Bristol in the west, or towns in Lancashire, Yorkshire, and Derbyshire. The Association, which was formed only in December last, already has a total of eighty members on the roll. The meeting decided that the annual meeting of the Association should be held in London on Friday, December 12 next. Some other formal business having been transacted, the meeting was adjourned for the purpose of a visit of inspection to the Salford Corporation sewage works at Weaste, on the invitation of the Engineer and Works manager, Mr. J. Arnold, who was present to conduct the party.

On the arrival of the members at Weaste, they were hospitably received by the manager, and then conducted round the works, successively inspecting the tanks, to which over 2,000,000 gallons of sewage found its way daily by gravitation; the powerful engines, capable of lifting to a height of 30 ft. as much

* Part of which is printed on p. 252.

as 30,000,000 gallons of sewage daily, an amount much above present requirements; the Tangye sludge-pumps, which raise 600 tons of sludge daily from the sludge-tanks, and force it out into a sludge-steamer, which carries it out beyond the mouth of the Mersey into the Irish Channel and deposits it in the sea, where the refuse cannot find its way back to the shore. The inspection was continued to the mixing-house, where lime to the extent of $5\frac{1}{2}$ cwt. per million gallons is added to the crude sewage, to the roughing-tanks, and the settling-tanks, where a new apparatus is at work removing the sludge from the tanks, and, finally, to the filter-beds, which cover an area of 26,000 sq. yds. Before passing to the filters an addition is made to the sewage of copperas (sulphate of iron) in the same proportion as the lime, namely, $5\frac{1}{2}$ cwt. per million gallons of sewage, but no other chemicals are used in the treatment. The characteristic feature at the filtering-beds is the spraying of the liquid for the purpose of getting the greatest possible amount of aeration. This is effected in a very simple manner by a brass sprayer or sprinkler fixed at intervals on the top of horizontal pipes crossing from side to side of each bay in the filter-beds at intervals of 8 ft. or 10 ft. On the whole filtering area of 26,000 square yards, which in reality forms one huge filter-bed, the division into bays, not being carried down to the upper surface of the filter, 4,500 of these sprinklers are fixed at regular intervals, the effect when they are all in action being striking and beautiful. They can be worked bay by bay in any order, and the whole can be worked simultaneously; but in practice it is found best to let them rest and play alternately at three hours' interval. Each of the 4,500 sprinklers throws up the water in a hollow cone, spreading out from the centre, the drops falling in a fine rain over a circle of 4 ft. or 5 ft. in diameter. The upper stratum of the filter-bed is formed of clinker which has passed through a $\frac{1}{2}$ in. screen. This has a depth of 5 ft., but can be raised to 7 ft. Below it is a bed of coarse clinker 1 ft. thick, resting on concrete. Up to a few years ago the sludge resulting from the lime process was simply deposited on the spare land at the works, until 150,000 tons of it had accumulated, and covered the whole of the land to the depth of from 10 ft. to 15 ft. Since the works of the ship canal, which runs along the south side of the Corporation property, were begun, and the steamer could be utilised for disposing of it, the old sludge has been gradually dug out and mixed with that daily produced, the land being thus cleared and restored to usefulness. The steamer at each journey takes out 600 tons of sludge more than sixty miles out to sea, the cost of thus disposing of it working out at less than 8d. per ton. Mr. Corbett, the Borough Engineer, puts the cost of the new works begun in 1897 at 80,000l., when finished bringing up the total expenditure to about 108,000l., to serve a population of 250,000, or at the rate of 10s. per head, a much lower outlay than is usually found necessary. The results are regarded by the Corporation as extremely satisfactory. The effluent is odourless and clear, has a not unpleasant taste, the filtrate averaging well within the standard insisted on by the Joint Board of the Irwell and Mersey Watershed.

After the inspection the meeting was resumed, and a cordial vote of thanks was given to Mr. Arnold. In proposing it, the Chairman, Mr. Ashton, declared that the sprinkler they had seen at work (Mr. Arnold's) did its work more satisfactorily than any he had examined, and he believed he had seen them all. He had no hesitation in saying that this was the sprinkler of the future, and that the processes they had inspected perfectly solved the problem of sewage disposal for Salford, in spite of the difficulties created by the large proportion of very foul trade refuse which Salford sewage contained.

Mr. Arnold having briefly acknowledged the vote of thanks, the visitors returned to Manchester.

COMPETITIONS.

MARKET, DUBLIN.—In response to Lord Iveagh's invitation, eight architects in Dublin sent in designs for the New Market. These were submitted to Mr. C. J. McCarthy (City Architect), Mr. Spencer Hart (City Engineer), and Colonel Addison, R.E., who awarded the first place to Mr. G. P. Hicks, the plans of Messrs. Kaye, Parry, & Ross being placed second.

Illustrations.

NILE BARRAGE AND RESERVOIR WORKS.

THE whole of our plates this week are devoted to the illustration of the great Barrage and Reservoir works recently completed on the Nile, under the direction of Sir Benjamin Baker as consulting engineer.

The whole work is described at considerable length in our leading article in this issue, to which the reader is referred.

In selecting the illustrations we have aimed at combining pictorial illustration of the aspect of the works with constructional representation in section and elevation. Thus, our first plate gives a complete perspective view of the Asyut barrage, with views of portions of the work in process of construction; the next sheet gives the elevation and section of the work. In the third we give the general plan of the Asyut Reservoir works, with two sections of the dam, and in the fourth plate two views of portions of the dam, in progress and completed.

For the material for the illustrations we are indebted to the courtesy of Sir Benjamin Baker.

SANATORIA FOR CONSUMPTIVES.*

THERE are three important factors for consideration in connexion with every project for a sanatorium. These are (1) site, which involves the questions of subsil, altitude, shelter, prospect and aspect; (2) water supply; and (3) sewage disposal.

First, as to site. A sandy or gravel subsoil should be selected if attainable, so that rain may be readily absorbed. Stiff clay is imperious, and a site with clay not far from the surface gets waterlogged. Evaporation creates ground mists or fogs, which are very bad for consumptives. But a low-lying site on sand or gravel is as bad, because the subsoil water percolates through the subsoil and renders the earth moist and cold. This percolation also forces outwards ground air, or air charged with carbonic acid gas. The ideal site is the southern slope of a hill sheltered from north and east winds by trees. On sandy soil the trees will generally be some species of pine, the resinous exudation from which is health-giving, imparting a clean and brisk flavour to the air. Given, then, a suitable site amid trees, the next thing is to place the sanatorium in an elevated position. It is not good to put it on a flat plain. Shut in by woods, with a strictly limited prospect, the influence on a patient is bad. Again, there should be a wide clearing on the south side of the building and in a less degree on the other sides. Admit to building and to gardens plenty of sunlight. Another point of great value is to set the building well away from a high road, and in a sandy district this is of especial importance. Dust of any kind is, of course, very bad for affections of the throat or respiratory organs, and the dust from a high-road, laden, as it is liable to be, with faecal matter and carried about by high winds, is worse than all. Of course, a good water supply is essential. Where a public service is not at hand, a spring should be available on the higher side of the sanatorium. It will there not be in danger of contamination from sewage, and the water will flow by gravitation to the building—a great saving in expense of maintenance.

Sewage purification and disposal are important matters. In small institutions earth closets are satisfactory in every way, and the limited quantity of liquid refuse, such as bath and sink water, can easily be dealt with; but in larger sanatoria some form of underground sewage disposal becomes a practical necessity. Where there is a public sewer at hand there appears to be no objection to its use.

The author then gave some information as to sewage disposal in various places in South Germany and at home. Proceeding, he said: Assuming the size of the building to be determined, we have to settle what are to be the bases of the design, and these I think may be thus set forth.—1. Let the whole be conceived on broad lines, to be and to suggest expansiveness—plenty of room to breathe and move. 2. Plenty of sunlight and fresh air into and through the patients' rooms. 3. Disconnection of all buildings containing water-closets and

other sanitary appliances. 4. Separation of rooms into groups for classification of patients. 5. Limitation of destructive fires, and provision of means of escape. 6. Open-air accommodation for those temporarily unable to walk. 7. Limitation of height of buildings. 8. Housing the medical and nursing staff away from their daily work. 9. Separation of administrative buildings from the hospital proper. 10. Avoidance of all angles, ledges, and crevices for the harbouring of dust.

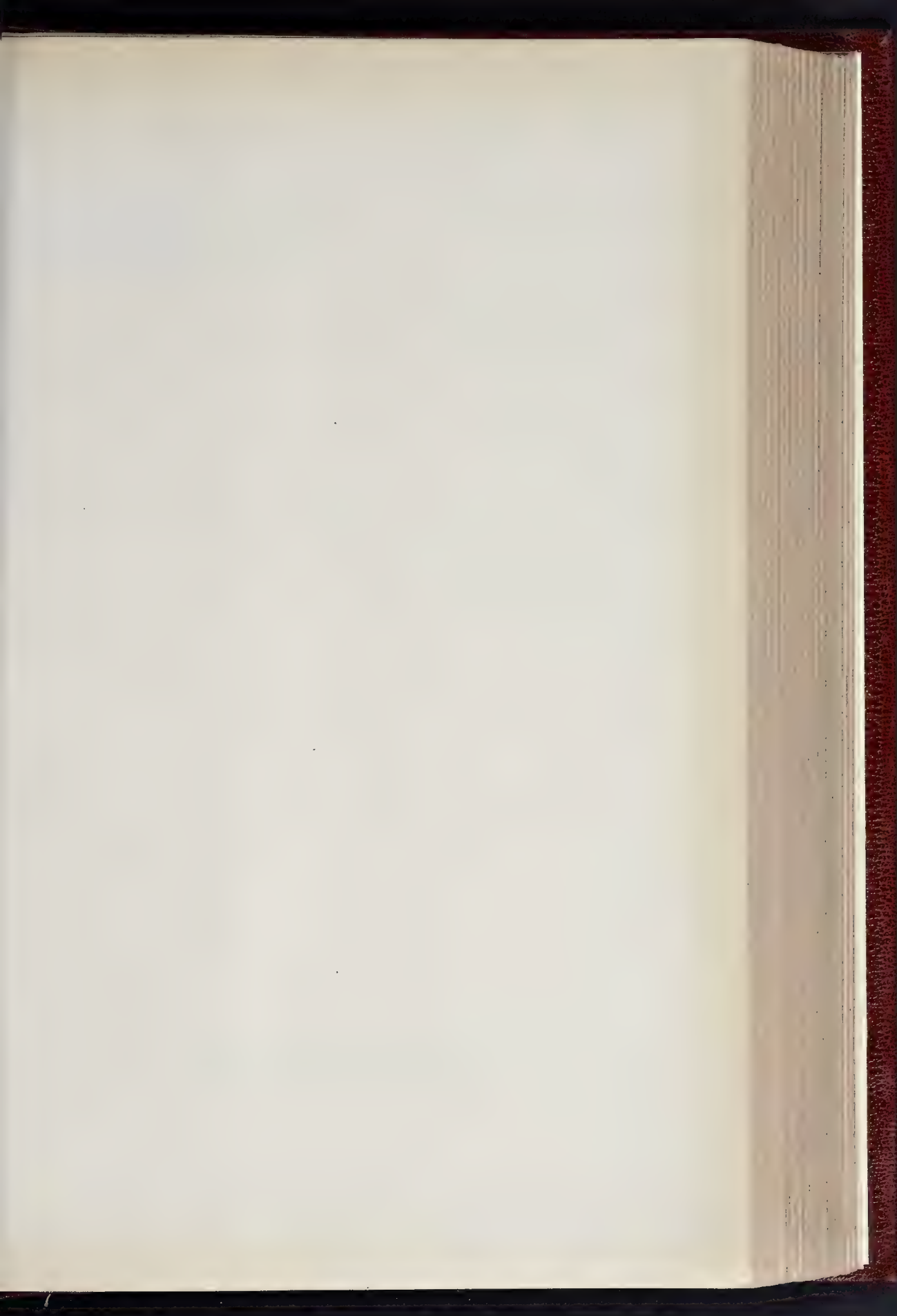
There is one all-important detail to be settled at the outset before putting pencil to paper, and that is, shall patients be accommodated with single or multi-bedded rooms? On this question there is difference of opinion. By some it is held that for the poor rooms with more than one bed are best, as these patients like company. There are cases where two or three beds in a room may be of advantage, as where hæmorrhage is likely to occur, when one patient may temporarily help another pending the arrival of the doctor or nurse. But the majority of doctors hold that patients who have separate bedrooms do the best, as they are not disturbed by others, and the King's Advisory Committee have adopted this principle for the new sanatorium about to be erected by his Majesty.

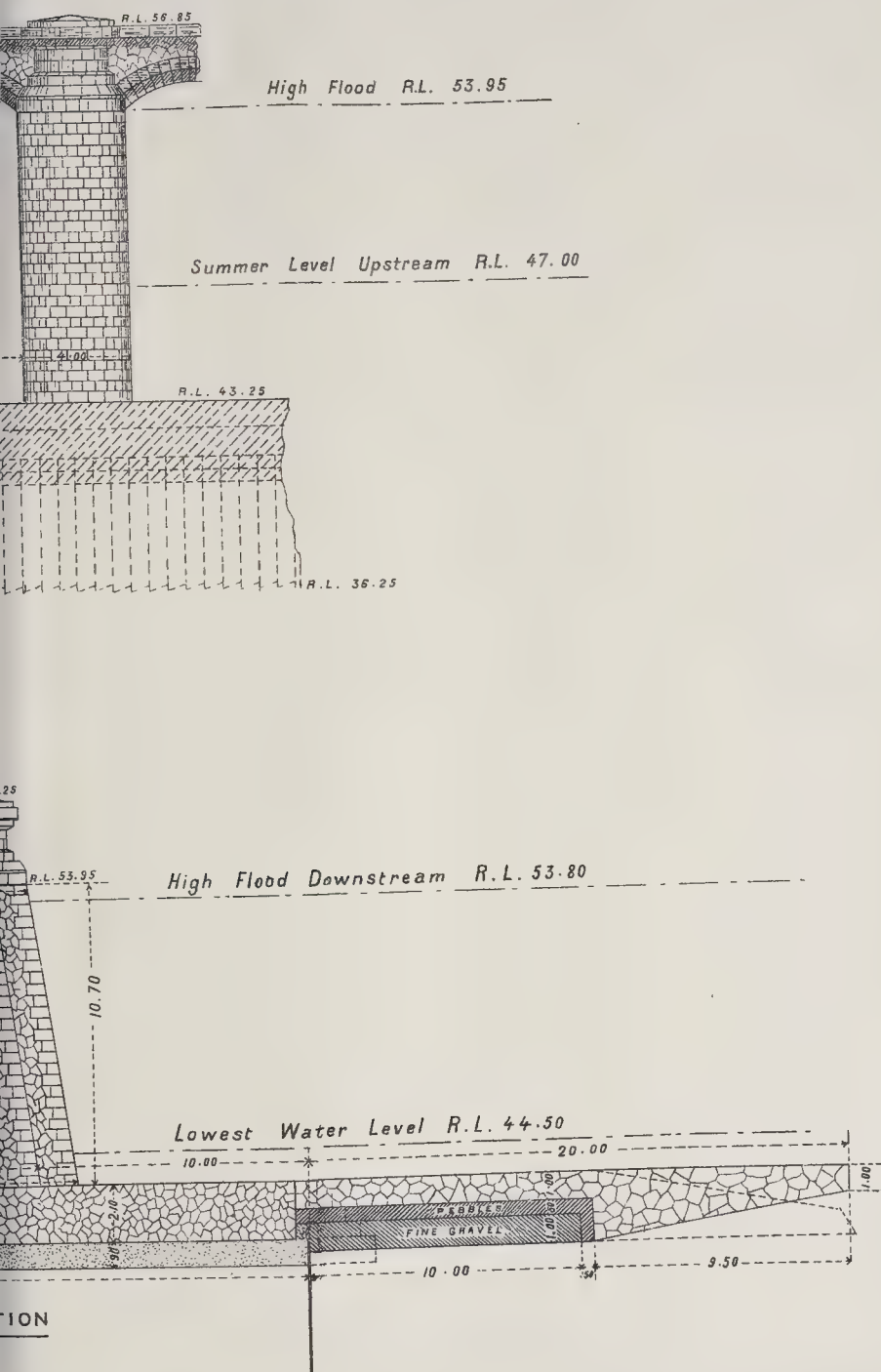
From the consideration of this subject we are led to another—viz., the external reclining balconies or liegchallen, as they are called in Germany. In these are placed couches where the patient may lie in the open air all day, and perhaps all night. Dr. Waghers, of Nürdrach, does not adopt them, as he thinks they tend to make patients lazy; but they are very generally adopted, and in certain stages of the disease are doubtless of great value.

Unless otherwise mentioned, all the German institutions have double casement windows, are heated by low-pressure steam radiators with no fireplaces, and are electrically lighted. In some of the latest institutions, as Harlach and Kraling, the administrative buildings are separate and distinct from those containing patients, but not so in others, particularly in earlier ones. For example, at Falkenstein, which is the first institution I propose to describe, the kitchens, larders, &c., are in the basement of the block. It must, however, be borne in mind that this institution commenced in what had been a private house, and although by additions it is now a large place, the original house remains part of it. The staff, except the medical men, live in the block. There are detached blocks—engine and boiler houses, stables for horses and cows, workshops, laundry, &c.

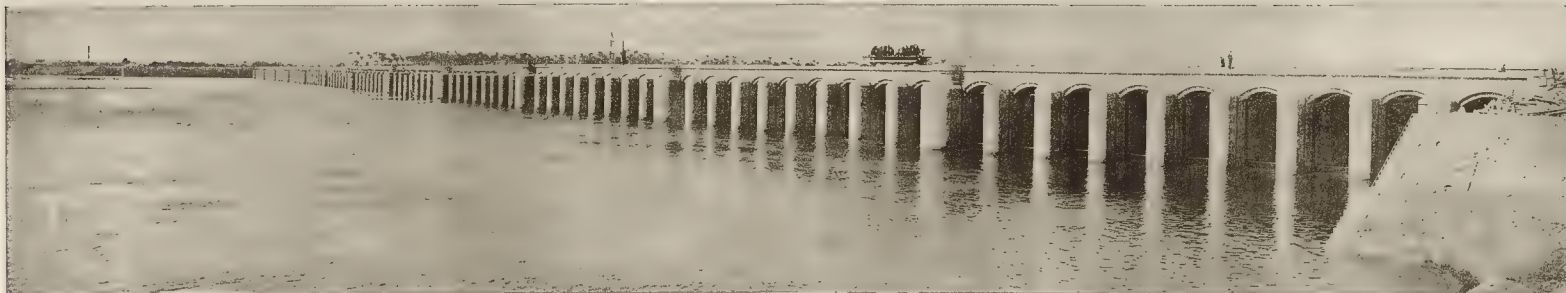
The main building, containing a basement and three floors above, one of which is in the roof, consists of a centre block facing east-south-east, with two symmetrical wings at a slightly obtuse angle, enclosing on three sides a terraced garden. To the east is a very large dining hall open on the south-south-east to a wide verandah, which is continued in an easterly direction to the chief doctor's house, forming a covered promenade about 65 metres, or say 200 ft. long. On the south side a long annex, with an enclosed verandah or gallery facing east, leads to another doctor's house containing the consulting-rooms, &c. On the west side of the gallery are the gardener's house, mortuary, &c. The total frontage in a straight line measures about 1,000 ft. The sanatorium has accommodation for 120 patients of either sex, with seventy single and twenty-five double bedrooms, generally of a large cubic capacity. There are three main staircases. The staff consists of a medical superintendent with three assistants, and a managerial staff of four. The total staff, male and female, indoor and out, is ninety-two. There is one waiter to eight or ten patients. There is no regular staff of nurses, and no separate accommodation for them. They are only taken in if required by patients. There are only two slipper baths for patients and a douche-room in the basement. The water-closets are contained in the building. The floors of bedrooms are covered with linoleum; the walls are plastered. There are no rounded angles. The liegchallen are attached to the building, forming wide verandahs on the three sides of the terrace at the level of the basement floor, which is above ground on this side. In the grounds there are large open pavilions and smaller summer-houses containing couches, all fancifully and luxuriously appointed, and in the building are winter-garden, reading, writing, billiard, and music-rooms. Altogether this is a high-class hotel, medically conducted, where wealthy patients

* Part of a paper by Mr. Edwin T. Hall, F.R.I.B.A., read before the Sanitary Institute Congress, Manchester, as mentioned on another page.

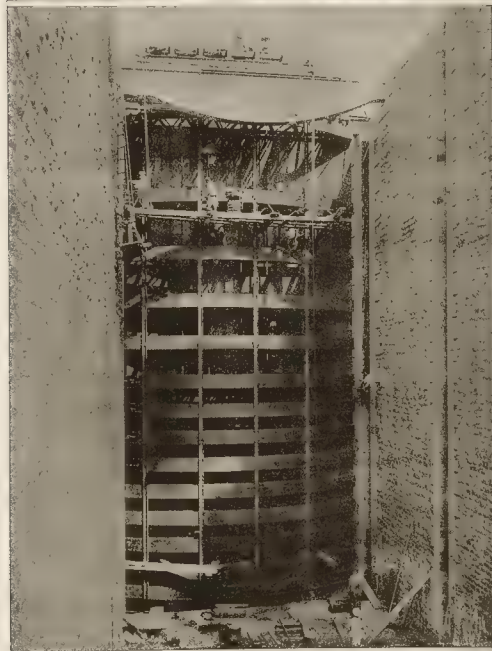




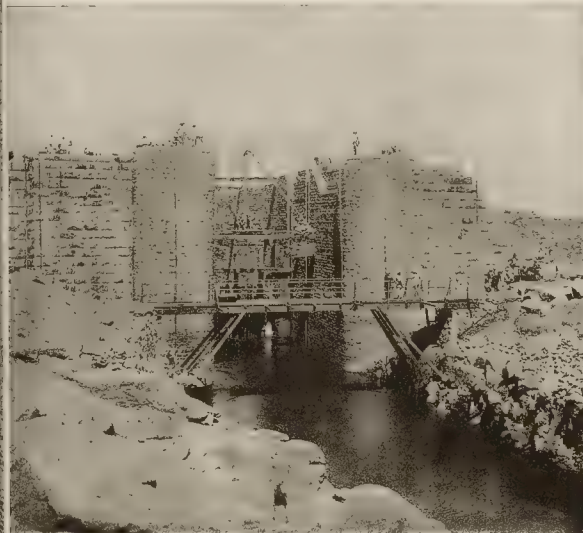
ELEVATION AND SECTION



VIEW OF COMPLETED WORK



LOCK GATE, NAVIGATION CHANNEL



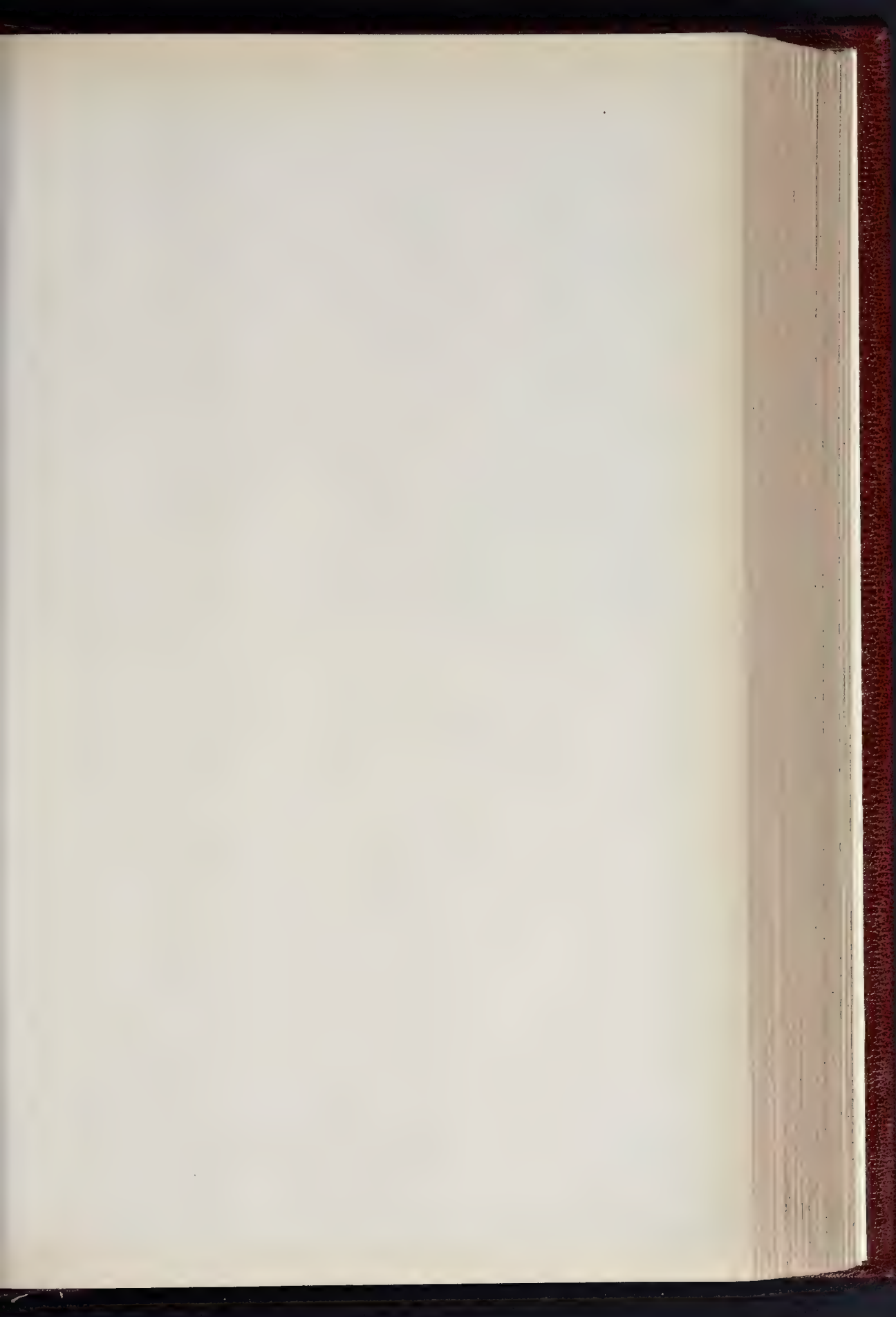
NAVIGATION CHANNEL

BARRAGE ACROSS THE NILE AT ASYUT



UNDERPINNING OF COLONNADE, PHILA.

BY PHOTO FROM "THE BUILDER" BY A. J. P. H. N. STREET & SONS, LONDON, W.C. 2



Section of Pierced Dam

Water Level 106.00

109.00
7.00

rad 6.605

Faced with Squared Rubble in 2 to 1 & Pointed in 2 to 1 Cement Mortar

Batter .056 per metre

Sluice Well

Ashlar Lined Sluice

7.00 + 2.00

87.65

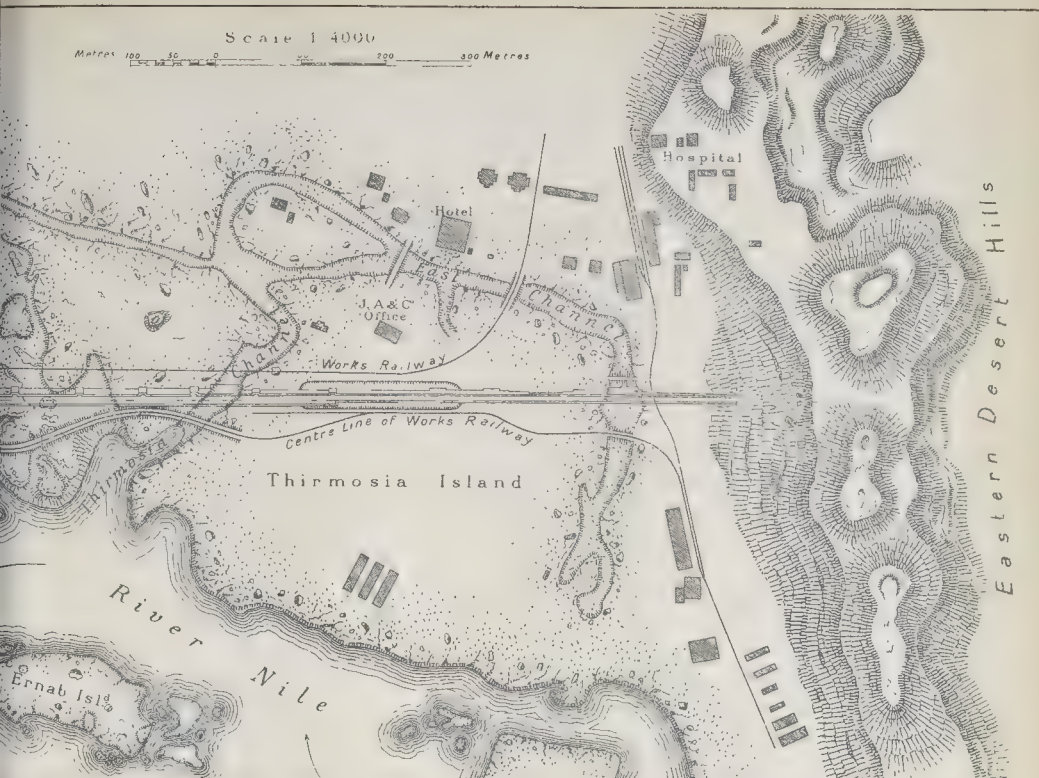
87.30

Rubble Masonry in 4 to 1 Cement Mortar

Foundation Course in 2 to 1 Mortar

Batter 1 to 1 1/2

facing



Section of Solid Dam

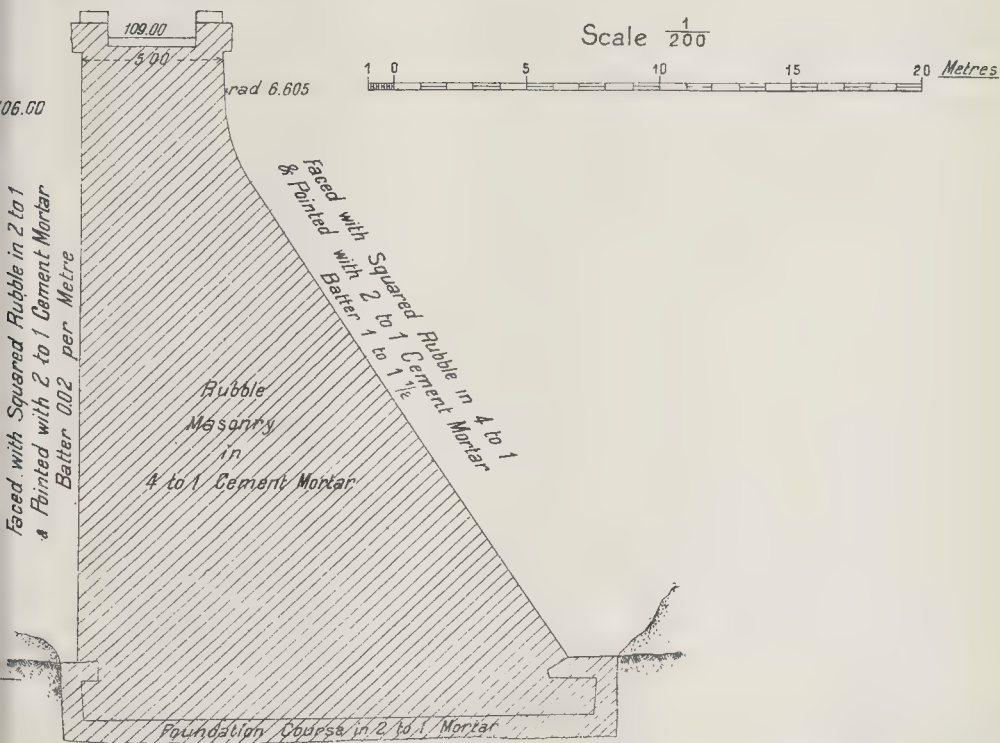
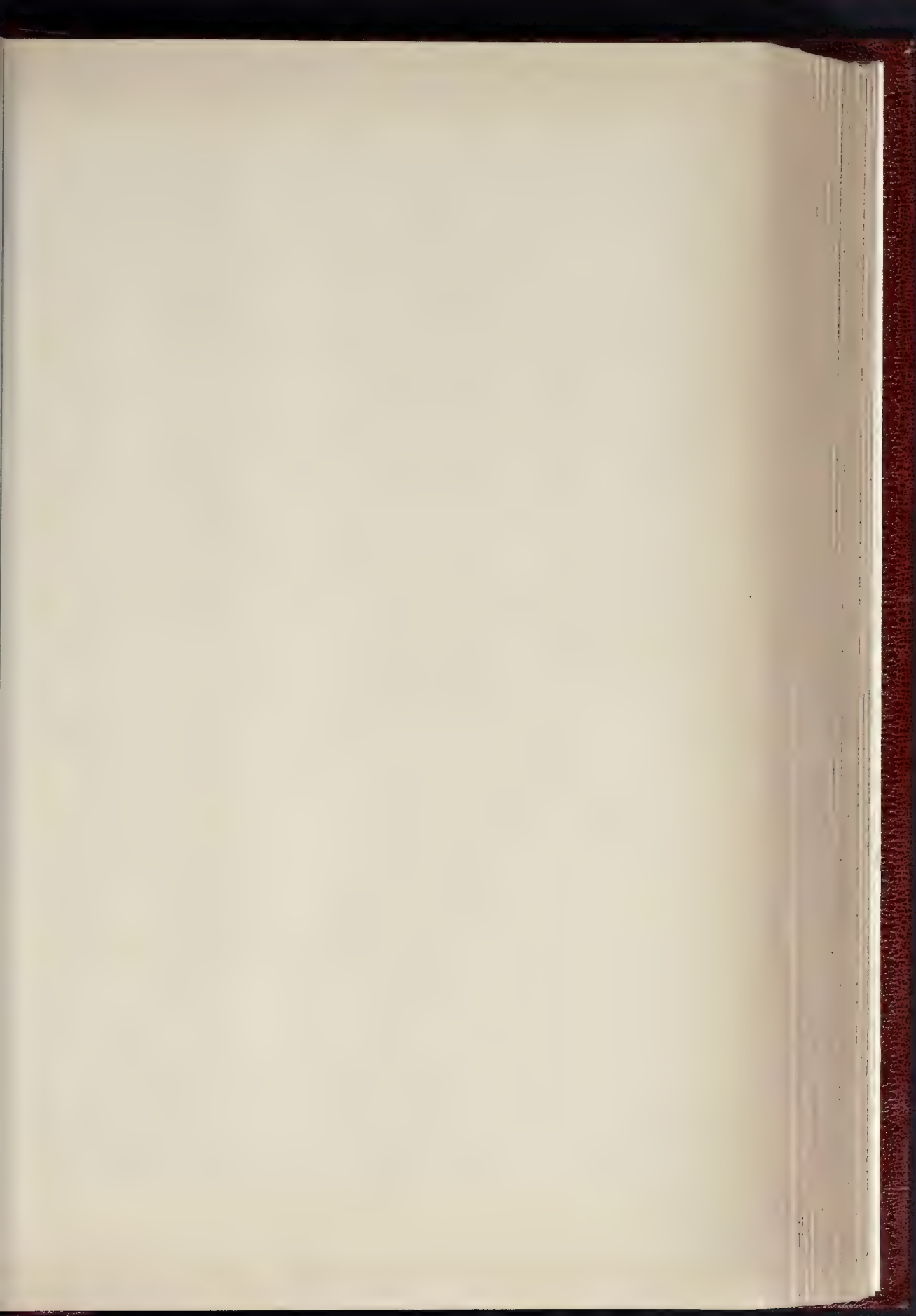


PHOTO LITHO. SPIRIGUE & CO. LTD. 4 & 5 EAST HARDING STREET FELTER LANE 1



THE BUILDER, SEPTEMBER 20, 1902.



PART OF DAM, SHOWING BUTTRESS AND SLUICE.



THE PHOTOGRAPHICAL COMPANY, LONDON, W. 1.

DAM IN PROCESS OF CONSTRUCTION: FROM WEST BANK, LOOKING EAST.
NILE RESERVOIR WORKS, ASWÂN.

live cheerful lives in beautiful air and glorious scenery.

Ruppertsheim, a few miles distant, near Hirschberg, is modern, is for poorer patients, and is more strictly a sanatorium. It is on a flat crescent three stories in height, above a basement with two short wings, and accommodates 122 patients, ninety male, thirty-two female. There are no separate administrative buildings, but the kitchen is in the west wing on the ground floor. There are eighteen rooms with one bed, sixteen with four beds, and six with six beds, of a cubic capacity per patient for men 20 metres to 30 metres, and for women 30 metres to 40 metres. The staff consists of the medical superintendent, with two assistants, a secretary, and a lady superintendent matron. There are three female and two male nurses, and twenty-four male and female servants. There are two main staircases from bottom to top. The patients' rooms face south, and are in single file, with a corridor on the north side. There are nine slipper baths for the patients, and one douche for each sex, all in a body of the building. The floors of the bedrooms are of plain uncovered deal boards; the walls and ceilings are of plaster. In the older portion of the building there are no concave angles to the rooms, but in that most recently built all angles are concave except at the floor, where they are most needed. At the ends of the building there are two storied liegehallen, about 12 ft. wide. The Hirschberg liegellatte, Engelthal, a few miles from Hirschberg, is a modern building—a parallelogram consisting of basement, three floors, and then rooms in the gables. There is no separate administrative block of buildings. It affords accommodation for fifty patients in seventeen rooms, two containing five beds, two with one bed, the others having three beds each. The cubic capacity per patient is 40 metres. There is no staircase, which is not sufficient for so high a body of the building. All the patients' rooms face south, and have a corridor in the north side. There is a medical superintendent, with no assistant. There are three female nurses and seven female servants. There are four slipper-baths and three douches, in the body of the building. There are six water-closets for patients, similarly placed. A handsome dining-room faces south, and is served from the kitchen in the basement. The floors are of uncovered deal boards. Walls and ceilings are of plaster and have concave angles, except at floor, which omission the doctor laments. The plastered surfaces are artistically decorated, a feature which I commend to the notice of our hospital authorities. The liegehallen are quite detached, one being on the terrace at the south-west of the sanatorium, the other in the woods. The next building to describe is one of quite another plan. The Städtisches Sanatorium at Mariaching is a few miles drive from Munich, on the top of a hill, in a fir forest. This building may be described as a hospital. It is primarily for consumptives, but a few other cases of non-infectious character are received. They also make a speciality of dental surgery, and the dental operating room is fitted with every kind of the most modern dental appliances. Accommodation is provided for 212 patients, half of each sex, but the ultimate scheme is to add buildings so as to accommodate 600 patients. There is the medical superintendent and three assistant medical officers. The remaining staff consists of a manager, a legal clerk, a clerk, and one matron. There are twenty-one female nurses (members of a sisterhood), two male attendants. Of servants there are nine female and eight male, including engineering staff. The hospital is a building E-shaped on plan, three stories in height, with, I am glad to say, no basement rooms. Its main entrance frontage is towards the north. There are twenty-eight wards, six with twenty beds, six with twelve beds, twelve with single beds, and eight isolation rooms, each with one bed, but I think some of these last-named are appropriated for three-bed wards. The cubic capacity per patient is 30·36 metres. There are four staircases, two near the centre and one at each end, and one lift. The windows reach nearly to the ceiling. There are twelve slipper baths and three douches, two slipper and one douche at each extreme angle, all contained in one room divided by partitions. There are eighteen water-closets for patients badly arranged, each group of three with a top-sink being placed in one room in the body

of the building, with only one window. It is surprising to find such an arrangement in these modern buildings, an arrangement which the medical superintendents all condemn and lament. The aspect of the wards is as follows:—The twenty-bed wards are axially east and west, with windows north and south. On the south side of the wards, three stories high, are the liegehallen, about 12 ft. wide. Dr. Hermann thinks these very conveniently placed, but too wide, and owing to the fact that they are of solid masonry, arched on each floor, they keep off too much sun. Had they been 9 ft. wide, with pillar construction, they would, he thinks, have been admirable. There are other liegehallen in the grounds. The twelve-bed wards are north and south, with windows east and west. The single bed wards face east or west respectively, the isolation rooms north. The floors of the wards are of concrete covered with linoleum. Walls and ceilings are plastered. No angles are rounded, a fact of which the doctor complains. Ventilation when windows are closed is by means of warmed air inlet and by outlet shafts. Time is too short to allow me to describe these in detail. The fresh air is warmed by passing through a case containing a steam radiator, but Dr. Hermann, the medical superintendent, complains that the air so heated is too dry. To me this statement was interesting, because I have always had this objection to steam radiators for heating such inlets. The same result does not arise when hot water is used. The lighting is by electricity, and all the clocks are electric. The day accommodation for patients is excellent. There are two adjacent dining-rooms in the centre for the two sexes, looking into the large quadrangles, and a reading-room to the south of the dining-rooms. There are two handsome chapels, one for Roman Catholics, one for Protestants. The administrative block is north of the sanatorium. It is said to be sufficient for the ultimate scheme. The plan is very complete and admirable. There are, however, two points I venture to criticise, and these are:—1. Placing the linen-drying rooms over the wash-house and finishing room. 2. Placing the disinfectant in the basement of the main block. The plan of the whole is a hollow square surrounding an open quadrangle. The south block contains the doctors' and priests' residences. On the south-west is the laundry; on the south-east are the kitchens, with dining-rooms attached for female staff, and the residences of the assistant matrons and nursing sisters. The west side contains the residence of the manager, servants, and engineer, and to the north of these the cow and pig stables, poultry-house, &c., with fodder lofts above. The east side contains the stables, coach-houses, &c. The boiler-house and engineer's department are in the centre of the quadrangle. The main basement contains heating apparatus, disinfectant, and very extensive cellars. The cow stable is a regular feature at most of the sanatoria, and those I have seen are beautifully kept. The importance of pure milk is evidently fully recognised.

We turn to yet another type of plan in the Volksheilstätte Kraling, about half-an-hour's walk from Planegg, in Bavaria. The whole district is a forest, principally of pines, and the Volksheilstätte is beautifully placed, and seems the ideal abode of rest and seclusion. This is strictly a sanatorium for open-air treatment of men only. It receives 120 patients. There is a chief medical officer with two assistants. The matron does the correspondence, otherwise the institution is managed from Munich. There are twelve nursing sisters and three male attendants. There are twenty-one servants in all, male and female. The sanatorium contains a basement and three other stories. It consists of a central block with two wings at widely obtuse angles, and at the south-east and south-west intersections there are pretty chapels for Roman Catholics and Protestants respectively. There are patients' rooms containing 100 beds, thirteen rooms have single beds, fourteen have two beds, six have three beds, two have four beds, six have five, and two have six; but 120 patients can be accommodated if necessary. The cubic space in single bedrooms is fifty metres, in other rooms from thirty to thirty-five metres per patient. There are two staircases. The doors have fanlights, but not to the ceiling. All patients' rooms face south, and of the multi-bedded rooms there are four with side windows. There is an

unobstructed corridor on the north side of the rooms in the wings. The kitchen is in the basement of the central block, the dining-room being on the ground floor on the south side, with a sitting-room adjacent. There are four slipper baths in one room on the ground floor, divided by curtains, and one douche-room. There are eighteen water-closets in groups of three arranged on each floor in one room in the heart of the building, with only one window. There is on each of the upper floors a room fitted with lavatory basins on both sides. In all there are thirty basins, the best accommodation I have seen in any sanatorium. The floors of all rooms are covered with linoleum. The walls and ceilings are of plaster with concave angles, except at floors, the omission of which is, of course, complained of. The patients' bedrooms are all on the first and second floors. The northern side of the ground floor of the west wing contains the matron's and nurses' rooms; that of the east wing the consulting-room, laboratory, doctors' bathroom, and the patients' baths. On the south of these are corridors, and south of these again are the liegehallen, about 3 metres wide. These form a structural arcaded verandah beneath the patients' bedrooms. There is also a liegehalle 78 metres long in the woods, fitted with eighty couches. The medical officers' rooms are on the north side of the central block, with a committee-room on the first floor. At some distance east of the sanatorium is an administrative block connected by a subway. This block consists of basement and three other stories. It contains the boiler and engine houses, disinfectant, accumulator-room, laundry, stables for cows and horses, and residences for the remaining staff and female servants.

I conclude the description of German sanatoria with that of the Nordrach colony in the Black Forest, nine miles from the little station of Biberach. Here there is no sanatorium proper, but many small buildings dotted about the hillside. High up the hill to the left is the largest building, of three stories, containing rooms for twenty patients. It consists of a long centre, with two short wings at obtuse angles of some 190 deg., so that they face to the south-south-east and south-south-west. At the intersection of the angles are hexagonal turrets. There are two staircases. In this building, as in the others, each patient has a separate bedroom of about 50 cubic metres capacity. All have single casements with fanlights, which latter are hung at the top and open outwards. There are balconies to some of the rooms. Each bedroom is fitted with a douche-bath supplied with hot and cold water. There are only two slipper-baths altogether, and these are solely used for medical purposes. There is one water-closet for every ten patients placed within the building. The floors are of wood covered with linoleum. The walls and ceilings are of narrow boards, beaded not only at the edges but on the solid parts, and there is a moulded wooden cornice. There are no concave angles. It is strange that all canons of smooth surfaces and rounded angles are here set at naught. The explanation probably is that there is no dust in the place. I have before noted that each bedroom is fitted with two lavatory basins, one for washing, one for sputum. There are a few ordinary summer-houses in the grounds. Another building of two stories is provided for sixteen patients, and the rooms are only about 8 ft. high. It is not only electrically lighted, but heated by electric radiators of the doctor's own manufacture. The medical staff consists of Dr. Walther and another physician of equal standing. There is a secretary. There are no nurses as such, the doctor holding that nursing, as we know it, "ought to be done by the medical men." There are two female servants to every ten bedrooms. In parenthesis it may be interesting to know that Dr. Walther strongly objects to the plenum system of ventilation, about which we have lately heard a good deal, of which he has had experience. There are various other buildings forming the colony, dotted about here and there. Among them is the doctor's house, with the sitting-room made so that in the summer one external wall or enclosure can be completely removed. It will be seen from the foregoing that Nordrach has nothing of the structural sanatorium about it. It is a hamlet on a mountain side, "far from the madding crowd." Nature provides varied refreshment for the body and mind.

It may now be of interest to briefly describe a few modern English institutions. I have had the pleasure of visiting the sanatorium near Crookesbury Ridges, under the direction of Dr. J. Rufenacht Walters. The sanatorium consists of two one-storied pavilions, one of eight and one of twelve single bedrooms, facing south, all with French casement windows opening out to a verandah, canvas covered, for reclining couches; corridors run the whole length behind the rooms. There are two nurses living in the buildings and one masseuse. The cubic capacity of the rooms per patient is about 1,100 ft. The floors are of wood covered with linoleum. The walls and ceilings are of plaster with slightly concave angles. The ventilation is by the windows, by inlet tubes, and by shafts at ceiling level across the corridor to the north. In the newer eight-bed block there are fanlights to the doors, so that all the room may be scoured with air. There are four bathrooms, two having needle-baths. The dining-room is attached to the older pavilion opening from the corridor, and beyond it are the kitchen and offices. The heating is by hot-water radiators. The lighting is by electricity.

A larger institution is that called Pinewood, at Wokingham. This has accommodation for sixty-four patients, each in a single bedroom of an average cubic capacity of 1,100 ft. The institution consists of a central block of three stories, containing the consulting-rooms, offices, and dispensary, with residence for the medical staff above. Detached from this on either hand is a patients' block of two stories, each block containing thirty-two single bedrooms. These blocks face south-south-east and south-south-west, and each has a corridor on the inner or northern side. There is one staircase in each. The ground-floor walls are of brick; the first floor is enclosed by wood framing covered with boards and tiles. There is one resident nurse in each block. The douche and slipper-bath rooms and water-closets are on the north side of the corridor, and open directly from it. The windows are single casements, which do not reach the ceiling. The doors have no fanlights. There are no verandahs or balconies. The floors are boarded and covered with linoleum. Walls and ceilings are of plaster. There are concave angles, except to floors, where angle fillets are fixed. The heating of rooms is by open fires, that of corridors by hot water radiators. Lighting is by electricity. The administrative block is detached to the north; it contains a handsome dining-room, with service and nurses' rooms attached, kitchen and offices (with female staff bedrooms over), and other rooms adjacent. There is a laundry block with disinfectant, an engine-house, stables, &c.

I may now perhaps describe a sanatorium which the Brompton Consumptive Hospital is erecting at Frimley, in Surrey from my designs. It is to accommodate 100 patients, and, unlike the others, it is for non-paying inmates. The site is high, and well wooded with fir trees. There are forty-eight single bedrooms, eight with two beds and twelve with three beds. Every patient's room will face S., S.E., or S.S.W. Outside the central block is a wide paved terrace. It will be noted that we have provided a large number of single bedrooms, and in other rooms have fixed our maximum at three beds. Many of the German doctors with whom I have discussed the question favour this as the maximum. The sanatorium proper, or patients' block, consists of a central building three stories high, with four radial wings or pavilions two stories high, all built of brick, the upper story tile hung on the brick, the roof being also tile covered. All wings are practically detached, and in a pine country this tends to limit the risks of fire and consequent danger to patients. By this arrangement of plan any one floor of the two or four wings may be appropriated to women, leaving the others for men; each group is self-contained, with its separate sanitary conveniences. This plan also affords much greater facilities for classification than could be found in one building of the ordinary type. The main entrance hall is in the centre, and behind it is a dayroom facing south, with two three-bed wards at the sides. East and west of the hall are the consulting and matron's rooms, dispensary, and sister's duty-room. The first floor has similar patients' and sisters' accommodation, a committee-room, a residence for the matron, rooms for the sisters, and a maid's room. Overhead, in the roof, are bed-

rooms, &c., for female servants, with their bathrooms, &c. The pavilions are connected to the centre by enclosed corridors having windows on both sides. Each wing contains twenty-two beds. The corridor on the north side has no obstruction whatever to light and air. Opposite every room door there is a fanlight in the corridor, and as all doors have ceiling, we shall get through ventilation, and even on hot sultry days the cooler air on the north side of the building will induce a current to the hotter south side. The windows are casements, those on the ground floor opening to the floor so that, if necessary, beds may be wheeled out. The casements on the ground floor are so constructed as to keep out rats and other vermin, while the windows may remain wide open. On the first floor there will be outside jalousie shutters, which can be closed either to exclude rain or intense sun heat, the windows remaining open. On the ground floor rolling canvas blinds, like those over shops, will effect not only the same purpose, but will shelter beds or couches outside. By this means we get the advantages of a verandah without any of its drawbacks. On each floor are large linen-rooms, and on the ground floor are boot-rooms. Between each pair of pavilions is a sanitary tower, detached except for a cross-ventilated lobby. This contains all the patients' water-closets, baths, lavatories, and housemaids' closets. For the nursing staff on duty separate ward kitchens, lavatories, and water-closets are provided on both floors. There are separate entrances to each pair of pavilions, two main staircases, and at the outer end of each pavilion a fire-escape staircase. The heating generally will be by hot water, the lighting by electricity. The floors will be of wood covered with linoleum, and all walls and ceilings will be of plaster with concave angles everywhere. To the north of the sanatorium proper are the two patients' dining-rooms and a general assembly hall. Behind are the kitchen block, female servants' hall, men's room, &c. At the east end is the nurses' home, at the west the medical officers' and men servants' residence. Nearer the main road are the laundry, boiler, and electrical engine houses, electrical ambulance house, mortuary and gate lodge. There are two laboratories.

Lastly, may I be permitted to refer to the new Camberwell Infirmary in course of erection from my designs. There will be 800 beds in the institution. My reason for mentioning it here is, that the Board of Guardians have, on the advice of the medical superintendent, Dr. Keats, and myself, made special provision for tuberculosis patients. We have three large wards of twenty-four beds each, in which practically the whole length of the walls on three sides are made to open, so that the patients may be said to lie in the open air, and above the wards are flat roofs with easy access, so that some patients can be actually in the open air all day long.

THE PROVISION AND CONSTRUCTION OF SANATORIA FOR PULMONARY TUBERCULOSIS.*

An ideal sanatorium cannot be designed on a cramped site, and not only should the site be ample enough to allow the buildings to be arranged to the best possible advantage, but there should also be grass land around to ensure the absence of dust, and to afford room for walks and exercise. A sanatorium for consumption must be considered as a specially designed hospital in which an infectious disease is to be treated.

"In order to facilitate the maintenance of healthy conditions in a hospital the form of the building should be such as to ensure the provision and proper application of (1) fresh air, with the necessary warmth and coolness; (2) ample light, including the penetration of sunlight to every part; (3) purification of floors and walls."

These words of Sir Douglas Galton will apply with even greater force to sanatoria, and in an ideal building the following requirements are essential:—(a) Free play of sunlight upon each room and block of buildings provided for the patients' accommodation. (b) The freest possible circulation of air around each building, and the avoidance of all enclosed spaces can-

which air would be liable to become stagnant. (c) Ample space between the various buildings. (d) Facilities for enabling the patients to spend the greater part of each day in the open air. (e) Sufficient compactness of plan to allow of all departments being placed within reasonable distance of the administrative centre, which should be separated from the patients' quarters. (f) Isolation of the engine and boiler-house, the laundry, mortuary, and other subsidiary buildings. (g) Departmental separation of male and female patients, whose quarters and exercise grounds should be placed on either side of a central administrative block.

The best type of sanatorium for small numbers probably is one built on the village system, in which the patients live in detached chalets, which are grouped around a central administrative block. Not only is free circulation of air and light promoted, but there is no institution look about the place. The patients feel more at home, and scarcely realise that they are in a hospital. But such a plan is not the best for a sanatorium containing 100 or more patients, as the labour of supervision and administration in a public institution consisting of a multitude of detached units, together with the expense of maintenance, would be prohibitive. A compromise may be effected by planning a series of pavilions, each consisting of a one-storied row of single rooms, completely surrounded by a verandah, with their long axes radiating from the central administrative block with which they are connected by a wide open corridor. Such a sanatorium has all the advantages of free circulation of air and light which the sanatorium of the "village" type possesses, while it is as easily administered and supervised as a large hotel.

The drawings which we exhibit to-day constitute an attempt to design a sanatorium of this type, to give accommodation to eighty-eight patients of the usual hospital class, and to twelve paying patients who require better accommodation. Provision has been made for an administrative block, arranged with the object of interfering as little as possible with the free circulation of air and sunshine. The front is two stories in height, and has a southern aspect. Behind this building is a long range of one-storied buildings, the principal rooms of which are lighted by lantern lights in addition to the usual side windows. The boiler house, laundry, &c., forming the centre of the semi-circular plan, are placed at the extreme north end of the central block. Then pavilions containing sleeping rooms radiate on either side, and an open corridor connects them with one another and with the administrative building. Twelve separate chalets are placed between the pavilions and the front administrative building. The stereotyped design seen in so many asylums and hospitals has been carefully avoided. A good aesthetic result may be obtained without the employment of costly stone quoins, cornices, and so-called enrichments. The bungalow type of building appears to be the best for our purpose, and the elevations conform to the plan. Without going into detail we may say that in a sanatorium all the usual precautions against dirt and dust, such as rounded corners, hard impermeable walls, terrazzo or teak flooring would be required.

In the front administrative block on the ground floor spacious dining, drawing, reading, and recreation rooms for the use of the better class patients open into a large central hall. On the first floor are bedrooms for the matron and nurses, and on the attic floor, approached by separate staircases, sleeping accommodation is provided for the servants of either sex. The kitchen occupies a central position between the dining-rooms allotted (a) to the patients, (b) to the nurses, and to the servants. An extraction fan placed in a large lantern light ensures thorough ventilation, and in order to obviate the possibility of any cooking fumes permeating into the adjacent passages, it is approached through well-ventilated lobbies, placed at either end, and forming the necessary serving rooms in connexion with the kitchen. On either side are the necessary provision and store rooms, and surrounding the building in front is a wide covered verandah, which is prolonged on either side into a raised terrace. On the west side an annexe is provided for medical work. This comprises patients' waiting and dressing rooms, consulting room, and an inner room for physical diagnosis. On the opposite side of a central passage are the laboratories, together

* Part of a paper by Mr. A. W. S. Cross, R.A. Cantab., F.R.I.E.A., and Mr. A. G. Walsford, M.D., read before the Sanitary Institute Congress at Manchester.

with a dark room and an animal room. Overlooking the terrace are rooms for an assistant medical officer, and the dispensary and general office. On the east side a corresponding annexe contains the nurses' dining and day rooms. Dining-rooms for the patients and servants, recreation-rooms, including a library, a large winter garden and a chapel are provided in the main central block. The main corridor is centrally placed, and connects the pavilions with one another. This corridor, open at the sides, is on the same level as that of the floors of the pavilions, and beneath it is a subway for pipes, &c. On either side of the administrative buildings three separate pavilions, each containing fifteen rooms, are placed with their long axes radiating from the centre of the plan, and planned as separate and independent blocks, communicating by an open covered way, with the main corridor. Each room is provided with an open fireplace. Each pavilion is surrounded by a wide verandah, and the rooms open on to it by French windows or doors, which, to prevent direct draught, may be double, as efficient ventilation is assured by windows consisting of fixed glass louvres above the verandah roof. As these cannot be closed constant and efficient ventilation is provided without the use of pipes and tubes which collect dust, and are often worse than useless. Outside the windows, jalousie framed shutters are provided for use in very boisterous weather. The verandah is enclosed with glass at one end, to form a sunroom, but with this exception it is entirely open, and, unless the weather were very inclement, the windows of the sunroom would be always open. The verandah roof is glazed with thick unpolished plate glass, through which the sun's rays will not penetrate with full force. Each room has a floor area of 15 ft. by 12 ft., and a clear height of 12 ft. This gives a cubic capacity for each patient of more than 2,500 ft. Each pavilion practically consists of a row of one-roomed chalets, the verandahs of which communicate. This gives the opportunity to patients to obtain the full benefit of the open-air treatment as regards sunshine and fresh air. The better class patients are housed in separate chalets. Between the pavilions and the main building is a building containing a douche room, and a room in which special inhalations can be given. A glass room for the sun-bath treatment is provided. Fronting the main back road is a detached building containing the boiler-house, pumproom, the laundry, and the disinfecter and destructor. Surrounding the boiler-house and laundry block is a wide road for vehicular traffic, in connexion with which is a branch inclined roadway, leading to a subway connecting the back with the front of the administrative buildings. The subway runs from north to south, and is of sufficient width to allow of a trolley service for the carriage of coals and provisions which would be brought in at the back entrance and conveyed to the kitchen. The open corridors afford ready access to all parts of the sanatorium without interfering with the circulation of air. The principal medical officer's house is within easy reach of the sanatorium, but separate from it. The grounds would be laid out with covered and open, level and inclined, paths, and with the usual desiderata of a well-appointed sanatorium, into the details of which we cannot enter now.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A YORKSHIRE district meeting of the members of the Incorporated Association of Municipal and County Engineers was held at the Council Offices at Shipley, on Saturday, September 13.

The President (Mr. T. H. Ybbicom, C.E., of Bristol) occupied the chair, and among those present were Messrs. A. D. Greatorex, West Bromwich; T. Cole, London (Secretary); W. H. Hopkinson, Keighley; C. F. Wike, Sheffield; J. H. Williams, Burnley; T. Kidd, Swadlincote; S. Edmondson, Burnley; S. Turner, Knarborough; T. Scott, Tadcaster; A. S. West, Harrogate; E. J. Silcock, Leeds; C. Lund, Cleckheaton; E. R. S. Escott, Halifax; G. Flitton, Basingstoke; J. R. Wakeford, Bilston; and others.

Councillor Shaw, Chairman of the Council, received and welcomed the members and expressed his pleasure at receiving the Association.

The President acknowledged the welcome accorded to the Association. He believed their

meetings were of mutual advantage to surveyors and to the authorities they represented.

Mr. W. H. Hopkinson, Borough Engineer, Keighley, was unanimously re-elected Honorary Secretary for the Yorkshire district.

Mr. I. Lindow, Clerk of the Council, presented a paper on the municipal works at Shipley. He prefaced the paper with an explanation that it was a journalistic effort, a collection of facts rather than an expert review of the works of the district. The town had been practically remodelled, but the heavy expenditure which had been incurred on street improvement work had abundantly justified itself, in that it had without doubt materially contributed to the progress of the district. It might fairly be claimed that the town was now generally provided with good wide sanitary streets, and that "slum" property, in the sense generally understood by that expression, was practically non-existent. Public needs and requirements had been provided for by an efficient scheme of water-works, a thorough system of drainage with outfall and purification works, public cemetery of twenty acres, isolation hospital, parks, modern public abattoirs, fire brigade, whilst the District Council had recently added, as part of the municipal works, the acquisitions of the gasworks, the municipalisation of the Salt schools, and the institution of an electrical supply station for traction, lighting, and motor-power purposes. These works had been and were being carried out under three Acts of Parliament and seventy-five Provisional Orders, and sanctions for loans amounting in the aggregate to 751,281l. The growth of the district was shown by the following figures:—The population, which in 1881 was 15,080, was now over 26,000, whilst the rateable value in the same period had advanced from 68,000l. to over 108,000l. In the year 1853 Shipley was constituted a Local Government district under the Public Health Act, 1843, and in the following year the authority obtained the Shipley Waterworks Act, empowering them to construct waterworks, and thus giving them the right to supply what had now become a very large consumption of water. Further powers were obtained in an Act of 1874, and the storage reservoirs were increased to the extent of 95,000,000 gallons, so that at present, with a storage capacity of nearly 140,000,000 gallons, Shipley was provided with a storage equal (apart from compensation water) to 120 days' supply. The gathering grounds, which comprise an area of over 2,000 acres, formed part of the far-famed Rombalds Moor common lands. Shipley people were extravagant users of water, the consumption per head of the population being over 30 gallons per day,* and whereas the receipts from water used for domestic purposes had increased over 20 per cent. during the past seven years, the income for trade consumption had actually gone down. In an industrial centre such as Shipley this was no doubt exceptional; but it was due to the circumstance that manufacturers had availed themselves of the facilities for obtaining water from the canal and the river, and also by means of wells, the valley in which Shipley was situated providing a good supply of water for dyeing and other trade purposes. The want of elasticity in the income from water prevented the rates being benefited from that source, but the Council were enabled to encourage the use of water for sanitary purposes. In another sense the Shipley consumers had a right to congratulate themselves, because, whereas in most towns there was an extra charge made for baths and water-closets, householders in Shipley were entitled to one bath and one water-closet free, no extra charge being made for these on the ordinary scale charge for domestic purposes. It might be argued with some show of reason that free baths and water-closets were unfair to those consumers who had no such privileges, and who had therefore to accept the burden of providing for their more fortunate neighbours. An important consideration, however, was the encouragement which it gave builders to make healthy sanitary provisions, and new houses without baths and water-closets were now the exception. The expenditure on waterworks account had been 125,000l. Shipley was provided with a thorough system of drainage, both in regard to street drains and main outfall sewers, though the complete interception had not yet been carried out. The early adoption of an expensive street

* We decline altogether to regard 30 gallons per day as "extravagant."—E.D.

improvement scheme got rid of a considerable area of old property, paved the way for the provision of wide streets, both at the back and front of dwelling-houses, and led to the adoption of stringent by-laws, striking testimony to the benefit of which was afforded by the wide, healthy thoroughfares to be found in the district. During the past ten years there had been over 1,000 houses erected in the district, of which not more than a score had been provided with the common privies. Whilst insisting on thorough drainage to the houses, the Council had also had before them the necessity of the gradual removal of the common privies, and the substitution thereof of waste-water closets or the ordinary water-closets flushed from the town's mains. Within the last five years about 1,000 common privies had been converted into water-closets, the most notable instance of this conversion in the district being the "model village" of Salthaire, which was built over forty years ago on what was then considered an admirable principle. But the streets were narrow, and the old privies a constant nuisance and danger to health. To the credit of the Salthaire firm (Sir Titus Salt, Bart, Sons, & Co., Ltd.), they resolved to carry out a privy conversion scheme for the whole of their 800 houses. This scheme entailed a very heavy cost, but the benefit was to be seen in the improved health of the community, and sweeter surroundings of the dwellings. The example set by this firm was being followed pretty generally, and the authority had not met with much disinclination on the part of owners to get rid of the old insanitary conditions. This improvement had also enabled the Council to deal more effectively with another department, that of ashpit cleansing. As the old system disappeared, ashpit refuse became more valuable at the destructor for steam producing purposes. Power to provide public slaughter-houses was obtained in the year 1874, but it was not until 1890 that the abattoir was opened and private slaughter-houses closed. It was a fact worthy of mention that the whole of the private slaughtering places in the district were closed without the authority having to pay a single penny compensation. On capital account the outlay on the abattoir had been 4,500l., and the maintenance and sinking fund charges amount to about 100l. per annum more than the income, but the Council considered it money well spent, and this view was endorsed by the general body of ratepayers. The necessity of providing an isolation hospital was forced upon the town by the closing of the Bradford Fever Hospital to the outside districts, and in 1890 the Council acquired two acres of ground at Stony Ridge, an elevated and healthy part of the district near to the western boundary. Exclusive of a grant of 730l. from the authorities of the Bradford Fever Hospital, the Council had expended 3,921l. The buildings comprise administrative block, four wards, washhouses, disinfecting chambers, mortuary, laundry, and smallpox hospital of two wards. The Council had obtained power for an extensive provision of tramways for the district. The first purchase of tramways by the Shipley Council took place in 1894, when they acquired the lines which had previously been used for horse trams by a company which failed to make them pay. This line, known as the Bradford and Keighley Road Tramway, was afterwards leased to a tramway company at a rental, but in the present year the Council arranged for the conversion of the line for electric traction. In May the conversion was completed to double line for a distance of about 1½ miles. In the meantime the Council had installed their electricity works, and they were able to add to their supply of current for lighting and power that of tramway traction. The tramway works in the Bradford and Keighley-roads had been carried out on the plans of Mr. R. C. Quin, M.I.E.E., Consulting Engineer, who had directed the contracts except those for the permanent way, which had been superintended by Mr. Dawson, the Council's Surveyor. The sewage and sewage-disposal works had been carried out under two engineers—Mr. M. Paterson, C.E., for the Shipley portion of the district and outfall works, and Messrs. W. B. Woodhead & Son, civil engineers, for the sewage of the Windhill district. Plans were adopted in 1894, and early in 1897 the sanction of the Local Government Board was obtained to an expenditure of 56,000l. Since that time the Council had been continually spending money on sewage and out-

fall works, with the result that the original estimate had been exceeded by 30,000, and a further sanction beyond that was expected to be necessary. The whole system formed an epitome of the difficulties and dangers of constructing sewers through an intricate network of buildings, which, in course of time, had been allowed to cover the only natural line of drainage alongside the river and stream of a busy manufacturing district. Nine-tenths of the sewage conveyed by the main outfall sewer discharged into a sewage tank sewer holding 275,000 gallons, whence it was lifted 47 ft. by electrically worked pumps into triplicate settling tanks with a capacity of 50,000 gallons, being joined at the well-head by the sewage, which flowed by gravitation from the Windhill District. From these tanks it flowed into eight bacterial beds arranged in two tiers or rows of four coarse and four fine beds on the double-contact system. The coarse tanks had a bottom fall of 6 in., and were filled to a mean depth of 3½ ft. with coarse clinkers or engine ashes of 3 in. or 4 in. diameter. The fine tanks were filled to a like depth with the same material crushed and sifted to about 1 in. down to ½ in. gauge. Thus taking the net working capacity in sewage volume as one-third of the empty filter, the capacity of each fine filter was 48,750 gallons, or a total of 195,000 gallons, and being filled three times per twenty-four hours, the total volume which could be dealt with daily was 585,000 gallons. The effluent drain discharged into the river Aire, which at this point was, at present, a black, foetid sewer, owing chiefly to the discharge of sewage and trade refuse from neighbouring districts. The works described did not entirely meet the requirements of the Local Government Board, who were insisting upon the provisions of more bacteria beds, so that it would be possible to treat three times the dry-weather flow of the sewage of the district. When plans were originally prepared for the sewage outfall works, the question of providing destructors came under the consideration of the Council, and it was ultimately decided that these should be erected on the same site as the outfall works. After plans for the destructors and engine-house had been submitted to the Local Government Board, the Council considered it would be an advantage to have electricity works also on this site, in order that the steam raised by the burning of the refuse (over and above that required for sewage pumping) might be used in this direction. The result was that Shipley holds the almost unique position of having sewage outfall works, refuse destructors, and electricity works upon the same site. The destructor was of the Meldrum regenerative type, consisting of furnace, combustion-chamber, Lancashire boiler, and regenerator. The refuse burnt at Shipley—which, for steam-raising, was equal to about one-tenth best steam-coal—averaged about 600 tons a month, but, were the refuse obtainable, it would be quite possible to consume 300 tons weekly in this four-cell destructor. The object of the Council was so to combine the three works—destructor, sewage pumping, and electric lighting—that there could not only be utilisation of the steam produced by the burning of the ashpit refuse, but that there should be economy in management. The policy of combining an electric lighting and tramway-supply station with a destructor and sewage disposal works was quite unique, and had much in its favour. The same staff and the same management suffice for all the undertakings. An electrical engineer would always prefer to raise his steam from coal rather than from a refuse destructor, but it would be folly for a town the size of Shipley to allow steam-power raised by the destruction of refuse to be wasted. On the whole the success obtained at Dockfield had been very gratifying, and even better results were hoped for when the different units could be run on full load instead of being run a quarter load, or even less than that, and at times had been actually run non-condensing, in order to utilise the steam and get rid of the refuse.

On the motion of the President, seconded by Mr. Escott, Halifax, a vote of thanks was passed to Mr. Lindow.

Mr. A. D. Grotovex, West Bromwich, congratulated the Shipley Council upon possessing so many important works, considering the size of the town. He also congratulated them upon having got rid of most of the privies.

Mr. E. J. Silcock, Leeds, said that a consumption of 30 gallons of water per head per day in a town where manufacturers took their

supply from other sources than the public supply seemed to be high. It was probably accounted for by the fact that the Council allowed a bath and one closet free of charge. He agreed with that policy, because the greater the facilities given to people to keep themselves and their houses clean the better their health was likely to be. In Leeds they were providing every cottage above a rental of 4s. 6d. with a bath, and he thought that provision would be extended to houses of a smaller class before very long. Turning to the question of sewage disposal, he said the materials used in the bacteria beds were obviously what they would expect, as they had a destructor there to produce clinker, but he agreed that a better material would be found the cheapest in the long run, because the breaking down of clinker was so great that the capacity of the beds was reduced to practically 50 per cent.

Mr. C. F. Wike, Sheffield, mentioned that he had been making experiments at Sheffield with bacteria beds for four years. He had put down two and a half acres of beds divided into two kinds—coarse and fine—and the results obtained were chemically perfect, amounting to 95 per cent. of purification. With respect to the engineering and financial part he would rather not go into figures at present, but he hoped some time to bring them before the Association. He first put down the beds with coke, but he had lately put down a set of tanks with destructor refuse.

Mr. Lynam, Burton-on-Trent, asked as to the character of the effluent from each part of the process, the coarse bed, the fine bed, and the land.

Mr. Lund, Cleckheaton, asked the amount of water evaporated by the destructor per pound of refuse.

Mr. Pitt, Chairman of the Sanitary Committee, drew attention to the fact that four-fifths of the sewage had to be pumped, while other towns in the Aire Valley got theirs to the outfall works by gravitation.

The President said that was entirely a matter of levels, upon which the engineers had advised the Council. It would be far better for the Council to accept that advice.

Mr. Lindow said that the cost of the tramway had not been above the average. That was as far as he ought to go, as they had an arbitration at the end of the month. The cost of the disposal of the town refuse was rather high, the collecting and disposing amounting to 3s. per ton. The sewerage and sewage disposal works were going to be very expensive to them, and they had not done yet. They had spent 10,000l. in easement and law expenses.

Mr. Paterson explained that they had decided to keep out trade effluents, as they were advised they would be a serious obstacle to the success of the bacterial system.

Mr. Schofield said the cost of the current for the sewage pumps worked out at 36 of a penny per thousand gallons. In reply to Mr. Lund he said this was taking the electricity at one penny per unit.

The members were entertained at luncheon at the Sallaire Institute, where the discussion was taken, and visits were made to the electricity, destructor, and sewage disposal works, and to the Sallaire Mills of Sir Titus Salt & Co.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

At the meeting of the Building Act Committee of the London County Council held on the 3rd inst., the proceedings were governed by the clause in the order of reference which empowers the Committee at certain seasons to act on behalf of the Council in relation to matters included in the Committee's order of reference. The names of applicants are given in parentheses—

Lines of Frontage and Projections.

Marylebone, West.—The retention of an iron sign in front of No. 520, Oxford-street, St. Marylebone (Mr. R. J. Browne for Messrs. Poole & Smith).—Consent.

Fulham.—Buildings on the east side of North End-road, Fulham, to abut upon Sedlescombe-road (Messrs. Boyton, Pegram, & Buckmaster).—Consent.

Chelsea.—A projecting porch, bay windows, turret, and balconies to a block of residential flats on the north-western side of Royal Hospital-road, Chelsea, at the corner of Franklin's-row (Mr. P. Hoffmann for Mr. F. Britton).—Consent.

Deptford.—Two houses, with one-story shops in

front, on the east side of Horstead-road, Brockley (Mr. A. H. Kersey for Mr. R. Soper).—Consent.

Hammersmith.—An iron and glass shelter at the side of the new King's Theatre, Hammersmith-road, Hammersmith, to overhang the footway of Rowan-road (Mr. W. G. R. Sprague for Mr. J. B. Mulholland).—Consent.

Hampstead.—An iron and glass hood over the entrance doorway of No. 15, Aberdare-gardens, Hampstead (Mr. J. D. Hunter for Mr. B. Samuel).—Consent.

Islington, North.—That, at the request of Mr. A. R. Hind, the Council do permit the retention of a showcase on the forecourt of No. 449, Holloway-road, Holloway.—Agreed.

Islington, North.—That, at the request of the International Tract Society, the Council do permit the retention of a showcase on the forecourt of No. 451, Holloway-road, Holloway.—Agreed.

Lambeth, North.—A one-story addition in front of No. 35, Cornwall-road, Waterloo-road, Lambeth (Messrs. Corderoy, Selby, & Corderoy for the Lambeth Estate Co., Ltd.).—Consent.

Lewisham.—Bay windows to four houses on the east side of Bromley-road, Catford (Messrs. Norfolk & Prior for Messrs. Kennard Brothers).—Consent.

Lewisham.—An addition to the basement story of No. 28, Brandram-road, Lee (Mr. F. Wenborn for Mr. R. B. A. Chambers).—Consent.

Portsmouth.—Porches to Nos. 14 and 18, Agnew-road, and Nos. 24 and 26, Whatman-road, Forest Hill (Messrs. Pooley & Follett for Mr. F. Newman).—Consent.

Marylebone, East.—That the application of Mr. H. O. Cresswell on behalf of the trustees of the Eves estate, for an extension of the periods within which the erection of buildings on the south-west side of Park-road, Regent's Park, was required to be commenced and completed, be granted.—Consent.

St. George, Hanover-square.—A portico at No. 13, Upper Brook-street, St. George, Hanover-square (Mr. P. A. Todd for Mr. W. Tebb).—Consent.

Strand.—The request of Messrs. Wylton & Long on behalf of Mr. F. Anstiss, for permission to retain a projecting illuminated sign at the third-floor level, in front of No. 45, Strand, extending beyond the general line of buildings in that street, be acceded to.—Agreed.

Wandsworth.—Two projecting oriel windows at the Foresters' Arms beerhouse, Mitcham-lane, Tooting (Mr. H. Griffiths for Mrs. C. Beard).—Consent.

Woolwich.—A one-story shop on part of the forecourt of No. 47, Plumstead-road, Woolwich (Messrs. Church, Quirk, & Wincoop for Mr. B. H. De Bertodano).—Consent.

Woolwich.—A vicarage room on the south side of Upper Ripon-road, Plumstead (Mr. V. E. Young for the Rev. S. Warner).—Consent.

Hackney, South.—A warehouse building on the site of Nos. 9 and 11, London-lane, Mare-street (Mr. W. A. Lewis for Mr. N. Fortescue).—Consent.

Hampstead.—Erection of an iron and glass covered way in front of No. 143, Abbey-road, Kilburn (Mr. W. Daniel for Mr. W. Gunn).—Refused.

Brixton.—A building on the west side of Brixton-hill, Brixton, to abut upon Acre-lane (Mr. C. W. Stephens for Messrs. Isaac Walton & Co.).—Refused.

Hackney, North.—Four houses on the south side of Cazenove-road, Upper Clapton, to abut also upon Goldstone-road (Mr. C. Cheston for Lord Amherst).—Refused.

Lackey, Central.—Erection of a block of buildings on the site of Nos. 220 and 222, Mare-street, Hackney (Messrs. Holman & Goodham for the Royal London Friendly Society).—Refused.

Hammersmith.—An iron, concrete, and glass shelter in front of the new King's Theatre, Hammersmith-road, Hammersmith (Mr. W. G. R. Sprague for Mr. J. B. Mulholland).—Refused.

Hampstead.—A modification of the conditions upon which consent was given to the erection of residential flats, with projecting one-story shops and bay windows, on the west side of Finchley-road and east side of Fortune Green-lane, Hampstead (Mr. G. H. Green for Mr. W. H. Pearce).—Refused.

Islington, West.—A one-story shop in front of No. 86, St. James-road, Holloway (Mr. A. Rods for Mr. J. H. Baldock).—Refused.

Kensington, North.—The erection of an addition to No. 24, Chepstow Villas, Notting Hill, at the corner of Ledbury-road (Mr. T. Baggislay for Mr. H. P. Hall).—Refused.

Norwood.—Erection of one-story shops in front of Nos. 16 to 26 (even number only) inclusive, Tulse Hill, Norwood (Messrs. Peacock Brothers for Mr. H. G. Englefield, Mr. W. Sayer, and Mr. Tewson).—Refused.

St. George, Hanover-square.—The erection of an addition in front of No. 9, Grafton-street, Piccadilly (Mr. W. A. Large for Messrs. Malkin & Lawson).—Refused.

Wandsworth.—Erection of one-story shops in front of eight houses on the north side of Revingham-road, Southfields (Mr. D. Mathews for Mr. G. A. Gale).—Refused.

Wandsworth.—One-story shops on the forecourts of eight houses on the north side of Rosendale-road, Herne Hill (Mr. P. C. Davies for the Suburban Building Land Co., Mrs. V. Davies, and Mr. R. Parry).—Refused.

Westminster.—A conservatory on a balcony at the first floor level in front of No. 57, Victoria-street, Westminster (Mr. L. Hervey for Mr. G. C. T. Bartley, M.P.).—Refused.

Woolwich.—The re-erection of Nos. 3 to 13 (odd numbers only) inclusive, New-road, Woolwich, with the main fronts to an advanced line in that street (Messrs. Church, Quick, & Whincom for Mr. B. H. D. Bertodano, Mr. C. H. Court, Mrs. E. Bridger, and Messrs. J. & C. E. Pearson).—Refused.

Woolwich.—A building, to be used as a Sunday school, on the north side of Glenure-road, Eltham (Mr. H. Busbridge for Mr. W. J. Smith and others).—Refused.

Deptford.—The rebuilding of the Crown and Anchor public-house, No. 43, New Cross-road, Deptford, at the corner of Avonley-road (Messrs. C. Saunders & Son, Ltd., for Messrs. Noakes & Co., Ltd.).—Refused.

Width of Way.

Fulham.—A stable building on the north side of Peterborough-mews, Fulham, with the external walls at less than the prescribed distance from the centre of the roadway of the street (Mr. H. Harris).—Consent.

Hoxton.—A warehouse building at the rear of No. 97, Curtain-road, Hoxton, with the external wall at less than the prescribed distance from the centre of the roadway of Welch's-buildings (Mr. R. Peters for Mr. W. C. Wigg).—Consent.

Newington, West.—A staircase addition to No. 16, Hurlbutt-place, Newington, with the external walls at less than the prescribed distance from the centre of the roadway of the street (Mr. J. G. Arpin).—Consent.

Erskine.—A two-story building on the west side of Erskine-road, Brighton, with the external wall at less than the prescribed distance from the centre of the roadway of the street (Messrs. Weston & Sons for Mr. E. Jones).—Refused.

Islington, West.—A range of one-story cart-sheds on the south side of Pleasant-grove, York-road, Islington, with the external walls at less than the prescribed distance from the centre of the roadway of the street (Mr. C. W. Reeves for Messrs. Bennett, Son, & Co.).—Refused.

Linehouse.—Re-erection of the Waterman's Arms beer-house on the south side of Maroon-street, Linehouse, at the corner of Cnder-street (Mr. W. Stewart for Messrs. Mann, Crossman, & Paulin, Ltd.).—Refused.

Rotherhithe.—The retention in front of Nos. 50A and 50B, Farncombe-street, Bermondsey, and a two-story workshop on the south side of that street, of a boundary fence at less than the prescribed distance from the centre of the roadway of the street (Messrs. Barnes-Williams, Ford, & Griffin for Mr. A. W. Crips).—Refused.

Wandsworth.—Seven houses on the east side of Above-near Earlsfield (Mr. R. A. Hinds, for Mr. G. Edwards).—Refused.

Space at Rear.

Strand.—Re-erection of the Wellington Hotel, No. 351, Strand, at the corner of Wellington-street, with a portion of the building extending over the space required by Section 41 of the Act to be provided for the premises (Messrs. Bird & Walters, for Messrs. G. and C. Snow).—Consent.

Chelsea.—A conservatory on the open space at the rear of Old Swan House, No. 17, Chelsea-embankment (Messrs. J. Weeks & Co., Ltd., for General E. H. Sartorius, V.C.).—Consent.

Deptford.—Two dwelling houses on the east side of Hove-road, Deptford, with an irregular open space at the rear (Mr. A. H. Kersey for Mr. R. Soper).—Consent.

Lewisham.—No. 2, Stillness-road, Brockley-rise, Lewisham, with an irregular open space at the rear (Mr. G. M. Webb).—Consent.

Islington, East.—Re-building of the Hen and Chickens public house, Nos. 128 and 130, Canonbury-road, Islington (Mr. W. A. Aickman for Mr. L. Taylor).—Consent.

Lines of Frontage and Width of Way.

Norwood.—The retention of buildings on the north side of George-street, Gipsy Hill, Norwood, the external walls of one of such buildings and the forecourt fence being at less than the prescribed distance from the centre of the roadway of George-street (Mr. F. W. Ledger).—Consent.

Kensington, South.—A building on the south side of Stratford-road, Kensington, with balconies and a forecourt fence at less than the prescribed distance from the centre of the roadway of Radley-mews (Mr. C. R. Guy Hall).—Consent.

Clapham.—Buildings on the south-west side of Park Hill and western side of Abbeville-road, with the forecourt fence at less than the prescribed distance from the centre of the roadway of Park-place (Mr. E. Messiter).—Refused.

Lewisham.—A three-story dwelling-house on the north side of Catford-road, Lewisham, with the external walls of such building at less than the prescribed distance from the centre of the roadway of Thomas-lane, and with a one-story shop in front (Messrs. Bedle & Meyers for Mr. E. J. Beaumont).—Refused.

Paddington, South.—Three projecting porches to a proposed hall on the east side of Newton-road,

Paddington, with the external walls of such porches at less than the prescribed distance from the centre of the roadway of the street (Mr. T. E. Figgis for the Building Committee of St. Paul's Presbyterian Church, Westbourne-grove).—Refused.

Bermondsey.—The retention of a one-story building on the east side of Weston-street, Bermondsey (Mr. E. Crosse for J. Salomon & Co.).—Refused.

Width of Way, Line of Frontage, and Construction of Building.

Fulham.—The retention of a wood and iron structure on the forecourt of No. 282, North End-road, Fulham (Mr. W. D. Thompson for Messrs. T. Crowther & Son).—Refused.

Line of Frontage and Space at Rear.

Wandsworth.—A building, to be used as a beer-house, on portion of the site of Nos. 8 and 10, High-street, Tooting, to an advanced line of frontage in Selkirk-road (Mr. D. Watney for Messrs. Attlee).—Refused.

Line of Frontage and Construction.

Bethnal Green, North-East.—An iron balcony at the Children's Home Hospital, No. 22, Bonner-road, Bethnal Green (Messrs. Holman & Goodham for the trustees of the Children's Home).—Refused.

Bermondsey.—Two temporary wooden shops on the south side of Prier-road, Dockley-road, Bermondsey, to adjoin Spa-road Station (Mr. A. Thompson for the South-Eastern Railway Co.).—Refused.

Width of Way and Construction of Building.

Kensington, South.—A temporary wood, iron, and brick motor-car shed in the garden at the rear of No. 4, Bilton-gardens, Old Brompton-road, Kensington, with the external walls of such building at less than the prescribed distance from the centre of the roadway of Bolton-gardens South (Mr. W. Cave for Mr. W. H. Lawrence Copeland, M.D.).—Refused.

Formation of Streets.

Paddington.—That, at the request of Mr. H. A. Hunt, the Council do permit the retention of wooden fences or barriers across the western end of Lauderdale-road, the north-western end of Bidulph-road, at both ends of Ashworth-road and at both ends of Delaware-road on the Paddington estate, Sutherland-avenue, Paddington.—Agreed.

Greenwich.—That an order be issued to Mr. L. Sandilands sanctioning the formation or laying-out of a new street for carriage traffic to lead from Toddman-lane to Woodlands Park-road, Greenwich, and in connexion therewith the widening of a portion of Toddman-lane and Woodland-place (Mr. D. G. Horlock).—Consent.

Hampstead.—Deviation from the plan sanctioned on March 24, 1902, for the formation of a new street to be named "Hewitt-street," to lead from Haverstock Hill to Glenilla-street, so far as relates to an alteration in the position of the outlet of the new street into Haverstock Hill (Mr. C. J. Bentley for Mr. J. C. Hill and himself).—Consent.

Holborn.—A deviation from the plan sanctioned on February 6, 1900, for the formation or laying-out of two new streets to lead out of the east side of Tottenham Court-road into Chertsey-street and Store-street respectively, so far as relates to the abandonment of the proposed street to lead from Tottenham Court-road to Store-street (Mr. A. Murray for the City Lands Committee of the Corporation of London).—Consent.

Woolwich.—That an order be issued to Messrs. Tapp & Jones sanctioning the formation or laying-out of new streets for carriage traffic proposed to be named Brixham-street, Grenadier-street, Baronet-street, and Dock-street (in continuation), on the north side of Elizabeth-street, Woolwich).—Consent.

Fulham.—The retention of a wooden fence across Vera-road, Fulham, at about its centre (Mr. H. G. Brace for Mr. W. Moss and Mr. E. Messiter).—Consent.

Greenwich.—That an order be issued to Mr. J. Ellis refusing to sanction the formation or laying-out of a street for carriage traffic, proposed to be named Attilla-street, at the rear of houses on the south side of Cedar-grove, Charlton.—Agreed.

Wandsworth.—That an order be issued to Mr. W. H. Marler refusing to sanction the formation or laying-out of new streets for carriage traffic on the Furzedown Park estate, Mitcham-lane, Streatham.—Agreed.

Hampstead.—That an order be issued to Mr. E. Owers refusing to sanction the formation or laying-out of new streets for carriage traffic on the Mountfield Estate, George-lane, Catford (for Mr. C. C. Story).—Agreed.

Lewisham.—That an order be issued to Messrs. Norfolk & Prior refusing to sanction the formation or laying-out of new streets for carriage traffic on the Mountfield Estate, George-lane, Catford (for Mr. C. C. Story).—Agreed.

Wandsworth.—That an order be issued to Mr. E. B. L'Anson, refusing to sanction the formation or laying-out of a new street for carriage traffic to lead from Streatham High-road to Tooting Bec-road (for Mr. C. Mortimer).—Agreed.

Wandsworth.—That an order be issued to Messrs.

H. E. Milner & Sons, refusing to sanction the formation or laying-out of new streets for carriage traffic on the Furzedown Park Estate, on the south-east side of Rectory-lane, Tooting Common (for Sir Charles Seely).—Agreed.

Formation of Streets and Line of Frontage.

Norwood.—That an order be issued to Messrs. F. & W. Stucker, sanctioning the formation or laying-out of three new streets for carriage traffic, to lead from Herne Hill to Elmwood-road, Dulwich, and in connexion therewith the widening of a portion of Herne Hill and the erection of buildings to an advanced line of frontage (for Mr. H. G. Smallman).—Consent.

Formation of Street, Lines of Frontage and Space at Rear.

Deptford.—That an order be issued to Messrs. Humphreys-Davies & Co. sanctioning the formation or laying-out of a new street for carriage traffic out of the west side of Sanford-street, Trundley's-road, Deptford, and in connexion therewith the erection of houses (for the Surrey Commercial Docks Co.).—Consent.

Artisans' Dwellings.

Hammersmith.—A block of intended dwelling-houses, to be inhabited by persons of the working class, and proposed to be erected, not abutting upon a street, on a site at the rear of Nos. 209-219, King-street, Hammersmith (Mr. H. M. Newlyn for Messrs. Hinchliffe & Co.).—Consent.

Separation of Buildings.

Kensington, South.—The omission of party walls on the ground floor of a proposed building to form part of the premises of Harrod's Stores, Brompton-road, Kensington (Mr. C. W. Stephens for Harrod's Stores, Ltd.).—Refused.

Excess of Openings in External Walls.

Strand.—A building on the south side of Curstior-street, Chancery-lane, Strand (Mr. R. C. Fry for Mr. H. Cox).—Refused.

Means of Escape from Top of High Buildings.

City.—Means of escape in case of fire, proposed to be provided on the sixth story of Cocker's Hotel, Nos. 18 to 21, Charterhouse-square, Aldersgate (Mr. E. Haselhurst for Messrs. Wheeler & Warren).—Consent.

Holborn.—Means of escape in case of fire, proposed to be provided on the sixth story of Cranston's New Waverley Hotel, Great Russell-street and Charlotte-street, Holborn (Mr. G. Waymouth for Mr. R. Cranston).—Consent.

Cubical Extent.

Finsbury, East.—The erection at No. 121, Bunhill-row, City, of a building to exceed in extent 250,000 cubic feet, and to be used for the purposes of stores, saw mills, and joiners' shops (Messrs. Wakeford, May, & Woulfe for Messrs. W. H. Lascelles & Co.).—Refused.

Strand.—The erection at Windsor House, Breams-buildings, Holborn, of an addition which, together with the existing building, will exceed in extent 250,000 cubic feet, and be used only for the purposes of the trade of a printer (Mr. R. C. Fry for Mr. H. Cox).—Refused.

Wandsworth.—The erection at Garratt Works, Summers Town, Wandsworth, of a building to exceed in extent 250,000 but not 450,000 cubic feet, and to be used only for the purposes of the manufacture of metal-edged boxes, electrical conduits, &c. (Mr. A. A. Righter for the Corruganza Manufacturing Co.).—Refused.

Dwelling-houses on Low-lying Land.

Lambeth, North, and Southwark, West.—Dwelling-house and shop on low-lying land at No. 1, Gloucester-street, Lambeth (Mr. J. W. Jacomb Hood for the London and South-Western Railway Co.).—Consent.

LIVERPOOL BUILDING REGULATIONS.—A second edition, revised and enlarged, has been issued of "A Manual of the Building Regulations in force in the City of Liverpool," arranged and annotated by Mr. William Goldstraw, City Building Surveyor, with diagrams by Mr. James D.D. architect, surveyor to the Liverpool Exchange Co. The work is issued in two volumes, one containing the text and the other the diagrams. Mr. Goldstraw has furnished a code of all the building regulations in force in Liverpool, whether in local or general enactments, with one exception, viz. the Liverpool Fire Prevention Acts, 1843 and 1844. These Acts, applying solely to "warehouses," affect a much smaller section of the public, and have on that account been omitted. The diagrams prepared by Mr. Dod illustrate the text of the regulations with regard to the most usual cases occurring in practice. Messrs. Tinsling & Co. are the publishers.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

12.—IRON AND STEEL.

IRON is not an article of commerce. Pig iron, cast iron, wrought iron, mild steel and hard steel, are all forms of iron admixed or combined with small proportions of other elements.

Irons, even of the same commercial class, vary considerably in composition, and there is no sharp line of demarcation distinguishing one class from another. An ingot of iron or steel is not even of uniform composition throughout its mass, for the unequal rate at which the metal cools and the differences in the solidifying points of the various impurities cause the elements to be unevenly distributed through the solidified mass.

Each foreign element present in the iron has its own peculiar effect upon the physical properties of the metal, but the nature of the influence of the foreign element when not combined with the iron is entirely different to that which it exerts when in chemical combination with the iron.

The following analyses may be regarded as representative of the composition of typical samples of the various classes of iron:—

TYPICAL ANALYSES OF IRON AND STEEL.

Authority....	Grey Cast-iron	Hard Steel.	Mild Steel.	Wrought Iron.
Bodeman		Phillips.	Phillips.	Thorpe.
Iron	91.42	93.75	98.85	99.863
Combined Carbon	1.14	1.07	0.49	0.054
Graphitic Carbon	0.71			
Phosphorus	0.02	0.002	0.003	0.005
Sulphur	0.01	0.002	0.001	0.005
Silicon	0.21	0.006	0.11	0.028
Manganese	0.10	0.12	0.57	—
Copper	—	—	0.02	—
	100.00	100.00	100.00	100.000

Carbon in Iron.—Carbon is always present in iron, partly in chemical combination, and partly in a free state as graphitic carbon. The total quantity of carbon in pig iron varies from about 1½ per cent. to 4½ per cent. The graphitic carbon does not appear to exert much influence upon the properties of the iron, but the combined carbon is of the first importance, as it is this ingredient that the hardness of the metal is largely due. The following table shows the proportion of combined carbon present in the different classes of iron:—

	Combined Carbon.
Cast iron.....	0.1 to 4.0 per cent.
Hard steel ...	0.5 to 1.5 " "
Mild steel ...	0.15 to 0.5 " "
Wrought iron	nil to 0.15 " "

Silicon in Iron.—Silicon increases the hardness of the iron. Its effect upon the properties of the iron depends to a considerable extent upon the proportion of carbon and other foreign elements present. Generally speaking, the proportion of silicon should not exceed 2.5 per cent. in cast-iron, nor more than 0.4 per cent. in steel. Wrought-iron should be almost free from silicon.

Sulphur in Iron tends to render the metal brittle at high temperatures, and its proportion should not exceed 0.1 per cent. in any form of iron or steel. The presence of a small proportion of manganese reduces the prejudicial influence of the sulphur.

Phosphorus renders the iron more readily fusible, and more perfectly fluid when in a molten condition, but also increases the brittleness of the metal. Steel should be as free as possible from phosphorus, and wrought-iron should not contain more than 0.2 per cent. Cast-iron often contains over 1 per cent.

Copper may be present to the extent of 0.8 per cent. if the proportion of sulphur present be not excessive. Copper increases the tensile strength of the iron.

Iron Ores.—The principal ores from which iron is manufactured are:—

Magnetic Iron Ore (magnetic oxide), found in Sweden, Norway, Russia, and North America.

Red Hematite (anhydrous ferric oxide), found in Lancashire, Cumberland, and Glamorgan-shire.

Brown Hematite (hydrated ferric oxide), found in Cumberland, Durham, and in France. **Specular or Micaceous Ore** (crystalline ferric oxide), found in Spain, Nova Scotia, and Elba. **Spathic Iron Ore** (carbonate of iron), found in Somerset and Durham, and in Styria and Corinthia.

Clay Ironstone (carbonate of iron with clay), found in South Wales, Yorkshire, Staffordshire, Derbyshire, and in Silesia and Belgium.

Blackband Iron Ore (clay ironstone, with bituminous or coaly matter), found in Durham and Staffordshire, and in North Wales and Scotland.

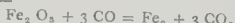
Preparing the Ore for Smelting.—The ore is broken to small fragments and the pieces of gangue seen to be free from iron ore are removed. In the case of magnetic ores the ore is sometimes powdered, and, by means of revolving magnets, the magnetic ore is separated from the non-magnetic gangue. Hematites and carbonates when roasted at a high temperature also yield magnetic oxide, which can be separated from the gangue by the revolving magnets.

Unless the ore is already in the form of iron oxide, it is usually roasted before passing to the smelting furnace. The roasting causes the expulsion of water, sulphur, and carbon dioxide from ores containing those substances, and converts the iron compound into iron oxide.

Smelting.—The iron ore, in the form of impure iron oxide, is mixed with limestone or other flux, and alternate layers of coke or coal and of the iron ore mixture are placed in a cylindrical furnace 60 ft. to 100 ft. in height.

When the furnace is in operation a blast of hot air is forced up through the fuel and iron ore.

The action of the air upon the incandescent fuel is to produce gaseous carbon monoxide, which abstracts oxygen from the iron oxide and leaves metallic iron in a molten condition, thus:—



The lime from the limestone, the ash from the fuel, and the siliceous impurities from the ore are all liquefied and form the glass-like refuse from the furnace known as *slag*. This blast-furnace slag consists mainly of silicate of lime and alumina.

The gas which leaves the upper part of the furnace is combustible, for, although it contains all the incombustible nitrogen of the air admitted in the blast, and a certain proportion of carbon dioxide, it also contains sufficient carbon monoxide to enable it to be ignited and used for heating the air blown into the furnace, and for other purposes.

Pig Iron.—The molten iron is allowed to run out of the furnace into bar moulds capable of containing about 1 cwt. of the metal. Crude iron in this ingot form is known as pig iron.

Pig iron is divided in commerce into six grades, the classification depending upon the appearance of the freshly fractured surface of the metal. Nos. 1, 2, and 3 are called foundry pigs and are used for castings. Nos. 4, 5, and 6 are called forge pigs and are used for conversion into wrought iron. The foundry pigs are more fluid when molten than the forge pigs.

Cast iron is pig iron which has been re-melted and re-cast. **Grey cast iron** is made from foundry pigs, and contains a large proportion of graphitic carbon. **Mottled cast iron** is made from No. 4 pig, and has a larger proportion of combined carbon but less graphitic carbon than grey iron. It is lighter in colour and stronger than grey iron. **White cast iron** exhibits no flakes of graphite, and shows a silver white surface when freshly fractured. It is not sufficiently fluid when melted to be suitable for castings.

Wrought iron, also known as **malleable iron** and as **acid iron**, is the purest of the commercial forms of iron. It cannot be used for castings because it is infusible at ordinary furnace temperatures. It contains less carbon than either cast iron or hard steel, but there is little difference between the chemical composition of some of the hardest forms of wrought iron and that of the mildest steel. The small proportion of carbon always present in wrought iron exists almost entirely in combination with the iron and not as graphitic carbon.

Manufacture of Wrought Iron.—Several methods are used for the production of wrought iron. The process most extensively employed is the "puddling" or "pig boiling" process. Pig iron is melted on the hearth of a reverberatory furnace in which the flame

from the burning fuel, and a current of air, play upon metal. Hematite or some other oxidising material is added to the iron, and the molten metal becomes covered with a layer of liquid slag.

Gaseous carbon monoxide escapes from the molten metal, and rising through the liquid slag gives it a boiling appearance. The molten metal gradually changes from a mobile liquid to a thick plastic mass, and although the temperature of the furnace is now raised the iron remains sufficiently plastic to enable it, after being thoroughly puddled (stirred), to be rolled into "puddle-balls" weighing about ½ cwt. each. These puddle-balls are lifted out of the furnace, hammered into slabs, and passed between rollers. The rolled metal is known as "puddled bar iron," and forms the lowest commercial grade of wrought iron. The higher grades are produced by re-heating and re-rolling the metal one or more times.

The effect of the hammering and rolling is to squeeze out most of the slag. Rolling also renders the metal more fibrous.

The impurities present in the original pig-iron are to a large extent oxidised and removed in the slag, but the carbon escapes in gaseous form as carbon monoxide. The following analyses may be regarded as representative of the composition of iron before and after puddling and rolling in the manner described:—

	Pig Iron.	Puddled Bar Iron
Iron	92.80	99.47
Carbon	2.80	0.20
Silicon	2.50	0.08
Phosphorus	0.70	0.12
Sulphur	0.10	0.08
Manganese	0.50	0.05
	100.00	100.00

Steel.—Steel, containing from 0.15 to 0.5 per cent. of carbon is termed *mild steel*, and can be welded, but not tempered. **Hard steel** contains from 0.5 to 1.5 per cent. of carbon, and can be tempered. As the proportion of carbon increases welding becomes more and more difficult, but remains possible even when the proportion exceeds 1 per cent. The larger the proportion of carbon the harder and more brittle the iron.

Manufacture of Steel.—Many methods have been employed for the manufacture of steel, but the three most extensively adopted are (1) the cementation process, (2) the Bessemer process, and (3) the Siemens process.

The Cementation Process consists in embedding bars of wrought-iron in charcoal in a cementation furnace and exposing them to a bright red heat for from six to nine days. When the bars are withdrawn they are seen to have become blistered on their surfaces, the blisters being produced by gaseous carbon monoxide. The bars absorb some of the carbon in which they are embedded and become converted into steel, but they are not uniform in composition, and have, therefore, to be re-heated, hammered under a tilt hammer, and rolled. Steel so treated is known as "shear steel." If the hammering and rolling are repeated the metal becomes "double shear steel." If the blistered bars are melted in fire-clay vessels to render the metal more uniform in composition, the resultant steel is known as "crucible cast steel."

The Bessemer Process consists in blowing air through molten pig-iron in a "converter," and subsequently adding a small proportion (say, 5 per cent.) of an alloy of iron, manganese, and carbon, known as "spiegeleisen." The air blown through the pig-iron removes most of the carbon and certain other impurities by converting them into gases.

The carbon added in the form of "spiegeleisen" is sufficient for the conversion of the purified iron into steel.

The converter is in some cases lined with basic bricks, manufactured by heating raw bricks made of ground magnesians lime and pitch. The phosphorus present in the pig iron is, to a large extent, removed owing to its entering into combination with this basic material. When the furnace lining consists of ganister or other siliceous body, the phosphorus in the pig iron remains in the steel into which the iron is converted. Hence, pig iron selected for use in a siliceous or "acid" lined converter must not contain so much phosphorus as is permissible in pig iron to be converted into steel in a "basic" lined converter. In the basic process a considerable quantity of lime is used in the converter, and a slag containing much

phosphate of lime is obtained. This slag is largely used as a manure.

The Siemens Process consists in adding hematite ore (ferric oxide) to molten pig iron, then alone or mixed with scrap iron or steel, which has been heated to a molten condition upon the open hearth of a regenerative gas furnace. The hematite is added in small portions at a time, and the oxygen it contains oxidises the carbon and converts it into gaseous carbon monoxide.

When from the appearance of the metal it is thought that enough hematite has been added, sample of the metal is withdrawn and tested. The iron having been sufficiently purified in this way, a charge of speiseleisen is added, in the Bessemer process, and mixed with molten metal until steel of the required composition has been produced.

GENERAL BUILDING NEWS.

TRINITY METHODIST NEW CONNEXION CHURCH, ILLINGBORO, SHEFFIELD.—This new church is part of a scheme inaugurated by the Sheffield M.N.C. North Circuit. The new church is situated on Idlewood-road with a frontage to Hillsbro' Park. The design is that of the late Mr. John W. Firth, of Ilkham, and the work has been carried out by him. The side of the church and the frontage of the school overlook Idlewood-road, while the main entrance to the church opens from Lennox-road. The schools are erected at the rear adjoining the main structure. Beyond the school, on the land lying up to Dorothy-road, sufficient space has been reserved to permit the erection of a minister's house and a caretaker's dwelling; but these will be matters for future consideration. The contracts for the work were let as follows:—Excavating, drainage, brickwork, stonework, and concreting, Mr. Harris Wood, Shepley, near Huddersfield; carpentry and joiners' work, Mr. Geo. Broadbent, Shepley; plumbing, glazing, painting, and varnishing, Mr. George Lindley, Shepley; slating and tiling, Messrs. Geo. Beard & Sons, Thurlstone; gasfittings, hot water engineering, Messrs. W. S. Jenner, Oldham.

NEW CHURCH, ST. ANDREWS.—The tenders for the building of St. Leonard's Church, St. Andrews, have been accepted, viz.:—For the mason work, Mr. William Ness; joiner work, Mr. Henry Law; lumber work, Mr. Andrew Turpie; and slater work, Messrs. Rintoul & Mackie—all of St. Andrews. The work is to be done by Messrs. Blairbaird & Winton, of Glasgow. Several subsidiary contracts, including the heating, have not yet been fixed. The cost of the building, exclusive of the upper part of the tower, will be over 4,000l. The plans of the church, which is to be erected on a site in the Rathelphie district, have been prepared by Mr. Macgregor Buchanan, L.A., Glasgow, and they show a nave 55 ft. long, with an apsidal termination at the north end, in which the Communion table will be placed. In the west of the nave is a wide side aisle, also with an apsidal termination for the present baptismal font. The south front shows a gable terminating the nave, and a cross-stepped saddle tower above the aisle at the end of the side aisle. Both outside and inside the walls will be faced with ashlar in irregular courses, and the roofs will be covered with Buttermere green slates. The work is to be carried out locally under the superintendence of Mr. David Henry, architect, F.S.A. Scot., St. Andrews.

SUNDAY SCHOOL, NEW ENGLAND, PETERBOROUGH.—Extensions are being made to the New England Wesleyan Sunday school. A new schoolroom with classrooms is being built, and the work includes a slight improvement to the chapel. The present undertaking is estimated to entail an expenditure of 1,000l. Mr. J. Jameson Green, of Liverpool, is the architect.

QUEEN VICTORIA MEMORIAL AT LEITH.—At both Leith United Free Church, on the 6th inst., the ceremony of laying the memorial stone in the spire, and the foundation stone of the church itself, was performed. The spire has been given in memory of Queen Victoria, and when completed will be about 125 ft. in height. Messrs. Greig & Co., architects, Leith. Messrs. Hardy & Wight were the architects of the work.

EXTENSION OF THE YORK FEVER HOSPITAL.—The York City Council having applied to the Local Government Board for sanction to borrow the sum of 4,400l. for the extension of their fever hospital, Huntingdon-road, an inquiry, directed by the Local Government Board, was held by Mr. R. W. Whiston, M.D., at York on the 8th inst. There were present the Town Clerk (Mr. R. P. Dale), the City Surveyor (Mr. A. Creer), and others.

HOSPITAL, OLD RATTRAY, PERTH.—A new institution hospital is to be built for the burghs of Blairgowrie, Rattray, Alyth, and Coupar Angus, east of Old Rattray. The ground acquired for the hospital extends to 2½ acres. The hospital is to be placed facing in such a way as will give the windows of each pavilion (there will be two pavilions) an exposure to the south by east and north by west. The administrative block is placed

behind the fever pavilion. The laundry block is about 90 ft. from the nearest fever pavilion. The administrative block will contain a doctor's room, with drug store, lavatory, matron's store, kitchen, parlour, and bedroom for caretaker, all on ground floor, together with servants' accommodation, pantry, &c. There are four bedrooms for nurses on the upper floor, also bathroom, &c. Arrangements have been made with Rattray Town Council to get the use of their small portable hospital as an observation ward. The two pavilions will be 70 ft. apart. Both pavilions are exactly alike, and contain two wards, one for males and one for females, each containing four beds, and having an annexe at the end. Between the wards is placed the nurses' duty-room, with other accommodation. The wards are to be heated with special hospital stoves, with open fires, but in addition to the stoves there is to be an open fireplace in each ward. The plaster work is to be finished with Keene's cement, and all the angles, external as well as internal, all rounded over, and there are no cornices. The floors of the bathrooms, &c., are to be laid with concrete. The laundry block consists of ambulance van shed, mortuary, washing-house, laundry, &c. The plans have been drawn by Mr. Lake Falconer, architect, Blairgowrie.

WORKHOUSE, SOUTHMEAD, WESTBURY-ON-TRYM.—A new workhouse has been built for the Barton Regis Board of Guardians at Southmead, Westbury-on-Trym. The site of the new workhouse is not far from the laundry. The buildings are divided into five main blocks, and the architects (Mr. A. P. I. Cotterell, Bristol, and Mr. W. H. Thorpe, Leeds) have designed the building in the English Renaissance style. Block A comprises the boardroom, 20 ft. by 24 ft., and the clerk's offices, with a strongroom and other offices and a porter's waiting room. This block is distinct from the workhouse buildings proper, and is situate to the left of the main entrance. A separate entrance is provided for persons having business with the Clerk. Block B consists of the porter's lodge and the male and female tramp wards, providing accommodation for sixteen males and eight females. At the rear of these premises is the stone yard. Block C comprises the master and matron's apartments and accommodation for eighty-two inmates. This section of the workhouse is arranged on the pavilion system. To the rear of the master's rooms there are store-rooms and an inmates' dining hall 40 ft. by 26 ft. Provision is made for the women inmates on the right side of Block C, and for the men inmates on the other side. Quarters are also supplied in this section for two married couples, and at the rear there are the laundry, carpenters' and shoemakers' shops, and a boiler house. In devising Block C on the pavilion type, it was felt that such an arrangement would give facilities for better classification of the inmates, and the old-fashioned workhouse arrangements. The inmates may, accordingly, in each centre be classified in four divisions, and the indiscriminate commingling of all sorts and conditions of people is avoided. The heating here, as in other parts of the workhouse, will be by hot water. The infirmary is comprised in Block D, provision being made for twenty-four inmates—two male and twelve female. On either side of the corridor there are three wards, which will afford the means of dealing with doubtful cases. Provision is made for the medical men and the nurses, and at the end of the corridor, reached by a covered way, are two rooms for maternity cases. The mortuary and stables are comprised in Block E. A boundary wall, nearly high as the main length, surrounds the new workhouse, outside of which is the hospital for infectious cases. No children will be kept at the workhouse. Two cottage homes have been acquired for some of them quite half a mile away from the workhouse, and others will probably be boarded out. The total present accommodation of the new unit buildings is for 110 inmates and twenty-four casuals. The work of erecting the buildings was entrusted to Mr. H. A. Forse, of Bristol. The cost of the site was 3,700l. The site is 13½ acres in extent, and the outlay for the new premises, furnishing, and machinery, will amount to about 20,000l.

BANK, BETHNAL GREEN.—A new building has just been opened at Bethnal Green for the London City and Midland Bank. The new premises are situated at 405 and 467, Bethnal Green-road. The building is 60 ft. in height, and 50 ft. by 50 ft. There are three floors, a portion of which will be utilised as offices. The elevations, both in Bethnal Green-road and Hollybush Gardens, are of granite and Bath stone, while around the parapet runs a stone balustrading. The joinery, externally and internally, is of polished walnut, the floors being of oak and mosaic. The counters, which face both Bethnal Green-road and Hollybush Gardens, are protected with iron grilles. The ground floor is 17 ft. high, and contains the clerks' departments and the manager's offices. Electric light fittings have been installed, and now only await the carrying out of the electrical scheme by the Borough Council, and the laying of the necessary mains, to be utilised. The architect for the building was Mr. T. B. Whinney, Old Jewry, E.C. Messrs. Roome & Co. were the builders, the work being carried out under the personal superintendence of Mr. John Whiter, a partner

of the firm. The fireproof floors were laid by the Columbia Fireproof Co., of King William-street, E.C.; and the electric lighting is by the firm of Mr. Chas. Winn, Union-street, Borough.

BUSINESS PREMISES, DARLINGTON.—New premises for Messrs. Todd Bros., drapers and general outfitters, have been erected at Darlington, in Crown-street. Mr. G. G. Hoskins is the architect. The building has a frontage towards the south of about 80 ft., and extending from south to north about the same distance. The lower ground floor is treated with Burmantoft's faience. Electricity has been installed for artificial light.

VESTRY HALL, NORTON.—At a meeting of the Vestry of the parish of Norton, within one of the districts recently added to the city of Sheffield, the ratepayers approved of the erection of a Vestry Hall and offices, in accordance with the plans prepared by Mr. Joseph Norton, architect, of Sheffield, and have authorised the overseers to proceed with the scheme, which, with land and furniture, is estimated to cost about 5,000l.

SANITARY AND ENGINEERING NEWS.

WIDNES AND RUNCORN BRIDGE.—The construction and erection of this work has been well advanced during the last six months, and although considerable progress has been made on the site, still more has been made at the contractor's works. On the Runcorn side a large amount of masonry and earthwork, to form the new road approach, has been completed, and most of the large cast-iron cylinders which form the base of the towers have been sunk to the level of the rock, about 25 ft. below the bed of the Manchester Ship Canal. The engineers for the work are Mr. John J. Webster, M.Inst.C.E., of Westminster, and Mr. John T. Wood, of Liverpool, the resident engineer being Mr. L. H. Chase, M.Inst.C.E. The contractors for the steel superstructure are Arrol's Bridge and Roof Co., Glasgow, who have sublet a portion of the girder, tower, and cast work to the Widnes Foundry Co., and the sinking of the tower cylinders to Messrs. Holme & King. The contractors for the masonry and earthwork of the approaches are Messrs. W. Thornton & Son, of Liverpool.

RESERVOIRS, HALIFAX.—The members of the Halifax Corporation visited, on the 10th inst., the new reservoirs at Walsaw Dean. Walsaw Dean is fourteen or fifteen miles from Halifax. The scheme embraces the construction of three reservoirs, the combined capacity of which will be 640 million gallons. Messrs. G. H. Hill & Son, Manchester, are the engineers, and Mr. Enoch Tempest, of the same city, is the contractor. The total cost will exceed 200,000l. The drainage area is 2,300 acres, and the completion of the scheme will give an additional daily supply of 2½ million gallons, after allowing 1½ million gallons per day for the compensation water which the Corporation are obliged to send down the brooks for the use of mill-owners and farmers on the stream.

FOREIGN.

FRANCE.—The jury in the annual competition founded by the Société Nationale des Architectes Français has awarded the first prize to M. Parenty. The subject of the competition was "Une Ecole Maternelle à Paris."—The town of Troye (Aube) has opened a competition for a new Hôtel de Ville on a large scale.—A new Hôtel des Postes et Télégraphes is to be built at Clermont.—M. Jean Boucher, the sculptor, has been commissioned to execute the monument to Renan which is to be inaugurated at Tréguier next spring.—The Department of Fine Arts has entrusted to M. de Lasteyrie, of the "Monuments Historiques," and to M. Bonneau, of the Brive district, the direction of the excavations at the church of St. Pierre at Molsac, celebrated for the sculptures over its principal entrance. It is expected that their researches will lead to the discovery of some remains of the church built in 1063.—M. Charles Lucas, the architect, has been appointed for three years a member of the "Comité des Habitations à Bon Marché" in connexion with the Department of the Seine.—The Municipality of Malakoff (Seine) is about to open a competition for the building of a new mairie.—M. Roussi, architect, has been commissioned to prepare the plans for the new Ecole des Arts et Métiers which is to be built on the Boulevard de l'Hôpital at Paris, at an estimated cost of 6,500,000 francs.—The tower of the church of the Madeleine at Verneuil, remarkable for its sculptural decoration, is to be restored, and has been classed among the "Monuments Historiques."—It is proposed to demolish the fortifications of Lille between the Porte d'Ypres and the Porte Louis XIV.—The death is announced of a young sculptor, M. Guittet, at the age of thirty. He was believed to have a brilliant future before him; he had received an honourable mention in 1896, a second medal in 1897, and a travelling studentship in 1899. He also received a bronze medal in the 1900 Exhibition. The museum at Amiens possesses three excellent works by him. M. Guittet was a pupil of M. Rouleau.—The death is also announced of M. Paul Liot, landscape painter, whose Brittany scenes were well known at the Salon exhibitions. He was

a pupil of M. Guillemet, and held the official post of Painter to the Ministère de Marine (equivalent to the Admiralty in England).

INDIA.—Burlings recently executed in Vizagapatam Harbour shows that a deep navigable channel, about 300 ft. in width, can easily be dredged. The burlings, in which the Government of India is much interested, were carried out in the creek and backwater, and taken down to 30 ft. below low water spring tides. The Calcutta Commissioners have decided to obtain from England a qualified architect and building surveyor to supervise works for the Corporation. *Indian Engineering*, in commenting upon this, remarks: "We shall look forward with interest to this selection, and to seeing an architect established in Calcutta who will exercise his influence on the building operations that are always proceeding on an extensive scale." The erection of large barracks at Monkey Point, Rangoon, has been sanctioned. The new Government telegraph office at Poona has been completed.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Mr. T. M. Rickman, surveyor, 8, Montague-street, Russell-square, has taken into partnership Mr. E. J. Burr, who has been his assistant in his business for many years; and the practice will be carried on at the above address under the style of "Rickman & Burr."

LOCAL IMPROVEMENTS.—The Earl of Carrington has arranged with his trustees to grant to the Corporation of High Wycombe a site in Queen Victoria-road for the proposed municipal buildings. The lease will be for ninety-nine years at a ground rent of 20l. per annum, on condition that at least 2,000l. is expended upon the fabric. Lord Carrington is disabled from carrying out his wish to make a free gift of the land, which is valued at 950l., but surrenders his life interest therein for a nominal charge of 1s. yearly, and will contribute 100l. to the purchase fund.—The South Shields Corporation have formulated an extensive scheme for street improvements to involve an estimated outlay of 100,000l., as a part of their new tramways undertaking. The project comprises the laying out of a 60 ft. roadway in Fowler-street, to extend from Thomas-street to King-street, and the acquisition, under their Act of 1900, of all the property not hitherto taken on the line of the new street.—The Corporation of Birmingham will take measures for widening Dale End, in the old part of the city, and Vauxhall-road, and for facilitating the traffic between Sattleys, Sparkbrook, and Small Heath by means of a road from Victoria-street to Muntz-street. They intend also to widen the road from the Imperial Arcade to near the junction of Coles-hill and Stafford-streets, and to build a bridge at Small Heath on the tender for 22,860l. of the Dalziel Bridge and Roof Co. of Glasgow. The Corporation's electrical supply department have accomplished the work, at an outlay of about 9,000l., of converting their system to a higher voltage—from 110 to 220. Increased demands upon the supply necessitated the distribution of a greater current, and the old copper wiring is replaced with a three-wire service covered with bitumen and laid in iron troughs. New lamps capable of resisting the enhanced power, and altered fittings, have been furnished, whilst the expense of generating the doubled power will, it is expected, cost but little beyond that for the lower voltage. The Sanitary Council lately constituted in Birmingham have appointed a sub-committee to establish a scheme whereby, following the initiative set by Miss Octavia Hill in London, they will assume charge of neglected and crowded property upon lease, collect the rents, and carry out improvements of the dwellings without expending any capital in purchasing the several freeholds.

A PROPOSED CANAL FROM LIVERPOOL TO BIRMINGHAM.—The North Staffordshire Chamber of Commerce are about to invite the co-operation of the Birmingham Chamber in the construction of a canal from the latter city and South Staffordshire, through the potteries district to Liverpool. It is represented that the current railway rates have an adverse effect upon the exportation of iron from South Staffordshire, inasmuch as, that traders in the Midlands send their orders for heavy iron work to Belgium. To cite a concrete example in point, the railway rate from Birmingham to Liverpool for bedsteads is 18s. 1d. per ton, and that for hardware is 20s. 2d. per ton. Moreover, the similar rates from Hull to Birmingham are much less than those from Birmingham to Hull.

FONT, ST. THOMAS'S CHURCH, SALISBURY.—The Bishop of Salisbury recently dedicated a stone font and ornamental oak cover in St. Thomas's Church, Salisbury, which has been erected as a memorial to the late Rev. William John Birbeck. The font was designed by Mr. Doran Webb, and the work was entrusted to Messrs. Harry Hems & Sons, of Exeter. Various portions of the supplementary work, including the oak panelling round the baptistry, have been carried out locally. The font is carved from a single block of Beer stone, and is over 1½ tons in weight; it is octagonal in shape, standing upon a double tier of steps of the same material, and on the upper part of each side is a panel carved in relief. The four major panels

on the north, west, south, and east sides respectively represent the following Scriptural subjects: The Baptism of our Lord, the Crucifixion, the Burial, the Resurrection. The four minor panels are each composed of a shield, surrounded by a scroll, the subjects on the shields being as follows: South-east, the arms of the See (Venerable and Child); south-west, the Ark; north-west, the arms of St. Thomas à Becket; the north-east side panel has the Three Fishes. The canopy measures 6 ft. 6 in. in height above the top of the font; it is carved in old oak, with pinnacles at the base of the spire, which is relieved by the open tracery work on it. The whole is surmounted by a dove with outstretched wings. The complete height of the font and canopy is 11 ft. 6 in. The hanging apparatus by which the canopy is raised was supplied by Messrs. Singer, of Frome.

SWEDISH GRANTS.—According to official reports the exports of granite from Swedish ports to the United Kingdom are annually increasing, and Mr. Consul Duff writes from Gothenburg that exporters are very eager to open transactions with British firms, from whom, they say, they obtain better prices and meet greater promptness in business than from others.

DOLLARS AND POUNDS.—The Fairbanks Co. send us a small pamphlet of tables for converting American dollar currency into pounds sterling, which may be useful to firms having large dealings with the United States. They also give a table for converting French metrical measures and weights into English.

CONSUMPTION OF CEMENT IN THE UNITED STATES.—Mr. Bell, British Commercial Agent in the United States, reports on this subject to the Foreign Office in these terms:—"British cement manufacturers appear to have abandoned this market. During the last fiscal year only 8,674 tons came from the United Kingdom out of a total of 189,216 tons. Belgium sent 74,065 tons, and Germany 101,364 tons. The average declared prices per ton of the imported Portland cement from the different countries were as follows:—"

	Dols.
United Kingdom	8/70
Belgium	7/24
Germany	8/23
Average of all countries	7/81

Official statistics give the production of Portland cement for 1901 in the United States as 12,711,225 barrels, an increase of 4,259,205 barrels over that of 1900. It was valued at 12,532,360 dols., as against 9,280,525 dols. in 1900. In 1890 sixteen works produced 335,000 barrels, in 1894 twenty-four works produced 798,000 barrels, in 1899 thirty-six works produced over 5,652,000 barrels, in 1900 fifty works produced over 9,482,000 barrels, in 1901 fifty-six works produced over 12,711,000 barrels, in 1890 each one of the sixteen cement works averaged more than 220,000 barrels, in 1901 each one of the cement works averaged more than 220,000 barrels for the year. The percentage of the consumption of Portland cement has increased from 132 in 1891 to 347 in 1896, to 739 in 1899, to 701 in 1897, and to 902 in 1901. The total consumption of all kinds of cement in the United States in 1901 was 20,573,538 barrels, valued at 15,786,789 dols., as compared with 8,383,000 barrels produced by sixty-four works in 1900 and 9,808,000 barrels produced by sixty-three works in 1890. The production of slag cement in 1901 amounted to 272,680 barrels, valued at 108,151 dols., as compared with 365,601 barrels, valued at 274,208 dols. in 1900. Of the total consumption of cement of all kinds in the United States, natural rock cement furnished 7167 per cent, imported Portland cement 15.54 per cent, and domestic Portland cement 14.79 per cent. In the same report Mr. Bell mentions incidentally that in the past year building operations have been carried on all over the country to an unprecedented extent. This applies equally to residential buildings and factories.

WINDOW, MONK HESLEDEN CHURCH, DURHAM.—At St. John's Church, Monk Hesleden, near Hartlepool, three stained glass windows have just been unveiled. Messrs. Wallis & Strang executed the work, and the same firm carried out the work of the large east window which was unveiled recently.

LEGAL.

THE BUILDING ACT AND FIRE PROTECTION.

MR. H. McLACHLAN, District Surveyor of the western division of the City, appeared at the Guildhall recently under the following circumstances:—On August 27 last he served upon Messrs. Harrison certain work at 14, 15, 16, and 17, Holborn-viaduct, a notice of objections to such work, and the builders being dissatisfied with his (Mr. McLachlan's) decision, now appealed against it. Mr. J. P. Grain said this was an appeal from the objections raised to certain alterations which it was proposed to make in the buildings referred to. The Holborn Land Co. proposed to make an opening in the party walls of 14, 15, 16, and 17, Holborn-viaduct, and so make them into one building. Mr. Savill (chief clerk): The whole

question resolves itself into this, Is it wholly in one occupation, and is the place adapted for such occupation? Mr. Grain said he should contend that the Holborn Land Company were the sole occupants. The objection raised by Mr. McLachlan was that they were contravening the Building Act, but he thought he should show they were not. Of course, the great point was whether there was sufficient protection in case of fire. The proposed alterations would establish a central staircase leading up to the flat roof, whereby means of escape would be easy. The fire insurance company by whom the whole of this property was insured approved the alteration and did not increase the premiums. The question of occupation was a very wide one, but he contended that so far as could be the Land Company were the sole occupants. They had a housekeeper who held the key, and who had to see to the cleaning of the whole premises. Mr. Savill: Do you contend that there is but one occupation? Mr. Grain said he did, and quoted several passages in support of his views, remarking that the appellants proposed to do in regard to these four houses had been allowed in other buildings by the District Surveyor. Mr. Isitt (secretary of the Holborn Land Company) went into the box, and produced plans. He also explained how the premises were let. The Alderman held that these premises were not wholly in one occupation, nor were they adapted for such, therefore he dismissed the appeal. Mr. McLachlan asked for costs. Mr. Grain said the District Surveyor could hardly do so, seeing he had consented to similar alterations elsewhere. Mr. McLachlan said it was distinctly laid down in connection with the premises where the disastrous fire took place in Queen Victoria-street, that it was not in one occupation, nor fitted for such. Therefore, they could not but be careful. Mr. Savill remarked that the Court had no power to give costs in such a case. Mr. Grain asked the Alderman to state a case. It might be they would appeal. The Alderman: Certainly.

AN ALLEGED DILAPIDATED HOUSE.

The owner of premises at 20, Warbeck-road, Hammersmith, was recently summoned, before Mr. Rose, at West London, at the instance of the London County Council for allowing the place to remain in a dilapidated condition.

Mr. Collman, who supported the summons, which had been issued under the Building Act, said the object of the proceedings was to improve the character and the appearance of the building. At present the windows were broken and the house had a dilapidated appearance. Neighbours, he added, were consequently inconvenienced.

Mr. Rose: Do you suggest that a man is compelled against his will to clean up his house in order to facilitate the interests of his immediate neighbours?

Mr. Collman: The section of the Act seems to imply that.

Mr. Rose: The words are, "no doubt, very broad, but the proposition is a most startling one, and one I have never heard before."

The Council's official described more minutely the condition of the house, and his Worship thought it would be an exaggeration of language to say it was dilapidated.

The summons was adjourned to allow the magistrate to consider the legal aspect.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

9,923.—A PIPE-WRENCH: A. F. Jackson and W. W. Whitehead Co.—A rod having a bead and joined to a trigger that is pivoted on to the stem works the movable jaw which is pivoted in a slot cut in the stem. For gripping the work one opens the jaws by pressing the head and the trigger, and closing them with a spring set in the casing.

9,936.—AN ANTI-RUST COMPOSITION: M. Condram.—A compound for preserving surfaces of metal is made of pitch, crushed coke or coal, creosote or similar oil, slaked lime, and it may be, Portland or some other cement.

9,950.—JOINTINGS AND COUPLINGS FOR PIPES: New Haven Novelty Machine Co.—In one form a coupling consists of an engaging portion with an externally threaded sleeve, and shoulders that make acute angles with the pipes, which are flanged accordingly. For a valve, and to render a joint either fluid or gas tight without employing solder or packing, the coupling comprises a screwed nut of which the neck fits within the end of the pipe and causes it to expand, and an engaging part that forms the joint.

9,960.—APPLIANCES FOR VENTILATION: C. L. Zulwiler.—Over an opening into the apartment or other confined space is fixed a casing or hood, on to which is pivoted a valve which will exclude a current of air, or may have its flaps set at the front and the back of the hood, and linked to a vane worked by the air. In another form the hood is so pivoted on to arms that it can close one end of the passage, or the hood may be closed at one end, the valve being discarded. A screen mounted upon a shutter is applied to the opening, and on each end of

a shutter is a flange having a pivoted extension-

9,967.—WINDOW FASTENINGS, &c.: *G. W. Johns*.—The sliding stiles and sash stiles are joined together with pivoted plates and slotted plates that are worked with projections and studs to slide upon grooves secured to the sash stiles, and can engage with grooves cut in the sliding stiles; the pivoted plates on the former stiles will sustain the sashes when turned to be horizontal, and will serve for ordinary reversible non-sliding window-sashes.

9,980.—ENGINEERS' SQUARES: *W. Chesterman*.—In order that one may accurately replace a blade in the stock the inventor puts eccentric washers which engage with recesses in the blade upon sliding-screws; the washers are to be turned so as to turn against the shoulder of the blade before the screws are tightened up.

10,045.—TUNNEL-BORING MACHINES: *A. Farnsworth*.—Means of removing the face are combined with the shield, which has a cutting edge and advancing rams. Screws enable ploughing-cutters to travel along the arms of the revolving cutter-head that are secured to the boss and the rim, the latter being driven by gearing from a motor, and having attached to it front and back plates. Between these plates are other cross plates, either pivoted or fixed, that gather the cut material and lift it to the hopper; on the pivoted plates are stops that work against the hopper against the hopper for discharge of the contents.

10,084.—ARTIFICIAL STONE BLOCKS: *S. E. Boivie*.—For an artificial stone is made an admixture of quartz, slaked lime, slate or quartz sand, and diluted sulfuric acid. The blocks are treated with steam under high pressure, and are described as being equal to natural stone.

10,085, 10,093, and 10,104.—A SPRING-BALANCE FOR SLIDING WINDOW SASHES, AND IMPROVEMENTS IN WINDOW FITTINGS: *F. H. Wallace and A. G. Hillon*.—The ends of a broad spiral spring that is loosely placed within a section of barrel are hooked for engagement with projections from the barrel and a fixed angle, which is situated on the barrel and the casing or is attached to it. The hooked barrel is set in gear with a rack upon the sash, the lowering of which will wind up the spring; when the spring is unwound the barrel will freely slide in one direction over the outer end of the spring, but a reversal of its motion causes a projection to engage with a hook, otherwise the barrel will be free to move in the other direction, so that a pawl being pivoted on to the outer end of the spring. The casing has a detachable part in which is an aperture to take a collar of the barrel.

10,093.—Compensation for warping and shrinkage of the woodwork is afforded by pivoting the box that holds the apparatus already described on to a bolt which is inserted through the end of a face plate secured to the frame of the window, a spring that is mounted upon a bolt and presses against blocks of the box also forces the wheel to engage with a rack upon the sash, lugs within the two portions of the box constitute bearings for the latter bolt, and for a rocking shaft of which the cranked arm or pawl engages with the teeth of the wheel, by means of the cutting away of the shaft, the fibres extending to the front of the teeth from the back of the rack. A central strengthening-bar is let into the back of the rack, or two strips of wood are glued lengthwise in grooves, whilst the solid end of the rack will prevent it from running out of gear with the pinion of the spring.

10,134.—SUPPORTS FOR PIPES, MAINS, &c.: *H. C. Longdon*.—Adjustable supports and brackets, which are also adapted to meet differences in the diameters of the pipes, consist, in one shape, of a serrated base-piece (carried by a plate affixed to the pillar or wall) that will engage with the teeth of a bracket which can be tilted or otherwise moved adjustably by means of the cutting away of the head of the bracket-piece; the opening through which the head of the bracket-piece is inserted may be at the top, and a transverse adjustment is provided by causing the supports to engage with teeth upon the upper surface of the bracket. In another variety the toothed bracket is adapted for a smooth-faced cantilever support.

10,142.—SPRING-DRUM DISCHARGE: *F. Shanks*.—The tank is cast about the outlet leg of the siphon pipe so as to hold it securely; the cover, consisting of two unequally-sized portions, is bolted down, its two parts about crosswise and have lugs on to which the working lever is pivoted. For a cistern that is placed near the level of the closet, the shorter leg of the siphon is inserted into a vertical starting cylinder containing a piston to be worked by the hand. An inward and upward recess may be substituted for the customary depression that takes the well at the base of the cistern.

10,143.—CONSTRUCTION OF WALLS, CEILINGS, &c.: *Fireproof Plate Wall Co. and C. H. Sidebottom*.—Cement or plaster slabs, having recesses, interlocking edges, and perforations for metallic tie-rods, are laid diagonally. Rubber strips that are fastened

on to plugs with screwed rings, form undercut recesses which take the cement. The ends and sides of the mould are disposed so that they will slide outwards, whereby any distortion of the slabs will be obviated whilst the plaster is becoming set. Both the ends and the sides move outwards together as the plaster expands in the mould. The levelled tongues of the ends are turned against recesses fashioned in the side. For a horizontal laying of the slabs, confer Nos 18,583 of 1893, and 9,108 of 1898.

10,170.—IMPROVEMENTS IN LIFT-VALVES: *G. W. Walters*.—The inventor devises a socket having an aperture in its side for engagement with the flanged end of the spindle, and a detachable seating which fits over the flange of the diaphragm and is made fast with a screwed collar; the collar has a cap for its cover and openings through its sides.

10,209.—FLUSHING APPARATUS AND WATER DISCHARGE: *H. E. Bullock*.—A stem, having a cone-shaped shoulder, carries a valve which shuts the outlet from the cistern. A sleeve into which it is inserted works through a guide-bar, and a catch is pivoted to lugs upon the sleeve. A ring joins the catch to an arm and float. A spring inside a tube normally forces downwards the lower end of a rod that is also pressed by a projection from the seat of the float. On the tube are lugs in which is pivoted a lever linked to the upper end of the rod. The sleeve hangs from the outer end of the lever.

10,211.—FLOORINGS AND CEILINGS: *F. O'Shea*.—Flanged plates, of which the ends have notches that take the upper flanges of the girder, are rivetted together cross-wise for bars or joists to carry the floor; angle-iron bars and struts are rivetted on to the plates and forced against the girder flanges. Between the plates are nailed to the joists a set of corrugated metal sheets and wooden strips for flooring; the concrete or other material is laid over the sheets. The ceiling is sustained with metallic strips wired on to the joists, and having their tongues inserted through slits in metallic sheets and expanded metallic lathing. Tongues underneath the sheets are pierced for pins, and the end of the tongues are turned over beneath the plastered lathing. The sheets serve to exclude water and the passing of sound, heat, and fire is prevented by the spaces formed between the floor and the ceiling.

10,215.—CASINGS FOR ELECTRICAL CONDUCTORS: *F. H. Golding and C. A. James*.—The middle raised part of the metallic body divides two grooves, and provides a web to take the fixing-screws. The cover is sprung into its place by means of the bowed upper edges of the sides of the body, and the conductors are retained by bridges which fit on to the upper edge or grip the raised middle dividing-piece. Angular casings, joined to one another and reduced in the direction of the angle for the bending of the conductors supply elbows, which may have spring tongues to grip against the back part of the middle dividing-piece.

10,272.—A BRACKET FOR SPOUTING AND GUTTERS: *T. Baitinger and W. Milligan*.—For gutters or spouting underneath eaves is contrived a bracket of galvanised iron, made with a double thickness. A hook is pivoted at its end for retaining the head of the gutter. The feet are turned downwards and upwards, and are secured to the board, one of the feet having a hook beneath which the edge of the gutter is put.

10,297.—MANUFACTURE OF PORTLAND CEMENT: *C. Forell*.—A liquid blast-furnace slag is granulated in water. The mixture is then treated to a fusing or clinkering point with so much of lime as will raise the amount of the latter to a ratio of 50 per cent. and is finally cooled and pulverised.

10,316.—A COVERING FOR BOILERS, TANKS, PIPES, AND OTHER HEATED FURNACES: *T. Smith*.—The composition contains 35 per cent. of pressed barm, 50 per cent. of fibre, 20 per cent. of fossil meal, 5 per cent. of salt, 5 per cent. of clay, 4 per cent. of tar, and 1 per cent. of lime.

10,334.—BRAKES AND PULLEYS FOR LIFTS AND HOISTS: *A. Gieseler*.—The movements of the hoisting-pulley and a bush that run loosely upon the spindle are restricted through the engagement of their recesses with a key affixed to a collar upon the spindle; the flats of the bush will engage with a slotted piece whereof one end constitutes a brake block; to its other end is pivoted a lever, the end of which is in one with a lever linked to a pin upon the hoisting pulley. A fixed brake ring is set in engagement with both brake blocks. When the pulley turns in a direction opposed to that of the driving power, as relaxed, the engagement between a recess and the key causes the pulley to carry the spindle with it, but a greater velocity of its turning causes the bush to remain stationary. The relative movement between the bush and the pulley brings the lever into play for the working of the brake.

10,388.—FLOORS FOR VIADUCTS, BRIDGES, AND SIMILAR PURPOSES: *F. A. Saner*.—A series of tubular spaces is formed by laying metallic plates one over the other. The plates have angular or curved corrugations which may be filled in with wooden strips, on to which the woodwork of the ceiling and floor can be nailed. The sheets are to be fastened together with bolts, rivets, or tongues punched in them and turned outwards.

10,407.—BUILDING OF WALLS: *W. F. Parker*.—The angles of plastered walls are protected with metallic bands or strips fashioned by the bending of their strips into a flanged and beaded T-shape (in cross section). The beads are fastened in their

places with strips of wire netting, or with clips which are slitted so as to form tongues to be turned over the flanges of the beads. Holes made in the webs of the beads take the plaster.

MEETINGS.

SATURDAY, SEPTEMBER 20.

Northern Architectural Association.—An excursion meeting to new buildings in Dean-street and Collingwood-street, Newcastle.

SEPTEMBER 21 TO 25.

National Association of Master House Painters and Decorators.—Newcastle Convention.

WEDNESDAY, SEPTEMBER 24.

Builders' Foremen and Clerks of Works' Institution.—Quarterly meeting of the directors. 8 p.m.

FRIDAY, SEPTEMBER 26.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. E. J. Stegmann on "Mechanical Physics: Laws of Motion, Hydraulics, &c." 7 p.m.

SATURDAY, SEPTEMBER 27.

Incorporated Association of Municipal and County Engineers.—Midland District meeting at West Bromwich.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

September 2.—By MESSRS. COBB (at Rochester). Rochester, Kent.—High-st., The Tartar Frigate, p. b., 12 p.	£9,000
Newington, Kent.—Keycol Farm, at a. a. 9 a. 19 p. f.	1,800
Meopham, Kent.—Priesthood Farm, 24 a. 2 r. 8 p. f.	395
September 4.—By DOUGLAS YOUNG & Co. (on estate). Finchley.—Stanhope-av., six freehold building plots, 12 p. f.	445
..... 12 freehold building plots.	1,241
Cavendish-av., Pont Nevis, f. y. f. 557. 750	
September 5.—By G. B. HILLIARD & SON (at Chelmsford). Springfield, Essex.—Sanford Mill, with residence, four cottages and 8 a. 1 r. 15 p. f. (as a going concern)	1,450
September 6.—By MESSRS. SPELMAN (at Norwich). Costessey, Norfolk.—The Church Farm Estate, 55 a. f. (in numerous lots)	5,160
By WILSON & PHILLIPS (at Southend). Southend, Essex.—Southchurch-rd., f. g. r., 517. 2s., reversion in 77 yrs.	1,250
Bascombe-rd., &c., twenty-three plots of free- hold building land (in lots)	1,373
September 8.—By G. B. HILLIARD & SON. Burnham-on-Crouch, Essex.—Gardner's-lane, two enclosures, 10 a. 0 r. 10 p. f.	2,050
Gardner's-lane, four enclosures of land and fore- shore, 47 a. 0 r. 7 p. f.	1,400
Main-st., freehold building site, 0 a. 2 r. 11 p.	500
September 9.—By HAMILTON & MALL. Kennington.—29, Sinclair-rd., ut. 71 yrs., f. g. r. 151, y. r. 654.	650
By MORGAN, BAINES, & CLARK. Croydon.—North End, f. g. r. 1141. 5s., reversion in 98 yrs.	3,830
Bromley, Kent.—The Broadway, f. g. r. 281, reversion in 81 yrs.	740
Sutton.—Carshalton-rd., f. g. r. 154, reversion in 56 yrs.	430
Bowes Park.—Queen's-rd., f. g. r. 61, reversion in 83 yrs.	155
East Ham.—Forley-rd., f. g. r. 81, 108, rever- sion in 88 yrs.	225
By RAWLINSON & SQUIRE (at Salisbury). Rollstone, Wilts.—Enclosures of Down pasture land, 11 a. 3 r. 25 p. f.	130
Shrewton, Wilts.—Three plots of building land, 1 a. 2 r. 21 p. f.	280
Two plots of garden ground, f.	140
Shrewton, Wilts.—Three freehold cottages and 0 a. 1 r. 38 p. f.	250
September 10.—By J. & W. JOHNSON & Co. Manor Park.—370 to 380 (even), Sherard-rd., f., w. r. 1984. 18s.	1,800
By DOUGLAS YOUNG & Co. Bermudey.—85 and 87, Long-lane (S), f., y. r. 804.	1,775
Kennington.—57, Kennington Oval, y. r. 504, also 1 g. r. 251. 10s., ut. 17 yrs., f. g. r. 804.	420
September 11.—By W. HALLITT & Co. Westminster.—29, Caroline-st., 29 yrs., f. g. r. 101, y. r. 354.	200
Chelsea.—88, Westbourne-st., ut. 181 yrs., f. g. r. 54, y. r. 504.	900
By W. MARTIN & Co. Dulwich.—45, Lordship-lane, ut. 64 yrs., f. g. r. 81, y. r. 554.	725
51, Oakhurst-grove, ut. 76 yrs., f. g. r. 104, f. g. r. 426.	360
By C. C. & T. MOORE. Whitechapel.—Raven-row, The White Lion b. h., f. y. r. 421.	1,000
Tottenham.—67, West Green-rd. (S), ut. 74 yrs., f. g. r. 91, y. r. 504.	680
Islington.—163 to 169 (odd), Essex-rd., ut. 16 yrs., f. g. r. 604, y. r. 1584.	725
Homerton.—43, Metcalch-rd., ut. 499 yrs., f. g. r. 84, w. r. 314. 16s.	345
Mill End.—60 and 64, Mill End-rd. (S), ut. 27 yrs., f. g. r. 134, y. r. 1004.	1,030
Hackney.—373, Hackney-rd., and 1, Garner-st., ut. 138 yrs., f. g. r. 61, f. g. r. 584.	230
Poplar.—153, 155, and 157, Brunswick-rd., ut. 369 yrs., f. g. r. 104, 108, w. r. 884. 8s.	630
Barnsbury.—75, Albion-rd., ut. 37 yrs., f. g. r. 74, y. r. 384.	315

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Technical Schools and Free Library	Ramsgate Corporation	50l., 25l., and 15l.	Nov. 3)

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., supplied by	Tenders to be delivered.
Additions to School, Church-street, Hursfield.....	Hemsworth R.D.C.	S. J. Aspinwall, 46, Chestergate, Manchester	Sep. 23
Waterworks	Ashton-under-Lyne Town Council	J. Schofield, Hemsworth, near Wakefield	do.
Street Works, &c., Dyar-street	Cardiff Corporation	T. L. Llewellyn, Civil Engineer, Town Hall, Ashton-under-Lyne	do.
Street Works, Pen-y-wain-road, &c.	Manchester Corporation	W. Harpur, Civil Engineer, Town Hall, Cardiff	do.
Stonework, &c., Victoria Buildings	Mount Bellow (Hertford) Guardians	City Architect, Town Hall, Manchester	do.
Additions to Workhouse	Levonport School Board	E. Halvey, The Workhouse, Mount Bellow	do.
School, Ker-street	Willesden District Council	Hine & Ogden, Architects, Lockey-street, Plymouth	do.
Electricity Sub-station, Sackville-street .....	.....	S. Barty, Engineer, City Hall, Dublin	do.
*Wood Fencing and Gates .....	.....	Council's Engineer, Dyne-road, Kilburn, N.W.	do.
Sinking Pit Shafts, Oughterside .....	.....	J. James, Manor House, Oughterside	Sep. 24
Additions to Burnside, Ilkley .....	.....	H. Hudson, Architect, Old Bank Chambers, Bradford	do.
Additions, &c., to Chapel, Etherley, Durham .....	.....	F. H. Livesey, Architect, Bishop Auckland	do.
Offices, Swinburn-street, Gateshead .....	.....	J. Duncan & Son, Architects, Turf, Aberdeen	do.
Additions, &c., to Auction Mart, Turf .....	.....	G. V. McInosh, Architect, Cornwallis-street, Barrow	do.
Additions to County Hotel, Ulverston	Messrs. Case & Co.	R. Porter, Surveyor, Town Hall, Wakefield	do.
Weigh Office, &c., Teal-street	Wakefield Corporation	G. C. V. Inkpen, Civil Engineer, King's-road, Southsea	do.
Mortuary, &c., Milton	Foramouth Guardians	G. E. Bond, Architect, Pier Chambers, Chatham	do.
Mortuary, Coach House, &c., Cobham	Strood R.D.C.	1. M. Newell, Engineer, Dock Office, Hull	do.
Steel Bridge, Kingston-on-Hull	N. E. Railway Co. ....	.....	do.
Timber Wharf, Middlesbrough .....	.....	.....	do.
Bridges, Walls, &c., Middleton Junction	L. & Y. Railway Co. ....	.....	do.
Brick Paving Works, West-street	Burgess Hill U.D.C.	R. C. Irwin, Hunt's Bank, Manchester	Sep. 25
Repairs, 41, Norton-road, Hove .....	.....	A. F. Hardwick, Council Offices, Burgess Hill	do.
Laboratories, &c., Chelmsford	Essex County Council	Mr. Cook, 53, Elm-grove, Hove, Brighton	do.
Flint Road Metal	Deal Corporation	F. Whitmore, Architect, Duke-street, Chelmsford	do.
Street Works, Kelvin-grove, &c.	Gateshead Corporation	T. C. Golder, Borough Surveyor, 33, Queen-street, Deal	do.
Road Works, Roman-road, &c., Bemerton, Salisbury	Earl of Pembroke	Borough Engineer, Town Hall, Gateshead	do.
Rebuilding Mermaid Inn, Coventry	Messrs. Phillips & Marriott, Ltd.	Lemon & Bizard, Surveyor, 85, Silver-street, Salisbury	do.
Stabling, House, &c., near Birmingham	Aston Manor U.D.C.	H. W. Chataway, Architect, Trinity Churchyard, Coventry	do.
Additions to Baths, Argyle-street, South	Birkenhead Corporation	G. H. Jack, Civil Engineer, Albert-road, Aston Manor	do.
Three Houses, Fenwick-croft, Wales	Stoke-upon-Trent Guardians	C. Brownridge, Civil Engineer, Town Hall, Birkenhead	Sep. 23
Street Paving Works, Anstruther Wester, N.B. ....	.....	C. Lynam, Architect, Stoke	do.
Granite Setts	Southampton Corporation	J. Currie, Architect, Cardiff	do.
Stable, &c., at Hospital	Rochester &c. Hospital Board	J. A. Crowther, Engineer, Municipal Offices, Southampton	do.
Town Hall and Library	Bo Sess (S.E.) Town Council	G. E. Bond, Architect, 384, High street, Rochester	do.
Bridge, Rhodes Bank	Oldham Corporation	P. & B. Brown, Architects, 8, Albany-place, Edinburgh	do.
*New Building, Newgate-street	Corporation of London	Kennedy & Jenkin, 17, Victoria-street, S.W.	do.
Swing Bridge	West London School District	Engineer, Guildhall, E.C.	do.
Police Station, South Bank, near Middlesbro'	Ipswich Dock Commissioners	F. W. Roper, Architect, 9, Adam-street, Adelphi, W.C.	Sep. 27
School Extension	North Riding County Council	W. H. Brierley, Architect, 15, Lendal, York	do.
Steel Tank, &c.	Wallsend (U.D.) School Board	The Clerk, Bewick's Schools, Willington Quay, R.S.O.	do.
Steel Footbridge, Oak-street .....	.....	A. Graham, Engineer, Gas Offices, Mansfield	do.
*Erection of Turkish Bath, adjoining existing Baths	Southport Corporation	R. P. Hirst, Civil Engineer, Town Hall, Southport	do.
*Making-up Roads	Burton-on-Trent Corporation	Borough Engineer, Town Hall, Burton-on-Trent	do.
Additions to Sewage Outfall Works, Appledram	Beckenham U.D.C. ....	.....	Sep. 29
*Wood Paving Blocks Ravvy Barrows, &c.	Chichester Corporation	Town Clerk, Chichester	do.
Additions to Schools, Cymarn, Mon.	Bethnal Green Council	Town Clerk, Town Hall, Bethnal Green, E.	do.
School, Normanton-road	Derby School Board	R. L. Roberts, Architect, Abercrom	do.
Additions to Outfall Sewage Works	Chichester Corporation	A. Macpherson, Architect, Tenant-street, Derby	do.
Waterworks, Newlyn, Cornwall .....	.....	J. W. L. Cooper, Town Hall, Chichester	do.
*Construction of Sewers, Upper Holloway .....	.....	W. Currow, Council Offices, Paul	Sep. 30
Road Making and Paving Works, Tottenham	London County Council	Borough Engineer, Town Hall, Upper-street, N.	do.
*Construction of Road Bridge over River, Bowes Park .....	.....	Architect's Department, 15, Chancery-lane, S.W.	do.
*Making-up and Paving Camphill-street	Southgate U.D.C.	Council's Surveyor, Palmer's Green, N.	Oct. 1
*New Hospital	Fulham Boro' Council	Council's Surveyor, Town Hall, Fulham, S.W.	Oct. 3
*Supply of London-made Stone-ware Pipes	Wolverhampton & Hosp. for Women	Architect's Department, 15, Chancery-lane, S.W.	Oct. 3
*Laying Main (Waterworks)	London County Council	Albert Latham, Engineer, Municipal Buildings, Margate	Oct. 6
*Permanent Way (for Elec. Traction), Bridge Work, &c.	Margate Corporation	County Engineer, Middlesex Guildhall, Westminster, S.W.	Oct. 7
*New Offices & buildings for County surveyor, Hertford	Hertfordshire County Council	County Surveyor, 41, Parliament-street, S.W.	Oct. 14
*New Court House, Harrow	Middlesex County Council	County Engineer, Middlesex Guildhall, Westminster, S.W.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Assistant Inspector for Sewerage Works	South Stoneham R.D.C.	3l. 4s. per week	Sep. 25
*Chief Building Inspector	Municipality of Georgetown, Penna.	200l. &c.	Sep. 30
*Surveyor & Water Engineer & Surveyor to Burial B'd.	Teignmouth U.D.C.	150l.	Oct. 4
*Junior Draughtsmen (Estates and Valuation Dept.).	London County Council	Not stated	No date

Those marked with an asterisk (*) are advertised in this Number

Competitions p. iv

Contracts, pp. iv, vi, viii & x.

Public Appointments, ix.

By J. BURNAN ROSEVEAR.	
Fulham, -1A, Grimston-rd., 92 yrs., g.r. 6l., e.r. 45l.	£490
77 and 79 Purser's Cross-rd., n.t. 87 yrs., g.r. 12l. 12s., e.r. 14l. 6s.	1,000
117, New King-st., f., e.r. 42l.	68s.
By WORSFOLD & HAYWARD (at Dover).	
Dover, Kent, -4, Council House-st. (S), f., p.	370
2, Stembrook, f., w.r. 12l. 2s. 8d.	135
48, Seven Stars-st., f., y.r. 12l.	200
6, Pleasant-row, f., w.r. 14l. 6s.	115
23, Queen's-gdns., f., w.r. 14l. 6s.	215

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; w. for weekly rental; y.r. for yearly rental; n.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove.

PRICES CURRENT OF MATERIALS.

*Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.	
Hard Stocks	1 10 0
Rough Stocks	1 10 0
Grizzles	2 10 0
Facing Stocks	2 10 0
Shippers	2 5 0
Flettons	1 8 0
Red Wire Cuts	1 10 0
Wolverhampton & Hosp. for Women	3 12 0
Best Red Pressed	5 5 0
Rusbon Facing	4 6 6
Best Blue Pressed	4 11 0
Staffordshire	4 8 0
Do, Bullnose	4 8 0
Best Stourbridge	4 8 0
Fire Bricks	4 8 0

PRICES CURRENT (Continued).

GLAZED BRICKS.	
Best White and Ivory Glazed	13 0 0
Stretchers	13 0 0
Quoins	13 0 0
Double Headers	17 0 0
Double Stretchers	17 0 0
Double Headers	17 0 0
One Side and two Ends	17 0 0
Two Sides and one End	20 0 0
Splays, Chamfered	20 0 0
Squints	20 0 0
Best Dipped Salt	20 0 0
Stretchers and Headers	20 0 0
Quoins, Bullnose, and Flats	20 0 0

PRICES CURRENT (Continued)

PRICES CURRENT (CONTINUED).		
ENGLISH SHEET GLASS IN CRATES.		
15 oz. thirds	2d. per ft. delivered	
18 " " "	2d. "	11
21 oz. thirds	3d. "	11
24 " " "	3d. "	11
27 oz. thirds	4d. "	11
30 " " "	4d. "	11
33 oz. thirds	5d. "	11
36 " " "	5d. "	11
39 oz. thirds	6d. "	11
42 " " "	6d. "	11
45 oz. thirds	7d. "	11
48 " " "	7d. "	11
51 oz. thirds	8d. "	11
54 " " "	8d. "	11
57 oz. thirds	9d. "	11
60 " " "	9d. "	11
63 oz. thirds	10d. "	11
66 " " "	10d. "	11
69 oz. thirds	11d. "	11
72 " " "	11d. "	11
75 oz. thirds	12d. "	11
78 " " "	12d. "	11
81 oz. thirds	13d. "	11
84 " " "	13d. "	11
87 oz. thirds	14d. "	11
90 " " "	14d. "	11
93 oz. thirds	15d. "	11
96 " " "	15d. "	11
99 oz. thirds	16d. "	11
102 " " "	16d. "	11
105 oz. thirds	17d. "	11
108 " " "	17d. "	11
111 oz. thirds	18d. "	11
114 " " "	18d. "	11
117 oz. thirds	19d. "	11
120 " " "	19d. "	11
123 oz. thirds	20d. "	11
126 " " "	20d. "	11
129 oz. thirds	21d. "	11
132 " " "	21d. "	11
135 oz. thirds	22d. "	11
138 " " "	22d. "	11
141 oz. thirds	23d. "	11
144 " " "	23d. "	11
147 oz. thirds	24d. "	11
150 " " "	24d. "	11
153 oz. thirds	25d. "	11
156 " " "	25d. "	11
159 oz. thirds	26d. "	11
162 " " "	26d. "	11
165 oz. thirds	27d. "	11
168 " " "	27d. "	11
171 oz. thirds	28d. "	11
174 " " "	28d. "	11
177 oz. thirds	29d. "	11
180 " " "	29d. "	11
183 oz. thirds	30d. "	11
186 " " "	30d. "	11
189 oz. thirds	31d. "	11
192 " " "	31d. "	11
195 oz. thirds	32d. "	11
198 " " "	32d. "	11
201 oz. thirds	33d. "	11
204 " " "	33d. "	11
207 oz. thirds	34d. "	11
210 " " "	34d. "	11
213 oz. thirds	35d. "	11
216 " " "	35d. "	11
219 oz. thirds	36d. "	11
222 " " "	36d. "	11
225 oz. thirds	37d. "	11
228 " " "	37d. "	11
231 oz. thirds	38d. "	11
234 " " "	38d. "	11
237 oz. thirds	39d. "	11
240 " " "	39d. "	11
243 oz. thirds	40d. "	11
246 " " "	40d. "	11
249 oz. thirds	41d. "	11
252 " " "	41d. "	11
255 oz. thirds	42d. "	11
258 " " "	42d. "	11
261 oz. thirds	43d. "	11
264 " " "	43d. "	11
267 oz. thirds	44d. "	11
270 " " "	44d. "	11
273 oz. thirds	45d. "	11
276 " " "	45d. "	11
279 oz. thirds	46d. "	11
282 " " "	46d. "	11
285 oz. thirds	47d. "	11
288 " " "	47d. "	11
291 oz. thirds	48d. "	11
294 " " "	48d. "	11
297 oz. thirds	49d. "	11
300 " " "	49d. "	11
303 oz. thirds	50d. "	11
306 " " "	50d. "	11
309 oz. thirds	51d. "	11
312 " " "	51d. "	11
315 oz. thirds	52d. "	11
318 " " "	52d. "	11
321 oz. thirds	53d. "	11
324 " " "	53d. "	11
327 oz. thirds	54d. "	11
330 " " "	54d. "	11
333 oz. thirds	55d. "	11
336 " " "	55d. "	11
339 oz. thirds	56d. "	11
342 " " "	56d. "	11
345 oz. thirds	57d. "	11
348 " " "	57d. "	11
351 oz. thirds	58d. "	11
354 " " "	58d. "	11
357 oz. thirds	59d. "	11
360 " " "	59d. "	11
363 oz. thirds	60d. "	11
366 " " "	60d. "	11
369 oz. thirds	61d. "	11
372 " " "	61d. "	11
375 oz. thirds	62d. "	11
378 " " "	62d. "	11
381 oz. thirds	63d. "	11
384 " " "	63d. "	11
387 oz. thirds	64d. "	11
390 " " "	64d. "	11
393 oz. thirds	65d. "	11
396 " " "	65d. "	11
399 oz. thirds	66d. "	11
402 " " "	66d. "	11
405 oz. thirds	67d. "	11
408 " " "	67d. "	11
411 oz. thirds	68d. "	11
414 " " "	68d. "	11
417 oz. thirds	69d. "	11
420 " " "	69d. "	11
423 oz. thirds	70d. "	11
426 " " "	70d. "	11
429 oz. thirds	71d. "	11
432 " " "	71d. "	11
435 oz. thirds	72d. "	11
438 " " "	72d. "	11
441 oz. thirds	73d. "	11
444 " " "	73d. "	11
447 oz. thirds	74d. "	11
450 " " "	74d. "	11
453 oz. thirds	75d. "	11
456 " " "	75d. "	11
459 oz. thirds	76d. "	11
462 " " "	76d. "	11
465 oz. thirds	77d. "	11
468 " " "	77d. "	11
471 oz. thirds	78d. "	11
474 " " "	78d. "	11
477 oz. thirds	79d. "	11
480 " " "	79d. "	11
483 oz. thirds	80d. "	11
486 " " "	80d. "	11
489 oz. thirds	81d. "	11
492 " " "	81d. "	11
495 oz. thirds	82d. "	11
498 " " "	82d. "	11
501 oz. thirds	83d. "	11
504 " " "	83d. "	11
507 oz. thirds	84d. "	11
510 " " "	84d. "	11
513 oz. thirds	85d. "	11
516 " " "	85d. "	11
519 oz. thirds	86d. "	11
522 " " "	86d. "	11
525 oz. thirds	87d. "	11
528 " " "	87d. "	11
531 oz. thirds	88d. "	11
534 " " "	88d. "	11
537 oz. thirds	89d. "	11
540 " " "	89d. "	11
543 oz. thirds	90d. "	11
546 " " "	90d. "	11
549 oz. thirds	91d. "	11
552 " " "	91d. "	11
555 oz. thirds	92d. "	11
558 " " "	92d. "	11
561 oz. thirds	93d. "	11
564 " " "	93d. "	11
567 oz. thirds	94d. "	11
570 " " "	94d. "	11
573 oz. thirds	95d. "	11
576 " " "	95d. "	11
579 oz. thirds	96d. "	11
582 " " "	96d. "	11
585 oz. thirds	97d. "	11
588 " " "	97d. "	11
591 oz. thirds	98d. "	11
594 " " "	98d. "	11
597 oz. thirds	99d. "	11
600 " " "	99d. "	11
603 oz. thirds	100d. "	11
606 " " "	100d. "	11
609 oz. thirds	101d. "	11
612 " " "	101d. "	11
615 oz. thirds	102d. "	11
618 " " "	102d. "	11
621 oz. thirds	103d. "	11
624 " " "	103d. "	11
627 oz. thirds	104d. "	11
630 " " "	104d. "	11
633 oz. thirds	105d. "	11
636 " " "	105d. "	11
639 oz. thirds	106d. "	11
642 " " "	106d. "	11
645 oz. thirds	107d. "	11
648 " " "	107d. "	11
651 oz. thirds	108d. "	11
654 " " "	108d. "	11
657 oz. thirds	109d. "	11
660 " " "	109d. "	11
663 oz. thirds	110d. "	11
666 " " "	110d. "	11
669 oz. thirds	111d. "	11
672 " " "	111d. "	11
675 oz. thirds	112d. "	11
678 " " "	112d. "	11
681 oz. thirds	113d. "	11
684 " " "	113d. "	11
687 oz. thirds	114d. "	11
690 " " "	114d. "	11
693 oz. thirds	115d. "	11
696 " " "	115d. "	11
699 oz. thirds	116d. "	11
702 " " "	116d. "	11
705 oz. thirds	117d. "	11
708 " " "	117d. "	11
711 oz. thirds	118d. "	11
714 " " "	118d. "	11
717 oz. thirds	119d. "	11
720 " " "	119d. "	11
723 oz. thirds	120d. "	11
726 " " "	120d. "	11
729 oz. thirds	121d. "	11
732 " " "	121d. "	11
735 oz. thirds	122d. "	11
738 " " "	122d. "	11
741 oz. thirds	123d. "	11
744 " " "	123d. "	11
747 oz. thirds	124d. "	11
750 " " "	124d. "	11
753 oz. thirds	125d. "	11
756 " " "	125d. "	11
759 oz. thirds	126d. "	11
762 " " "	126d. "	11
765 oz. thirds	127d. "	11
768 " " "	127d. "	11
771 oz. thirds	128d. "	11
774 " " "	128d. "	11
777 oz. thirds	129d. "	11
780 " " "	129d. "	11
783 oz. thirds	130d. "	11
786 " " "	130d. "	11
789 oz. thirds	131d. "	11
792 " " "	131d. "	11
795 oz. thirds	132d. "	11
798 " " "	132d. "	11
801 oz. thirds	133d. "	11
804 " " "	133d. "	11
807 oz. thirds	134d. "	11
810 " " "	134d. "	11
813 oz. thirds	135d. "	11
816 " " "	135d. "	11
819 oz. thirds	136d. "	11
822 " " "	136d. "	11
825 oz. thirds	137d. "	11
828 " " "	137d. "	11
831 oz. thirds	138d. "	11
834 " " "	138d. "	11
837 oz. thirds	139d. "	11
840 " " "	139d. "	11
843 oz. thirds	140d. "	11
846 " " "	140d. "	11
849 oz. thirds	141d. "	11
852 " " "	141d. "	11
855 oz. thirds	142d. "	11
858 " " "	142d. "	11
861 oz. thirds	143d. "	11
864 " " "	143d. "	11
867 oz. thirds	144d. "	11
870 " " "	144d. "	11
873 oz. thirds	145d. "	11
876 " " "	145d. "	11
879 oz. thirds	146d. "	11
882 " " "	146d. "	11
885 oz. thirds	147d. "	11
888 " " "	147d. "	11
891 oz. thirds	148d. "	11
894 " " "	148d. "	11
897 oz. thirds	149d. "	11
900 " " "	149d. "	11
903 oz. thirds	150d. "	11
906 " " "	150d. "	11
909 oz. thirds	151d. "	11
912 " " "	151d. "	11
915 oz. thirds	152d. "	11
918 " " "	152d. "	11
921 oz. thirds	153d. "	11
924 " " "	153d. "	11
927 oz. thirds	154d. "	11
930 " " "	154d. "	11
933 oz. thirds	155d. "	11
936 " " "	155d. "	11
939 oz. thirds	156d. "	11
942 " " "	156d. "	11
945 oz. thirds	157d. "	11
948 " " "	157d. "	11
951 oz. thirds	158d. "	11
954 " " "	158d. "	11
957 oz. thirds	159d. "	11
960 " " "	159d. "	11
963 oz. thirds	160d. "	11
966 " " "	160d. "	11
969 oz. thirds	161d. "	11
972 " " "	161d. "	11
975 oz. thirds	162d. "	11
978 " " "	162d. "	11
981 oz. thirds	163d. "	11
984 " " "	163d. "	11
987 oz. thirds	164d. "	11
990 " " "	164d. "	11
993 oz. thirds	165d. "	11
996 " " "	165d. "	11
999 oz. thirds	166d. "	11
1002 " " "	166d. "	11
1005 oz. thirds	167d. "	11
1008 " " "	167d. "	11
1011 oz. thirds	168d. "	11
1014 " " "	168d. "	11
1017 oz. thirds	169d. "	11
1020 " " "	169d. "	11
1023 oz. thirds	170d. "	11
1026 " " "	170d. "	11
1029 oz. thirds	171d. "	11
1032 " " "	171d. "	11
1035 oz. thirds	172d. "	11
1038 " " "	172d. "	11
1041 oz. thirds	173d. "	11
1044 " " "	173d. "	11
1047 oz. thirds	174d. "	11
1050 " " "	174d. "	11
1053 oz. thirds	175d. "	11
1056 " " "	175d. "	11
1059 oz. thirds	176d. "	11
1062 " " "	176d. "	11
1065 oz. thirds	177d. "	11
1068 " " "	177d. "	11
1071 oz. thirds	178d. "	11
1074 " " "	178d. "	11
1077 oz. thirds	179d. "	11
1080 " " "	179d. "	11
1083 oz. thirds	180d. "	11
1086 " " "	180d. "	11
1089 oz. thirds	181d. "	11
1092 " " "	181d. "	11
1095 oz. thirds	182d. "	11
1098 " " "	182d. "	11
1101 oz. thirds	183d. "	11
1104 " " "	183d. "	11
1107 oz. thirds	184d. "	11
1110 " " "	184d. "	11
1113 oz. thirds	185d. "	11
1116 " " "	185d. "	11
1119 oz. thirds	186d. "	11
1122 " " "	186d. "	11
1125 oz. thirds	187d. "	11
1128 " " "	187d. "	11
1131 oz. thirds	188d. "	11
1134 " " "	188d. "	11
1137 oz. thirds	189d. "	11
1140 " " "	189d. "	11
1143 oz. thirds	190d. "	11
1146 " " "	190d. "	11
1149 oz. thirds	191d. "	11
1152 " " "	191d. "	11
1155 oz. thirds	192d. "	11
1158 " " "	192d. "	11
1161 oz. thirds	193d. "	11
1164 " " "	193d. "	11
1167 oz. thirds	194d. "	11
1170 " " "	194d. "	11
1173 oz. thirds	195d. "	11
1176 " " "	195d. "	11
1179 oz. thirds	196d. "	11
1182 " " "	196d. "	11
1185 oz. thirds	197d. "	11
1188 " " "	197d. "	11
1191 oz. thirds	198d. "	11
1194 " " "	198d. "	11
1197 oz. thirds	199d. "	11
1200 " " "	199d. "	11
1203 oz. thirds	200d. "	11
1206		

£ s. d.

VARNISHES, &c

Fine Pale Oak Varnish	5	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Extra Extra Hard Church Oak	0	10	6
Superfine Pale Maple	0	10	6
Churches	0	7	4
Fine Elastic Carriage	0	12	6
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	10	6
Finest Pale Durable Copal	0	13	0
Superfine Pale Copal Body	1	4	0
Extra Pale French Oil	1	1	0
Superfine Pale French Oil	1	1	0
White Copal Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Finest Japan Gold Size	0	10	6
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	6
Berlin Black	0	16	0
French Green	0	10	6
French	0	10	6

J. R. (Amounts should have been stated.)

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Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

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TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100l., unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

BISHOP AUCKLAND.—For the erection of an inn, Woodham, for Sir Wm. Eden, Bart. Mr. F. H. Livesey, architect, Bishop Auckland:—

A. Johnston .. £1239 14 0	G. W. Lazenby £1,028 1 0
S. Gladwin.... 1,142 14 7	P. C. Scott,
	Avcliffe.... 908 15 6

Painting and Glazing.
Nelson & Taylor £46 7 7½ | M. Johnston£33 12 3V
Joinery and Carpentry.

J. Spaven.....	£454	5	0	W. Hope.....	£353	15	0
A. Brown.....	415	10	7				

Slating.

J. & R. Mascall	£93 3 0
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Plastering.

Sowerby	£159 15 6	S. Kirby	£145 14 6
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Plumbing.

E. Thompson.... £34 19 0 | W. Kilburn £35 17 6
[See also next page]

[See also next page]

STONE.

		S. d.			
1	caster in blocks	....	x	11	per ft. cube, deld. rly. depot
2	th	....	x	7	"
3	weight Down Bath	....	x	8	"
4	in	....	x	11	"
5	inshell	....	x	10	"
6	round Portland in blocks	2	x	11	"
7	size Dale in blocks	....	x	4	"
8	and Corshell	....	x	10	"
9	seaburn Red Freestone	2	x	11	"
10	and Mansfield	....	x	4	"
11	and York in blocks	....	x	10	"
12	6 in. sawn both sides				
13	landings, to sizes	S. d.			
14	(under 40 ft. cup)	2	x	8	per ft. super. at rly. depot.
15	6 in. Rubbed Ditto		x	0	"
16	6 in. sawn both sides				
17	slabs (random sizes)	x	3	x	11
18	2 in. self-faced Ditto	0	x	94	"
19	4 in. Hard Bed in blocks	2	x	3	per ft. cube, deld. rly. depot
20	6 in. sawn both sides landings				
21	2 in. self-faced		x	7	per ft. super. deld. rly. depot.
22	3 in. do.		x	24	"

SLATES.

In.	s.	d.
x ₁₀ best blue Bangor...	22	0
x ₁ best seconds	xx	10
x ₁ best	8	27
x ₁₀ best blue Portma-	xx	7
x ₈ best bluePortmadoc	6	5
x ₁₀ best Eureka un-	15	0
fading green	15	0
x ₁₂	11	10
x ₁₀	11	10
x ₈	17	10
x ₁₀ permanent green	10	10
x ₈	31	6

TILES.

Best plain red roofing tiles.....	47	6 per 1,000, at 7 1/2 per cent.	35	31
Hip and valley tiles.....	3	7 per cent.	35	31
Best Broseley tiles.....	48	6 per 1,000	35	31
Hip and valley tiles.....	3	0 per cent.	35	31
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6 per 1,000	35	31
Do, ornamental Do.	60	0 1/2	35	31
Hip tiles.....	4	0 per doz.	35	31
Valley tiles.....	3	35	35	31
Best Red or Mortlake	53		35	31
fordshire Do. (Peakes).....	50	0 per 1,000	35	31
Hip tiles.....	4	3 per doz.	35	31
Valley tiles.....	3	8	35	31

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard.
als: best 3 in. by 11 in. and 4 in.	6 10 0 0 10 0 0
als: 3 in. and 11 in.	14 10 0 0 10 0 0
als: best 3 by 9	13 10 0 0 15 0 0
Battens: best 2 in. by 7 in. and 8 in.	
and 3 in. by 7 in. and 8 in.	10 10 0 0 15 0 0
Battens: best 2 by 6 and 3 by 6	10 10 0 0 less than
als: seconds	7 in. and 8 in.
Battens: seconds	10 0 0 0 15 0 0
Foreign Saw Boards: best 2 in. by 12 in.	8 10 0 0 19 10 0
and 3 in. and 2 in. and 3 by 5 in.	8 0 0 0 9 0 0
Foreign Saw Boards:	
3 in. by 12 in. by 12 in.	10 0 0 0 more than
3 in.	battens.
3 in. by 12 in.	10 0 0
3 in. by 12 in.	At per load of 50 ft.
3 in. by 12 in.	4 10 0 0 5 0 0
3 in. by 12 in.	5 10 0 0 10 0 0
3 in. by 12 in.	3 10 0 0 3 15 0
3 in. by 12 in.	2 15 0 0 3 0 0
3 in. by 12 in.	3 0 0 0 3 10 0
3 in. by 12 in.	At per standard.
3 in. by 12 in.	23 0 0 0 23 0 0
3 in. by 12 in.	20 0 0 0 22 0 0
3 in. by 12 in.	16 10 0 0 18 0 0
3 in. by 12 in.	16 10 0 0 18 0 0
3 in. by 12 in.	13 10 0 0 15 10 0
3 in. by 12 in.	16 10 0 0 18 0 0
3 in. by 12 in.	14 0 0 0 15 10 0
3 in. by 12 in.	23 10 0 0 23 10 0
3 in. by 12 in.	20 0 0 0 22 0 0
3 in. by 12 in.	17 10 0 0 18 0 0
3 in. by 12 in.	13 10 0 0 14 0 0
3 in. by 12 in.	15 0 0 0 16 10 0
3 in. by 12 in.	13 10 0 0 14 10 0

S, GIRDERS, &c.

	In London, or delivered					
	Railway Vans, per ton.					
	£	s.	d.	£	s.	d.
Rolled Steel Joists, ordinary sections	6	5	0	7	5	0
Compound Girders	8	2	6	9	5	0
Angles, Tees and Channels, ordinary sections	7	17	6	8	17	6
Latch Plates	8	5	0	8	15	0
Cast Iron Columns and Stanchions, including ordinary patterns	7	2	6	8	5	0

METALS.

		Per ton, in London.	
		s. s. d.	s. s. d.
Common Bars,		7 15 0	8 5 0
Staffordshire Crown Bars, good merchant quality		8 5 0	8 15 0
Staffordshire "Marked Bars" ..		10 10 0	10 10 0
Mild Steel Bars,		9 5 0	9 20 0
Loop Iron, basis price,		9 5 0	9 20 0
" " Galvanised		16 0 0	- - -
" " and upwards, according to sheet iron, Blanked		size and gauge.	
Ordinary sizes to 36 ft.	10 0 0	- - -	- - -
36 30 10 34 ft.	11 0 0	- - -	- - -
30 24 10 22 ft.	13 10 0	- - -	- - -
Sheet Iron, Galvanised, flat, ordi- nary quality,			
Ordinary sizes, 6 ft. by 3 ft. to 3 ft. to 20 ft.	13 13 0	- - -	- - -
30 22 5 22 ft. and 24 ft.	13 5 0	- - -	- - -
30 20 5 20 ft.	14 5 0	- - -	- - -
Sheet Iron, Galvanised, flat, best quality,			
Ordinary sizes to 36 ft.	16 0 0	- - -	- - -
36 30 10 34 ft.	16 10 0	- - -	- - -
30 24 10 22 ft.	18 0 0	- - -	- - -
Galvanised Corrugated Sheets, ..			
Ordinary sizes, 6 ft. to 8 ft. 30 ft.	23 15 0	- - -	- - -
30 22 5 22 ft. and 24 ft.	2 2 0	- - -	- - -
30 20 5 20 ft.	14 8 0	- - -	- - -
Best Soft Steel Sheets, 6 ft. by 3 ft. to 10 ft. by 20 ft.	13 0 0	- - -	- - -
30 22 5 22 ft. and 24 ft.	13 0 0	- - -	- - -
30 20 5 20 ft.	14 5 0	- - -	- - -
Cut nails, 3 in. to 6 in.		9 15 0	- - -

(Under 3 in. in. usual trade extras.)

LEAD, &c.

		Per ton in London.					
		£	s.	d.	£	s.	d.
Map—Sheet, English, 3 lbs. & up.		13	16	0	•	•	•
Pipe in coils		14	3	0	•	•	•
Oil Pipe.....		16	12	6	•	•	•
Plc—Sheet—							
Malleable Montagne..... ton	24	5	0	•	•	•	•
Malleable.....	24	0	0	•	•	•	•
PPER—							
Strong Sheet..... per lb		0	0	10	•	•	•
" "		0	0	11	•	•	•
Copper nails..... "		0	0	11	•	•	•
ASS—							
Strong Sheet..... "	10	0	0	9	•	•	•
Zinc..... "	10	0	0	10	•	•	•
—(English Ingots).....	10	0	1	3	•	•	•
"Plumbers'..... "	11	0	0	6	•	•	•
Ironmen's..... "	11	0	0	9	•	•	•
" "	11	0	0	7	•	•	•

BRISTOL.—Alterations to business premises, 163 Ashley-road, Bristol, for Mr. W. Jenner. Mr. T. J. Moss Flower, architect, 28, Baldwin-street, Bristol :—
Denby & Co.* £920

DENNY (N.B.).—For additions, &c., to buildings, for the Co-operative Society. Mr. J. Strang, architect, Vicar-street, Falkirk :—
Masonry.—J. B. Abercrombie.
Joinery.—J. & P. Dewar.

Ovens for Bakery.—J. J. & P. McLachlan.
Plumbing and Gasfitting.—J. Hunter & Sons.
Plastering and Cementing.—J. Millar.
Slatting.—Drummond & Crowe.
Tiling.—Wilson & Wood.
(Estimated cost of buildings £2,200.)

DEVONPORT.—For the erection of boundary walls &c., at cemetery, North Prospect, for the Town Council. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, Ker-street, Devonport :—
W. J. Stevenson £6,018 0 0 | Pearce Bros. £1,886 8 0
F. J. Stanbury 2,013 0 0 | Matchem & Co.
Steer & Pearce 1,992 11 1 | Ltd. 1,780 0 0
Jenkin & Son 1,089 0 0 | H. J. Allen, St.
1,976 18 11 | Budeaux* .. 1,667 0 0
A. U. Coles ..

DUNSTABLE.—For the supply of granite, for the Town Council. Mr. George Simcox, Borough Surveyor, Town Hall, Dunstable :—
Cliffe Hill Granite.

	Per ton.
Grimley & Co., Sutton Bridge, near Wisbeach*	s. d. 11 3
<i>Harthill Granite</i> .	
Chas. Abell, near Atherstone*	9 9
<i>Steam-Rolling and Scarifying</i> .	
	Per day for rolling. Per super yard for scarifying.
	s. d. s. d.
Oxfordshire Steam Ploughing Co., Cowley, Oxon.*	1 6 6 .. 5 8

FARNHAM.—For the erection of two cottages, &c., for the Guardians of the Farnham Union. Messrs. Friend & Lloyd, architects, Aldershot :—
W. J. Snuggs £689 0 0 | P. J. Caesar £970 0 0
W. White 979 0 0 | A. G. Marlon .. 895 0 0
H. Fulford 912 8 8

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(Borough Surveyor's estimate £400)

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T. Jack 484 7 2 | W. Gebbie 287 12 0
R. Gibson 499 10 3 | T. Wylie 254 0 0
J. Calderwood .. 412 4 3 | Archd. Lucas
W. Lawson 330 12 11 | Hurford* 243 7 10

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PORTH (Wales).—For the erection of schools, Llwyn-celyn. Mr. Jacob Rees, architect, Hillside Cottage, Pentre :—
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SEPTEMBER 27, 1902.

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First Premiated Design: Elevation and Plans	By Mr. H. T. Hare, F.R.I.B.A.
One of the Second Premiated Designs	By Mr. A. E. Dixon, A.R.I.B.A.

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Notes on Franciscan Architecture.



ALDLY a country exists from China to Peru where the two great orders of the Franciscans and Dominicans are not represented by communities of Friars occupying buildings which reproduce to a great extent the parent institutions of Mediaeval Italy. The picturesque "Missions" of California, the venerable convents of Goa, date back almost to the Middle Ages, and form links in the monumental history of one of the most extraordinary of religious ideals. The vast organisation of the Friars—which is still a living one—has had as great an influence on art at a certain period as the older and now comparatively dead institutions of Cistercian or Benedictine Monks. But any general account of architecture as influenced by the greatest of the two Mediaeval Orders would occupy space far beyond the limits of our columns, and we must, therefore, confine our attention to the single architectural province of Italy and the development of its mediæval art.

The sudden spread and popularity of the Franciscan religion in North Italy immediately on the death of Francis [October 4, 1226] was very remarkable. Few, if any, religious movements have ever met with such success within so short a period, or left behind such imposing monumental evidences. The Order was founded in 1212, and before the close of the thirteenth century most of the huge churches which form the most conspicuous of landmarks in modern Italy had already been built by the Franciscan architects.

The beginning of the thirteenth century marks a turning point in the artistic history of Italy. Up to that date the older collegiate and monastic communities had been content with cathedrals and abbey churches built in the ponderous round-arched style which we call Romanesque; after that date the system of building with the pointed arch and vault became general, and it would seem that this change in taste is in a manner connected with the Franciscan Order, and the building of the new kind of churches for that Order in which it is exclusively used in

the thirteenth century. The amount of building commissioned by the Franciscans during that period of singular artistic activity was prodigious. In the earlier years of the century every Italian town, great or small, would seem to have set about establishing a convent of the new Order within its boundaries, and the inevitable churches had to be built. These churches—with the solitary exception of Ara Cœli in Rome, which happened to be an old basilica adapted for the purpose—are invariably in the style of the pointed arch.

The accompanying comparative chronological table of a few of the more important Franciscan churches gives some idea of the influence exercised upon art by this great organisation, and serves to prove how very much the principal "Gothic" buildings in the same towns owe to the fashion set by the Friars. The dates of the great cathedrals are almost invariably subsequent to those of the Friar's churches.

Dates of Early Franciscan churches compared with Cathedrals, &c., in principal Italian cities (in the "Gothic" style):—

Naples: S. Chiara (Fran. ch.), 1280. Cathedral,	1314.
Siena: S. Francesco, c. 1225. Cathedral, 1340.	
Florence: S. Croce (Fran. ch.), 1294. Cathedral,	1300.
Bologna: S. Francesco, 1236. S. Petronio, 1388.	
Perugia: S. Francesco, Assisi, 1228. Cathedral,	1277.
Prato: S. Francesco, 1290. Cathedral, 1300.	

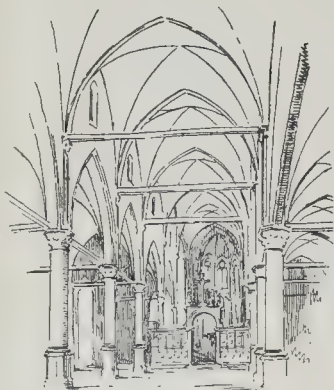
Tuscany may be regarded as the chief architectural district south of the Alps for the pointed style. In the vast plains of the meandering Po the ponderous Lombard style, with its round brick columns, obtusely pointed arches, and heavy depressed outlines, continues the traditions of Romanesque art into the later Middle Ages, and with but few modifications induced by the later styles. The architectural district of Lombardy forms a barrier of the older brick architecture between the developing school of Tuscan mediæval art and the still more vigorous styles of the north of Europe. It is difficult, if not impossible, to identify the invention or discovery of the pointed style of construction with any particular architectural district of mediæval Europe. Like most changes in fashion and taste, an architectural style spreads very rapidly, and although the means of communication between distant parts of Europe could not be measured in mediæval days, as in the

present, by hours, there is no reason to suppose that the itinerant workers would take longer on their travels than the many who still travel on foot at the present day.

St. Francis had been dead but a couple of years when his enthusiastic followers set about building the famous and central monument of the Italian Gothic style over his grave at Assisi—a monument whose magnificence was hardly appropriate to the memory of the lover of poverty. According to Vasari, the double church of Assisi was commenced in 1228, but its consecration would not appear to have taken place until 1253. This remarkable building embodies all the chief characteristics of the Italian Gothic. The extreme simplicity of constructive features, the wide spaciousness of the interior, and the tall narrow windows, are what we may see in all Italian churches of the thirteenth and fourteenth centuries. The extreme height of the windows seems almost to anticipate the extravagant ideas of German architects at a far later date.* We may perhaps be allowed to call the church at Assisi the "Cor Cordium" of the special Franciscan type of architecture and incidentally of the Italian Gothic style. Its elegantly-designed proportions and rich detail harmonise with the painted decorations which crowd every available space; and the rich glowing windows, many apparently of contemporary workmanship, give a particular splendour to a building in a country where such a mode of decoration is somewhat remarkable for its infrequency. The cathedral of Arezzo shares this latter distinction with the church of Assisi, although the glass is of a far later and a different character.

Every district or national type of architecture culminates, as a rule, in some particular building or buildings. The French geometrical style is perhaps best represented by the Sainte Chapelle of Paris. England has its Westminster Abbey, and Germany its Cologne Cathedral. In Italy the Gothic style was of short duration compared with northern countries; it began to be used at

* The tomb house of Francis has been claimed by different French and German archaeologists as the work of some northerner resident in Italy—no strange does it seem to some minds that a true "Gothic" style should ever have had a natural origin in the classic soil of Italy. But such theories and ideas betray a considerable ignorance of the country during and since the middle ages. As a matter of fact few districts of northern Europe have more imposing "Gothic" remains than Italy.



Santa Maria Gloriosa dei Frari, Venice.



S. Francesco Assisi.

the very beginning of the thirteenth century, it was superseded by the Early Renaissance about the year 1377—the year of Filippo Brunelleschi's birth. And of all the numerous Gothic buildings carried on during this century and three-quarters, the church at Assisi is one of the most representative. Like the Sainte Chapelle of Paris, it commemorates a religious enthusiasm which also found a means of expression in artistic development—a development which took the form of that brief but brilliant “Gothic” period of the days of Dante, Giotto, and Nicolo Pisano.

In other districts of the Peninsula the Franciscan influence may be studied with interesting results. In Southern Italy—the ancient kingdom of Naples—some of the most imposing of churches were built in the first years of the Franciscan era. Santa Chiara, Naples, is one of the largest “hall-churches” in existence—but, alas! its “Gothic” character, which must have been particularly interesting on account of its scale, is completely smothered beneath the tawdry plaster decorations of the seventeenth century. All the ancient churches of this most interesting district have suffered so much from the Jesuit atrocities that the most enthusiastic student cannot but feel repulsed by the overpowering effect of squalor and grimy neglect, added to the vulgar frippery of modern days.

In North Italy a special interest attaches to the very beautiful church of S. Francesco at Bologna. This seems to have been one of the earliest Franciscan churches planned. Its large proportions, the chevet of encircling chapels at the east end, and the flying buttresses, remind one of the characteristics of Central Europe. Its early date (1236) illustrates the very early development of the pointed style in Italy. This church has also a particular interest in connexion with the building of S. Petronio in the same city. That instance of misplaced confidence in a posterity which failed to carry on a colossal project (S. Petronio was to have been the largest church in the world) owes very much in general proportions and detail to the older edifice.

“The Coming of the Friars” synchronises with the advent of the “Gothic” style in

Italy and perhaps in other parts of Europe. As to how far the two facts have any relationship it would be difficult to define. It is at least reasonable to suppose that many of the great “Gothic” cathedrals of the peninsula owe their existence to a spirit of emulation with the older designs of the friars. They are invariably later in date—so much later, in fact, that, with a few exceptions, like that of Orvieto, they were finished in Renaissance times.

At the present day Italy is the only country where we can study the “Gothic” churches of the friars to any great extent. In other countries, partly owing to reformations and revolutions and the pulling down of churches which could not be turned into cathedrals or parish churches, such buildings have become rare. In London, for example, the Friars' Church (300 ft. long) which stood near Newgate has completely disappeared. We are therefore unable to appreciate the influences which the order may have exercised over art in more northern climes. In Italy, every little town still possesses its Franciscan convent, and almost in every case traces of Gothic tradition may be detected, unless where the building is manifestly of more modern origin. Italian parish churches, as a rule, belong to a much older date, or they have been built or rebuilt in comparatively modern times. The cathedrals and the Franciscan churches are the monuments which always represent the Gothic period in an Italian city.

The immense development of the conventual and monastic modes of life during the thirteenth century had much to do with the spread of the pointed style in the building of cathedrals and parish churches. The immense preaching houses of the Dominicans and Franciscans came to be fashionable models, in the same way as the religious practices of the Friars were considered the highest form of religion, and worthy of general imitation. The pointed arch introduced ideas which were quickly taken up and applied to all the churches then in course of building, and in place of the irregular and often eccentric planning and detail of the twelfth and preceding centuries a type of building was introduced, and became traditional all over Western Christen-

dom, which has for its keynote a cross. The Roman basilica, the square Byzantine hall, the still older circular plan, became things of the past, and it may be said that for three centuries no churches were built except on the stereotyped cross plan introduced by the Friars in about the year 1200.

After the sixteenth-century architects allowed their brains to run riot in eccentricities of plan until the force of ugliness could no further go in the absurdities of the “barocco.” Many of these circular, octagonal, square, and other forms of churches, which became common in the seventeenth century, seem at first sight the survivors of the earlier types, but in reality they are merely wanton protests against the severe rigidity of earlier times and a pure taste.

Important “Gothic” cathedrals belonging to the fourteenth century are:—Palermo (c. 1400), Orvieto (1290), Lucca (1388). These all evidently owe their pointed architecture to the influence of the Friars' churches built in their neighbourhood during the thirteenth century.

THE SONNING BRIDGES.

THE correspondence which has taken place in several papers in regard to the proposed demolition and re-building of the old bridges at Sonning, and the public interest manifested in the subject, induced us to pay a special visit to the place in order to examine the condition of things at first hand.

The bridges numbered 1, 2, and 3 in the accompanying views run in a line with each other in the order of numbering, all of them carrying the main road across the river and its backwaters from the Berkshire to the Oxfordshire side. The village of Sonning (or “Sunning” as it is called in old guide-books) lies entirely on the Berkshire side, though the parochial boundary includes land on both sides of the river. Starting from Sonning, we come first on the brick bridge which spans the main stream, a structure familiar in many paintings, notably in one of the most beautiful and delicate of Alfred Hunt's oil-paintings, and in more than one,



Fig. 3.—Bridge over Backwater, Oxfordshire side.



Fig. 4.—Horse Bridge at Junction of Backwater with Main Stream.



Fig. 5.—Main Bridge, up-stream side looking towards the Oxfordshire bank.



Fig. 6.—Bridge below Wood Mill.

if we remember right, of his water-colours. It is a plain brick-built bridge with what would now be considered a very steep gradient, though not steep enough to be a serious inconvenience to ordinary traffic. It is built with one comparatively high and wide arch in the centre, forming the chief water-way, and a series of lower and narrower arches on each hand, four on the Sonning side and six on the Oxfordshire side. It is one of those old bridges in which the difference between up-stream and down-stream side is frankly

recognised in the construction; the up-stream side, shown in our view, having large cut-water buttresses, while the down-stream side shows only the flat pilasters. We have not come across any record of its precise date; but though spoken of as an old bridge it cannot be of very great age, since it is described in Brayley and Britton's "Beauties of England and Wales" (1801) as "a plain modern structure of brick, well adapted for convenience and durability." Following on in the same direction we come on to the bridge No 2, over the sluice below the large

water-mill known as Wood Mill. After this the road passes over some partly modern and partly old bits of brick bridge or causeway (for this portion runs rather over land than water), and comes on to the wooden bridge No. 3, spanning the backwater which sweeps round in a curve here to join the main stream just opposite the White Hart at Sonning. The horse-bridge, No. 4, crosses the lower end of this backwater, from the Oxfordshire end of the main bridge to the left bank of the stream. This latter bridge belongs, we understand, to the Thames

Conservancy; it is merely a bridge for foot passengers and for leading horses across when necessary; it appears to be in fairly good condition and quite adequate for its present purpose; and we are not aware that there is any intention to interfere with it. The other two wooden bridges are under the jurisdiction of the Oxfordshire County Council; the main bridge is presumably the joint property of the Oxfordshire and Berkshire authorities, as the division line of the counties falls in the centre of the main stream.

With regard to bridges No. 2 and 3, there can be no doubt that they are very picturesque, save and except their balustrades, which are very commonplace iron castings—standards and cylindrical rails,—undoubtedly later additions to the structures, to replace wooden railings which had become insecure. It is odd that none of the people who have written indignant letters about the destruction of these bridges have noted this fact; although we are quite sure that if these iron railings were being put up now, as new ones, we should hear a great deal about the vandalism of destroying the character of the old wooden structures. That is the kind of way that defenders of the picturesque weaken their own case by not being sufficiently frank. The timber structure is undoubtedly picturesque; the railings are not; but at a little distance they are not obtrusive.

There can be no question that the timber bridges require rebuilding, and that without delay, even for ordinary traffic. The dilapidated state of the timber supports can be recognised even in these small photographs. So far we are with the County Council. It is no use shutting one's eyes to facts, and trying to keep up a rotting structure because it is picturesque, and we regret its loss. But as to the proposal to replace them by the ordinary style of engineering steelwork—lattice girders and so on, nothing which has been said on that subject is one whit too strong; in fact, nothing has been said that to our mind is strong enough. Sonning is a place of quite exceptional beauty; of that quiet serene beauty of English landscape which finds so many illustrations on the banks of the Thames. The whole place, with its flower-covered cottages, secluded churchyard, and the wooded banks of the river, seems, in Tennyson's words—

"A haunt of ancient Peace."

To place over the backwaters of the stream iron girders of the ordinary type would be to ruin the whole character of the scene. It is true that these bridges are on the opposite side from the village, but they form the approach to it, and close to them is the French Horn Hotel, with its quiet old house and beautifully kept garden, from which these proposed engineer's bridges will be prominent objects.

This ought to be stopped. The bridges ought to be rebuilt, but there is no kind of necessity to rebuild them in the way proposed. Under the Wood Mill bridge there is no water traffic whatever; it is the tail-race from the mill dam. Under the No. 3 bridge there is no water traffic to speak of; an occasional canoe may wander down the backwater, but it is not a river highway. There is therefore not the slightest excuse for erecting a one-span steel girder from supports on each bank. We do not advocate the use of wooden piles again; there is the

question, it must be remembered, of making the high road adequate for such things as traction engines, at present interdicted, here as on so many other country bridges. But simple piers of brick or stone (only not Staffordshire blue brick, some of which we see are on the ground already), placed pretty near to each other in the stream—there is no occasion, as before observed, to keep the waterway entirely open here—with oak beams laid across them, would form a style of bridge adequate for anything that is required, and not in the least at variance with the character of the scene (wooden balustrades might be designed which would be far more pleasing and more in keeping than the present iron castings); whereas the painted steel lattice girders would just ruin it.

In regard to the main bridge, it is quite sufficient at present for ordinary traffic; but there is the question again of providing for the heavier loads which now pass along country roads. To meet these it would have to be rebuilt; but there is no reason why, whenever this is done, it should not be rebuilt on its present picturesque lines. The centre arch might be a little widened, but there is no occasion that it should be much wider; it is sufficient for the river traffic now, and whatever the stream may be in winter (when people do not go boating), in summer it so shallow where the smaller arches are, at all events on the Sonning side, that the waterway could hardly be used there in any case. The gradient need not be altered, and could hardly be altered in fact without extending operations into the village itself, and raising the whole street running past the White Hart, which falls towards the bank of the river; and the height of the centre arch above the stream would have to be maintained in these days of steam-launches. It might be better to rebuild the bridge of stone rather than of brick, but there would be no occasion to depart materially from its present exceedingly picturesque lines.

It will be admitted that we have taken no bigoted view of the matter; we make no plea for retaining dilapidated structures. But we do say most emphatically that to rebuild these bridges in the average style of a modern railway viaduct, which is evidently what is proposed, would ruin the character of one of the most beautiful spots on the Thames, and that it is a perfectly heartless and brutal thing to propose.

NOTES.

Liverpool Cathedral.

WE give, under the head of "Competitions," the Report of the Assessors on the preliminary competition for Liverpool Cathedral. It is rather a weak document, and does not enter seriously into the question of what a twentieth-century cathedral should be. We quite agree that the designs in the Classical spirit which were sent in were not of much account, though we see that one of them, No. 94, is included in the list of "honourably mentioned"; a distinction which it seems to have owed rather to the size and finish of the drawings than to any important quality of design. Among those which were mentioned with special commendation in our article of July 26, No. 68 is included among the five selected, and Nos. 37, 41, 45, and 46 among

the "honourably mentioned." We regret that no position has been given to Nos. 23 and 53, (we do not know the authorship of either); the author of No. 53 especially showed a great deal of thought and originality in his design; but the inclination seems to have been to favour designs in orthodox English Gothic in preference to any attempt at originality of style or plan. This is obviously what the Committee wanted, so they will probably be satisfied with the result. Five is a small number to select for so important a competition, and one or two of those who are omitted might certainly have had a fair claim to share in the final competition.

Coroners and Technical Inquests.

FROM time to time the fact is made very clear that the Coroner's Court is by no means a proper tribunal for the investigation of accidents which appear to be, or are, connected with building construction or engineering work. The general character of the proceedings at the Loudwater Tunnel failure, upon which we commented last week, is a sufficient justification of this contention. No blame is to be attached to a coroner if he does not regard it to be his duty to settle knotty constructional points for the benefit of architects and engineers. His function, as defined by a statute of Edward I., is to go to the place where "any be slain or suddenly dead," and if it concern "a man slain, whether it were in any house, field, bed, tavern, or company," and whether the dead person "were known or else a stranger, and where he lay the night before." With the aid of a little imagination, a striking picture of life in early English history may be drawn from these words; a time when a man carried his life in his hand, and lost it with singular ease, perhaps in the course of discussion at his hostelry, or it might be on his way home. As an official charged with the investigation of crime, the coroner was an excellent institution; and so, in ordinary circumstances, he remains to the present day. He has primarily to discover if death has resulted from deliberate intent or from culpable negligence on the part of any person, and when sufficient evidence has been brought to determine either point, his duty is done. Therefore it happens that those engaged in constructional work often remain unsatisfied. What we now want is the establishment of a Commission having powers akin to those possessed by the Board of Trade in connexion with railway accidents, boiler explosions &c., to investigate all accidents, whether on private property or not, that may be directly connected with structural or engineering work. Much valuable information not at present forthcoming would thus be afforded for the future guidance of those engaged in such practice.

Workshop Philosophy.

It is very important that the exact nature of processes conducted in the workshop should be understood, because knowledge of this nature leads directly to the invention and production of improved tools and appliances. One of the papers read at the recent meeting of the British Association contained some references to this subject, wherein the author explained the action of cutting tools used for metals, plastic and elastic substances, and wood. From a purely educa-

onal point of view, the phenomena thus exhibited are of considerable interest, but they are equally worthy of attention from practical men. The intelligent mechanic generally has to think of something during the execution of his work, and it could often be to his advantage to direct his thoughts upon things taking place under his feet. Observation and reflection might often frequently result in the evolution of improved methods of work and consequent promotion or some equivalent benefit. Appreciation of the "flow of metals" has already led to various new processes in the treatment of materials by engineers. The modification of metallic powders and chips is now possible, so that bars of metal can be obtained equal in all essential qualities to those produced in the ordinary way. Milling cutters have recently been formed cold from blanks of tool steel by hydraulic pressure, and metal sheets can be drawn in the press, and innumerable small articles are satisfactorily produced in quick-acting drop presses. Some of these developments are due to mere book learning, but are traceable to the bit of independent thought that ought to be encouraged in all concerned in mechanical work.

Modern Gas-Engines. DURING recent years considerable attention has been paid to the perfection of internal combustion engines, which are theoretically far superior in efficiency to any form of steam motor that has been, or can be, devised. The realisation of theory in actual practice is not always easy, and in the case of a gas-engine it is difficult to utilise the high temperatures and pressures resulting from the inflammation and explosion of gas in the cylinder. So long as such motors were used chiefly in small sizes, the disadvantages of waste heat and pressure were largely counterbalanced by various practical advantages, and comparatively little incentive was afforded for efforts to attain higher efficiency. At the present time the sizes of gas-engines are being very largely increased, and the question of gas consumption is necessarily attracting far more attention. The application of producer gas has already exercised a most important influence in reducing the cost of fuel, and we have no doubt that a similarly satisfactory reduction will ultimately be made in the quantity consumed for a given duty. This is clearly a consummation to be desired, especially when we consider that natural conditions suitable for the development of mechanical power on a large scale are practically non-existent in the British Isles. Hence much dependence must be placed on the continued ingenuity and perseverance of the engineer. So far as gas-engines are concerned, a very remarkable development in the direction of size and power has taken place. In this country the first engines above 400 h.p. were made in 1900, but since then two of the leading makers have built fifty-one gas-engines of powers between 200 and 1,000 h.p. On the Continent the makers of the Cockerill engine of 600 h.p., which we mentioned in connexion with the Paris Exhibition of 1900, have built an engine of 2,500 h.p., and are now prepared to extend the power up to 5,000 h.p., the average size of the engines built under their patent so far being 558 h.p. Such another Continental firm has made thirty-two gas-

engines, with an average of 1,390 h.p. per engine; and two other firms have turned out fifty-one and twenty-eight gas-engines, of which the sizes average 400 h.p. and 600 h.p. respectively. In the United States a firm that has recently begun to build gas engines has turned out six engines of 1,000 h.p., and is now constructing two gas-engine gas compressors of 4,000 h.p. each. Other statistics might be quoted, but we have said enough to indicate the activity that is being displayed in this branch of industry. Of course, many of the largest engines are being worked under economical conditions not possible for every user, but experience is being gained which will ultimately be of advantage to the public at large.

The Edison Power Station, New York. A REMARKABLE feature of mechanical engineering in the present day is the construction and equipment of mammoth establishments, such as the Edison Power Station, now in course of completion in New York. When the whole of the plant has been laid down, this station will have a maximum capacity of no less than 125,000 h.p. Standing near the East River, the building occupies a site measuring 197 ft. by 272 ft., and includes a boiler house 79 ft. by 272 ft., with an adjoining engine house 118 ft. by 272 ft. The details of this plant are worthy of record, including as they do various novel and interesting features. The boiler house is divided into four stories, the roof of the building containing a coal-bin, capable of holding fully 10,000 tons of coal, for the conveyance of which from barges in the river to the bin a most complete mechanical plant has been devised. The sides of the bin slope at an angle of 45 deg. to the horizontal, and they are supported on deep lattice girders, while the weight of the receptacle and its huge load are carried partly on the side walls of the building, and partly on two lines of columns. Therefore, it will be seen that the American system of skeleton building has not been adopted in this case. In the two stories below the coal store there are fifty-six water-tube boilers, each of 650 h.p., and below the floor of each boiler-room ashbins are fixed. This mode of fixing steam boilers on the upper floors of a building has been adopted before in the United States, but would be considered rather a novelty in this country, where boilers are looked upon as appliances that must be placed on solid earth. Stoking is provided for by steel-plate shoots from the coalbin to hoppers connected with the mechanical stokers attached to the boilers. Ashes fall from the grates into the bins mentioned above, and are then led by shoots down to the basement, and delivered into cars running on rails, which extend for the whole length of the building. In the construction of the chimney stacks brick has been discarded, except for lining the great steel tubes. The thickness of metal used varies from $\frac{3}{8}$ in. to $\frac{1}{2}$ in., and the lining is of firebrick for one-third of the height, the remainder being of red brick. Even with this light form of construction the weight of each chimney is about 500 tons. In the engine-house, provision is made for the reception of sixteen Westinghouse-Corliss engines of 8,000 indicated horse-power each, and it should be observed that these engines are probably the first of very large capacity

to be equipped with poppet-valves, which are specially suitable for use with superheated steam. Each engine is to be direct-coupled with an electric generator, and the units will be disposed in two long rows down the engine-house. It is open to question whether the promoters of this undertaking have been wise in selecting reciprocating engines, as evidence shows that the most recent type of the steam turbine is more efficient and more economical than any other form of steam motor. Besides, it reduces vibration to a minimum, a point of much importance to the builder and structural engineer.

The Dolter Surface-contact Tramway. It seems as if the surface-contact systems of electric traction were at last going to be given a trial in this country. In this type of tramway we have no overhead wires, only studs slightly projecting above the level of the ground, placed at distances of every few yards between the rails. These studs are only "alive" when the car is over them, and the current is collected by sliding bars placed underneath the car. Some years ago we described the Kingsland system, in which the studs are made alive mechanically, and Swansea has recently adopted this method. The Lorain system, where the operation is effected by means of electro-magnets slung underneath the car has been successfully working at Wolverhampton for some months. The Dolter system, which the Torquay Tramway Committee have decided to adopt, is also a magnetic one. It has been working successfully for the last two years on a small scale in Paris, but it is being rapidly extended. As in the Lorain system, great use is made of the fact that manganese steel is almost non-magnetic, whilst it conducts electricity quite as well as ordinary steel. A strip of manganese steel through the centre of the stud separates the end portions magnetically. The two collecting skates are of iron, and are in contact with the north and south poles of six electro-magnets, and they rest on the two ends of the studs, which then attract a keeper in the contact-box underneath, which is in connexion with the high-pressure main. When the skate leaves the stud the keeper falls by its own weight and breaks contact, thus leaving the stud perfectly safe. In addition there is a safety skate at each end of the car, which short circuits the stud so as to make certain that it is disconnected before the car leaves it. It will be seen that overhead and conduit systems of electric traction are not going to be left in undisputed possession of the field, and we shall soon have data which will enable municipalities to calculate the cost of putting their trolley wires underground.

Shaft-Sinking. ORDINARY methods of sinking shafts are not unaccompanied by disadvantages, and in cases where hard rock has to be encountered the process becomes both tedious and expensive. A new method has recently been tried at a colliery in Nottinghamshire for boring two shafts of 25 ft. 6 in. diameter, and, judging by the results obtained, it appears likely to come into general use. Operations are conducted by the aid of an appliance consisting essentially of a circular steel frame, having annular T-shaped slots entirely round its circumference. In these, clamps are carried, fitted with arms,

adjustable telescopically to the diameter of the shaft to be sunk, and each arm is provided with one or two drills driven by compressed air. The whole plant can be erected complete on the ground, so that it may be lowered bodily into the shaft and raised again on completion of the boring. The periphery of the circular frame is divided and indexed, so that any required number of holes can be drilled without the labour of marking out, which in the ordinary way is a somewhat serious item. Experience at the colliery mentioned shows that a circle of sixty holes 6 ft. deep can be drilled through hard limestone in two and a half hours, this time including lowering and raising the apparatus. A new form of platform has also been devised for use with the plant, to enable brickwork to be executed simultaneously with sinking operations. Compressed air is found to be the most suitable form of motive power for the drills, and incidentally its use ensures an ample supply of fresh air for the men working in the shaft.

Vulcanite Roofing.

THE British Fire Prevention Committee send us a Report of a comparative test of an ordinary slated roof and a flat roof covered with "Vulcanite" roofing and ceiling. The vulcanite roof was composed of 1½-in. boarding on 7-in. by 2½-in. joists, plastered underneath; the boarding then laid with three thicknesses of asphalted felt, breaking joint, and cemented together with vulcanite, brought to a plastic state by being heated in a cauldron and applied to the asphalted felt with a brush. The edges were turned up against the angle fillet and covered with a No. 14 gauge zinc flashing. The results of the fire tests, as between the slated roof and the vulcanite roof, were very decisive:

"Slated Roof."	"Vulcanite Roof."
In fifteen minutes the plaster to the ceiling began to fall.	In forty minutes the plastering began to fall.
In twenty minutes the interior of the roof was well alight.	In fifty-four minutes the underside of flat was a sheet of flame.
In forty-one minutes the slates began to fall.	In sixty minutes the fire had not passed through the flat, and it was sound enough to be the whole of the roof collapsed.

As Mr. Ellis Marsland, who directed this test, remarks,—"The result will relieve the minds of London District Surveyors and District Council Surveyors of any doubt as to a roof of this construction being as fire-resisting as an ordinary slated roof."

Wandsworth Technical Institute.

THE exhibition of the work done at this Institute shows much conscientious work on the part of the students, but unfortunately displays much less life on the part of those whose duty it is to provide the learner with the full measure of help. The brickwork, plumbing, and joinery departments are doing good work. They have the merit of bringing to the hand of the student these branches of his craft, which are difficult to reach except by such help, and if the school can turn out such work as is exhibited by Mr. C. A. Brown in the joinery and geometrical drawing sections, sufficient proof is given of honest effort by teacher and student alike. It is in the architectural section that such absolute failure exists; not so much in draughtsmanship as in the design of the

examples from which the drawings are made. Surely our technical institutions have men in their management who appreciate the value of good design sufficiently to cleanse its schools of such rubbish. The same applies to the crafts exhibits, which are admirably executed pieces of design which no school ought to allow within its walls. Let us perfect our crafts by all means, but, at the same time, let us select our examples from our best, instead of searching the dust-heap of the jerry-builder. Illustrations of the work of our old masters are within the reach of every one, and the duty of masters is to bring these to the knowledge of their students. If more modern and, in many cases, more practical and everyday work be desired, let technical institutes approach our best designers on the subject, and there is little doubt that they will gladly give designs from which a really creditable school set could be compiled. The students of technical schools constitute a medium through which the public taste can be influenced for good or ill, and it is the duty of all who have the work at heart to see that that influence is properly directed.

BRITISH ARCHAEOLOGICAL ASSOCIATION.

THE fifty-ninth annual Congress was opened on the 15th inst. by the President of the year, the Mayor of the City of Westminster, Lieut.-Col. Clifford Probyn, J.P., at the Caxton Hall, Westminster, at 2.30 p.m., when a large party assembled for the inaugural proceedings.

The company afterwards visited St. Margaret's Church, adjoining the Abbey, where they were welcomed by the Rector, the Rev. Canon Hensley Henson, who gave a most interesting description of the church, which he said was really of more historical than archaeological interest. The original church was founded by Edward the Confessor, and next to the Abbey is the most ancient and celebrated parish church in Westminster. Stow says: "The parish church of St. Margaret, sometime within the Abbey, was by Edward the Confessor removed and built without for ease of the monks." Edward the Confessor's church remained until the time of Edward I., at which period, again to quote Stow, "the merchants of the Staple (i.e., the Woolstaplers) and the Parishioners of Westminster built it all of new, the chancel excepted, which was lately before new built by the Abbot of Westm." "and this church (he says) remaineth now a fair parish church though sometime in danger of down pulling." The present edifice dates mainly from the middle of the fifteenth century, and is far more imposing internally than would be expected from its exterior, which has been recased and otherwise altered in comparatively recent times.

St. Margaret's is known as the church of the House of Commons. The Canon related some of the historical events connected with the church, which are many. Amongst others, he mentioned that, on September 25, 1643, the Covenant was read from the pulpit, and all those present held up their hands in assent to it. Here, in Charles I.'s time, all the fast-day sermons were preached before Pym, Cromwell, Harrison, Praise-God-Barebones, and the rest of the then Parliament of England. Hugh Peters also preached here in order to cause the Parliament to bring the King to trial.

There are many monuments to the celebrated persons who have found a resting-place in this church and churchyard, but the object most worthy of notice is the famous east window of painted glass. Very curious is the history of this window, so far as it has yet been traced with exactitude. Said to have been painted at Dort, in Holland—Gouda is also mentioned, where it is said it took five years in execution—it was presented to Henry VII. in view of the betrothal of his son Arthur to Catherine of Aragon, and was intended by the King to be placed in his new chapel at Westminster Abbey. The King, however, died in 1509, and the window was not erected there, but, somehow, was obtained by the

Abbot of Waltham, in Essex. Whether it even was erected in that abbey-church is unknown. It has been stated that at the Dissolution it was taken to Abbot Fuller's private chapel in New Hall, at Boreham. As this mansion, however, never belonged to the Abbot, but to Henry VIII., Mr. Gould held that if the window went into any private chapel of the Abbot, it was more likely erected in his private chapel at Old Copt or Copped Hall, near Epping, and that when Henry VIII. obtained the old hall he removed the window to his much-favoured palace of Beaulieu or New Hall. All this, however, is but conjecture. All we really know is that the window found its way to that fine Tudor mansion, and there remained for about 200 years, till, in the year 1737, John Olmuis, becoming possessor of the house, at once commenced to pull it down, including the chapel. The glass of the window he preserved in chests. The window was next sold by Olmuis to John Conyers, of Copt Hall, who paid fifty guineas for it, but he, deciding to pull down old Copt Hall, never erected the window, and it was sold by his son in 1758 to the parishioners of St. Margaret at Westminster for 400 guineas, and so, after some 250 years of strange vicissitudes, this beautiful, painted glass at length came back to the immediate locality for which it was originally intended and, most curiously of all, uninjured. The monuments in the church commemorate amongst many others, Caxton, who lived in the Almonry upon a site now occupied by the entrance to the Westminster Palace Hotel, and had his printing press in the triforium gallery of the Abbey; Raleigh; Thomas May, the poet; Sir Wm. Waller, the Parliamentary General; Admiral Blake; Hollar, the celebrated engraver; and Blood, who attempted to steal the regalia. The poet Milton was here married to Katherine Woodcock, who died in the following year. Only one brass remains; all the rest were sold in 1644 at 3d. and 4d. per lb., as is attested by the churchwardens' accounts. From the time of Stow this church has been periodically threatened with demolition. It is to be hoped, however, that wiser counsels will continue to prevail, and that this most interesting edifice may be allowed to remain. Its removal would be a distinct loss to the appearance of the Abbey by reason of the scale which it gives, for St. Margaret's is by no means a small or insignificant building, but is a good-sized parish church.

In the vestry the visitors were shown by Canon Henson the fine collection of silver plate, churchwardens' maces, &c., and the parish registers, the earliest of which is dated 1537. Many interesting old engravings are framed and hung on the walls, from one of which it appears that as late as the year 1726 a woman was burnt alive for killing her husband.

Leaving St. Margaret's Church, the party proceeded by train to Addison-road Station and walked to Addison-crescent to view the rare and valuable examples of ancient china, faience, and majolica ware, illustrating the history of the art of pottery and china, collected by Mr. R. Duppa-Lloyd. Some of these treasures are priceless in value. Mr. Lloyd also exhibited a few rare examples of bronzes as specimens of art, or artisan work. Some examples from a very large collection of old engravings of the Italian school from 1420 to 1705. The German school, 1450 to 1800. The Dutch and French schools, from 1500 to 1800, and the English school from 1600, were also exhibited and admired. These engravings, from an archaeological point of view, are very instructive. Having partaken of tea the visitors returned to the hotel, and at 8.30 proceeded to the Caxton Hall, where they were received by the Mayor and Mayoress of Westminster at a conversation, and where his worship delivered his presidential address. This dealt generally with the history of Westminster and reminded us that it is more ancient than the City of London, and was an important trading centre in British days long before Londinium grew out of the marshes. The Abbey, the R-man remains found in the neighbourhood, the Parliament—itsself a vast theme—the site of the Royal Palace of the Saxon and Danish kings; the Woolstaple, where now is Bridge-street, whose mercantile importance is still signified by the woolstack in the House of Lords; the Whitehall of Tudor and Stuart days, all were touched upon in a very interesting manner, bringing to the recollection of the hearers the fact that

the interests of the city of Westminster are to be antiquary, historian, and archaeologist inhausable. In the course of his remarks the resident stated that in the churchyard of St. Martin Church, Victoria-street, opposite the Cotton Hall, the notorious Colonel Blood was buried on August 26, 1680, and that, as related in the "Civil War Tracts of Lancashire," some 600 "Redshanks," or Scotch prisoners, were commodated after being driven from Worcester field. Many of them succumbed to their rigorous treatment, and 1,200 of them were buried in Tothill Fields—now Vincent-square—and the churchwardens' accounts show that they were paid for sixty-seven loads of soil laid in their graves, whilst 30s. was received from the Council of State for cleansing the church after the Scottish prisoners had much annoyed and spoiled the same.

In a room adjoining the Mayor's parlour were exhibited some old records, the earliest tant being dated 1460, but the first was dated in 1256, giving a weekly market to the inhabitants of Westminster. These records were collected together and bound in 1730. The Corporation maces and the loving cups—very handsome, of silver gilt, dated 1588, and known as the "Armada Cup," and the famous "Tobacco Box"—were also exhibited and described by Mr. Terry.

Tuesday, September 16.

The members of Congress and visitors travelled to Rochester, where, at the Castle, they were met by Mr. George Payne, F.S.A., who was the guide of the party throughout the day. Assembled in the keep the company listened to a lucid and able description of this celebrated castle given by Mr. Payne, who, by the aid of a large scale plan, indicated its position with reference to the walls of the Roman town. These Roman walls have now been accurately traced and plotted, and the positions of its four strongly fortified gates have been identified. The walls enclosed an area of about 24 acres, and the gates were situated at the four cardinal points. Many coins and the remains of piles were found at the time of the building of the present bridge over the Medway, showing that there was a bridge here in Roman days, and some of these piles are now preserved in the keep of the castle. A causeway had been discovered in the marshes on the north side of the river, and upon its masonry were still remaining the traces of a wagon and chariot wheels. Mr. Payne conducted the party round the castle and described the explorations which had been carried out by the Corporation of Rochester under his superintendence. The Corporation is deserving of the highest commendation for the great interest and care it has manifested in the preservation of the archaeological remains of its ancient town. No restoration work has been attempted, but only careful and systematic reparation of the walls, the removal of the ivy, which was doing great injury to them, and the grouting of the walls with cement, so that now they will last and are secure for centuries to come. From the Castle the party proceeded to the Cathedral. Here Mr. Payne pointed out the different parts of the early work, the discovery of the foundations of the Saxon church of Ethelbert; the position of the semi-circular apse, the walls of which are now marked in double lines upon the floor of the Cathedral; and the evidence of Saxon walling were all indicated. The Cathedral was rebuilt by Gundulph, whose work extended to the position of the present pulpit, and had a nave of nine bays and a choir of six bays. The more ornate work in the nave and transepts is that of Ernulf and John, between 1115 and 1130, who reconstructed the Cathedral. Eastward of the choir the work is more recent. The masonry of Gundulph is enclosed in the present masonry of the columns of the nave. This church was from the earliest period both parochial and conventual, and, in consequence, disputes between the monks and parishioners of St. Nicholas were of constant occurrence, so that, in 1243, the church dedicated to that saint closely adjacent, was built for their use. The present choir of the Cathedral was first used in 1220, the Norman walls being incorporated in the existing walls.

After luncheon at the famous Pickwickian hotel, the Bull Hotel, the archaeologists journeyed in carriages to Cobham Hall, where they were welcomed by Lord Darnley in the drawing-room of that celebrated mansion. Mr. Payne gave an account of the building and of its former inhabitants, from which it appears the

Lords of Cobham had resided on the site of the present house for over 600 years. The present mansion is a very fine example of Elizabethan architecture and dates from 1534 to 1603. The date, 1584, remains upon one of the gateways, and the date 1594 is to be seen upon a leaden water shoot. In the large dining-room is a mantelpiece of the Elizabethan period. One of the curious features of this room is the side-board and sink of black and white marble. The ornamental iron railing of the grand staircase is dated 1601-1603. In the picture gallery, Lord Darnley pointed out the most celebrated paintings, which include many fine examples of Titian, Rubens, Salvator Rosa, Vandyck, &c. Charles I. visited Cobham Hall with his Queen after their marriage at Canterbury, and the Hall was captured by the Parliamentarians in 1643. Leaving the Hall, the party drove to Cobham village and visited the church, where they were received by the Rector, the Rev. Mr. Berger, who described some of the architectural features of the building, and Mr. Payne pointed out the remains of a peculiar arrangement of a staircase, quite in the south-east angle of the chancel, a very unusual position, which is thought to have led to a passage and screen above and behind the reredos for the exhibition of relics. The chief archaeological attraction of this church, however, is the magnificent series of monumental brasses of the fourteenth, fifteenth, and sixteenth centuries—some fourteen in all; they are in admirable preservation, and are probably unique. The original stone altar with the five crosses still exists. After seeing the church, the party visited the College, which was built by Lord Cobham in the time of Elizabeth. It has a fine old hall, and apartments for twenty pensioners. Some portions of the old chantry remain near the church. Thence the members drove to Sole-street Station for train to London.

Wednesday, September 17.

Leaving Waterloo Station at nine o'clock, the members of Congress and visitors went to Godalming, and at the station took carriages to Compton Church, where Mr. Ralph Nevill, F.S.A., met the party and described this very interesting church, which in some respects is probably unique in England. The architecture is late Norman, and the church retains the narrow lean-to aisles, with the little semi-circular windows at the western ends, which it is rare to meet with nowadays. The foundation of the church is probably of Saxon date, as it is mentioned in Domesday, and has a tower at the west end. The most interesting feature of the church, however, is its double sanctuary, which is considered to be unique in England. The lower sanctuary is groined, and the walls are in consequence much thicker than are those of the upper sanctuary, in order to counteract the thrust of the groining. The sacrum arch of the lower sanctuary is very elaborately enriched with elegant overlapping cusped work of late Norman style, not often met with, and above this arch is the celebrated wooden screen protecting and fencing in the western end of the upper sanctuary. It is believed to be the oldest existing in England, and dates from about 1180. This Norman wooden screen consists of nine round-headed arches supported on octagonal pillars inserted into a solid sill-piece, the whole being surmounted with a cornice slightly moulded. There are also some fine specimens of carved woodwork in the altar rail and the western screen, both of the seventeenth century. From Compton the drive was resumed to Loseley Place, where the members were kindly received by Mr. More-Molyneux, the owner, and the tenant, Mr. S. Christopherson. In the great hall of this fine example of an Elizabethan mansion, Mr. Ralph Nevill, F.S.A., read a brief history of the house and its early occupants. Mr. Molyneux had laid out for inspection several of the historical MSS. for which Loseley is so famous, and these Dr. W. de Gray Birch, F.S.A., described and gave an account of. The manuscripts preserved at Loseley are amongst the most valuable in the kingdom, and are of the utmost political importance. They consist of a very large collection of papers of the latter half of the sixteenth century. Some of the most important bear the signatures at the top, as was the case in those days, of Henry VIII., Edward VI., Lady Jane Grey, signed "Jane the Queen," Mary I., the Princess Elizabeth, Anne of Cleves, James I., Sir George More, Lord Ferrers, Lord Herbert of Cherbury, &c. Others exhibited the signa-

tures of the members of the Council of the Sovereign, Dudley, Earl of Leicester, Sir Christopher Hatton and others. There were some ancient charters also of the twelfth century. Mr. H. S. Malden, M.A., supplemented Dr. Birch's remarks by recounting his experiences of these manuscripts, of which he said there are thousands in the muniment room, in the course of his examination of them for the purposes of the Victoria County History of Surrey. Many of them, he said, throw much light upon local affairs all over the country, in the inventories and miscellaneous papers relating to the religious houses, and it would be quite possible to construct a history of the administration in London from the papers preserved in the muniment-room at Loseley. They dealt with all kinds of matters—pedlars' licences, the price of beer, the management of schools, the preparations against the Spanish Armada, the search for the Roman Catholic recusants, and many other things of greater or lesser importance. Mr. Molyneux pointed out the principal paintings and the numerous examples of ancient furniture in which the house is so rich. Loseley was on several occasions visited by Queen Elizabeth, who left mementoes of her visits in the shape of two small low-seated gilt chairs, with cushions said to be the work of her own hands, now on either side of the fireplace in the drawing room. Several of the elaborately carved fireplaces in this house are executed in chalk. Loseley cannot, of course, be classed with such palatial mansions as Longleat or Hatfield, but it is a good example of an English country gentleman's residence of the early days of Elizabeth. It was built by Sir William More between the years 1562-8. The detailed accounts of its construction are preserved, and it is curious to contrast the prices between that day and the present. The total cost, inclusive of materials, did not exceed 1,661l. 19s. 7d. Some of the materials were brought from the ruined buildings of Waverley Abbey. The painted panels in the great hall, with the monogram of Henry VIII. and Katherine Parr, came from Nonsuch House. From Loseley the drive was continued to Guildford, where, after luncheon at the Lion Hotel, St. Mary's Church was inspected, the company being received by the rector, Canon Grant. This church has many features of peculiar interest, which were pointed out by Mr. Ralph Nevill. The floor of the church slopes down very considerably from east to west. The earliest portion of the building is the tower, which has windows splayed inside and out and may possibly be Saxon, but this double splaying was usual in almost all cases where flint is used. The nave piers and capitals are all of the local chalk; some retain the original coloured decoration. The little delicate details of the carving could hardly have been executed in Bath stone. The plan of the church consists of nave, central tower, chancel, and aisles, the latter having apsidal chapels, which is an unusual feature, but the chancel is square-ended, in common with most English churches, that form being peculiar to this country and rarely found elsewhere. There is a good deal of painted decoration still remaining, although some of the paintings discovered by Mr. Nevill were obliterated by workmen in the absence of officials, a circumstance to be deplored, as they probably were the earliest decoration of their kind in England. Biblical subjects are the earliest in date. Legends were much later, and these destroyed paintings may have been of Saxon date. Master William, the Florentine, who was engaged in decorating the King's palace by Henry III., is thought to have executed the painting in the roof of the North Chapel, dedicated to St. John the Baptist.

Leaving St. Mary's, the only mediaeval church now remaining in Guildford, the party wended their way to the Castle, paying a passing visit to the museum of the Surrey Archaeological Society in Castle Arch. Beneath the walls of the ancient keep Mr. H. E. Malden gave a capital historical description of the Castle from the earliest times, which, he thought, might date from the days of Alfred the Great, when the mound on which the keep now stands was one of the burhs erected by Alfred, or his son Edward, as a defence against the Danes. Mr. Malden said the mound at Guildford seemed to belong to that class of construction in which the end, or two ends, of a ridge of hill were heightened by earth removed from the centre of the ridge. A spur of the chalk down over-

hanging the river was raised by earth removed from the ditch, still so well marked on the east side of the keep, and somewhat less so on the north and south. The mound was then encircled with wooden palisading, and had a house of wood upon the top, as is seen in the Bayeux Tapestry. Previous to the erection of the massive keep, Mr. Malden considered that stone walls encircling the mound took the place of the palisading and formed a "shell keep." These walls in parts still remain, and certainly were the walls of a building, and not merely of a courtyard. In one wall, that to the south, are the remains of several garderobes, with their shafts one above another, showing that the wall was of more than one story in height. Later on, when the massive keep was built, this enclosing wall would form the defence of an inner ward, which would have to be carried before the keep itself could be approached. With regard to the keep itself, it is placed on the side of the mound with one side standing on the natural formation, and this side is twice as thick as the others, and far less pierced by windows or passages, the reason being that it might hold up the whole structure, which it has done to the present time. The date of the shell keep may be of the time of the Conqueror, or one of his sons. The Castle is first mentioned in 1202 as a prison, and that, no doubt, was the present square keep, which for some centuries was used as the county goal. The next place visited was the Guildhall, where the Mayor welcomed the party, and exhibited the Corporation plate, &c. Afterwards Abbot's Hospital, founded in 1610 by Archbishop Abbot for the residence and support of a master, twelve brethren, and eight sisters, was inspected. It is a charmingly picturesque group of buildings, forming a quadrangle, with the hall and chapel opposite the entrance tower. In a room close to the entrance the Duke of Monmouth was confined for some time while on his way to London after the battle of Sedgemoor. There is some very good painted glass in the windows of the chapel, of Flemish character. On the way to the railway station some of the members, led by Mr. Nevill, looked into an ancient house in the High-street of Charles I.'s time, which possesses a fine carved staircase and some quaint ironwork in window fastenings.

Thursday, September 18.

This day the members of Congress visited Colchester and devoted their attention entirely to the examination of the many remains of archaeological interest in that very ancient town. Upon arrival the party at once drove to the Cups Hotel, where Dr. Laver, F.S.A., Mr. J. Horace Round, M.A., and other members of the Council of the Essex Archaeological Society, met and welcomed them. Under the guidance of Dr. Laver they then proceeded, first, to the museum of the Essex Society, established in the Castle, and inspected the magnificent collection of Celtic antiquities, all found in Colchester, or its immediate neighbourhood; also a good collection of Romano-British and other pottery, mostly found in the old British settlement at Lunden. Dr. Laver gave an interesting description of the finds which indicate survivals, and were not met with in the large Roman cemeteries, but in small private burial places. One vase was particularly interesting in this connection, as evidencing the survival of the method of construction of bronze vessels in the concentric flutings surrounding it. The celebrated "Joslin collection" is housed in the museum and forms the nucleus of the whole. A useful collection of modern antiquities is gradually being acquired—things gone out of date, memorials of obsolete customs, handicrafts, &c. Colchester in the days of Charles I. used to manufacture a particular kind of white cloth called "bays," which was introduced by refugees from Holland. This is now unknown and examples are hard to meet with. Dr. Laver paid 5*l.* for a piece only a few inches wide, and this now is framed and glazed and preserved in the museum. From the museum the party passed to the interior of the castle keep, where Dr. Laver gave some account of its history and construction. The keep is almost the largest in England, and is constructed of materials from Roman buildings with Roman mortar adhering to them, the walls at the basement being 31 ft. in thickness. The keep is the only part of the castle now remaining. It is a quadrangular structure, with square turrets at the corners. The castle stands in what was the Forum of the Roman town of *Colonia*

Camulodunum, as has been ascertained from explorations made by Dr. Laver, during which he discovered a row of shops and traces of a piazza in the earthbanks. These were carefully plotted and notes made, and then were afterwards covered over with earth again to preserve them. Mr. J. Horace Round, M.A., pointed out the lines of the old Roman walls of the town, extending in the form of a parallelogram for nearly two miles. They are composed chiefly of stone from the eastern coast, with bands of Roman brick in regular courses; its thickness varies from 7 ft. to 8 ft., and at the gates and posterns is much thicker. The Balkan Gate exhibits a very good example of Roman rubble work. It is one of the three Roman gateways remaining in England. The remains of a guardroom on one side are very clear, and there are indications of another on the other side of the passage-way. After luncheon a visit was paid to the ruins of St. Botolph's Priory Church. Of the Priory there are no remains above ground. It was founded about the middle of the twelfth century. The ornamental western doorway is about fifty years later. These ruins are so well known that they need no description in these pages. They are now well cared for, having been skilfully treated for their preservation by the late E. P. Loftus Brock, F.S.A., about 1887. A small portion of the original tile pavement may be seen, *in situ*, below the present level of the earth in the nave, which is some 4 ft. above the outside ground level.

The Church of St. Giles was next visited. Here are interred the bodies of Sir Charles Lucas and Sir George Lisle, who so gallantly defended Colchester for the King, and who were so ungenerously, to say the least, shot by order of Fairfax, the Parliamentary General, after the surrender of the town in August, 1648. From St. Giles' the archaeologists wended their way to St. John's Abbey gateway—the only remaining portion of the abbey. The abbey belonged to the Benedictine Order. It was a mitred abbey. All the buildings have disappeared but this gateway, which, apparently, dates from the last years of the fifteenth century. During the siege of Colchester in the seventeenth century an explosion occurred in this gateway, and the marks of the damage done may still be seen in the vaulting.

Friday, September 19.

To-day was, comparatively, an easy day, a visit being paid at 11 o'clock to the Abbey of Westminster, which Canon Hensley Henson had been able to arrange with the Office of Works, the present custodians of the sacred edifice, until the final removal of all the impedimenta connected with the recent Coronation solemnity. The Canon conducted the party, and gave an interesting description of the various features of interest. In the afternoon the members visited Staple Inn, Holborn, which, although not in Westminster, yet is connected with that City owing to the "Wool Staplers" having been connected therewith—and still having an identification in the "Woolpack." Here Mr. T. Cato Worsfold, F.R.Hist.Soc., met the party, and having pointed out the external features of the Inn, and indicated the residence of Dr. Johnson and other celebrated inhabitants in days gone by, led the company into the great hall, where he read a very interesting and exhaustive paper upon its history, the hall being kindly lent for the purpose by the Society of Actuaries, whose property it now is. In the course of his remarks Mr. Worsfold said that many of the houses in Holborn were built on arches in a foundation of sand. The district in earlier times was famous for strawberries, to which Shakespeare alludes. The "Stapler's" had a charge of 6*s.* 8*d.*, or half a mark, levied upon each packet of wool.

The painted glass in the bay window of the Hall, contains the insignia of the Staple-woolpack. The Society of the Merchants of the Staple seems to have had its origin in the year 1248 (Henry III.), and was incorporated in the reign of Edward II., in the year 1319, under the name of the Mayor and Constables of the Staple of England, being established at that time in the ancient City of Westminster. Staple Inn did not long remain the principal place of business of the wool-staplers; they were removed to Westminster by Richard II., and in 1378 it became an Inn of Chancery.

The only evening meeting which it was possible to hold, owing to the lateness of the hour, returned from the country excursions, was held this evening in the large room provided for the

use of the Congress at the Westminster Palace Hotel. At 8.30, Dr. Birch, F.S.A., took the chair, and a very interesting paper was read by Dr. Brushfield, F.S.A., on "Britain's Bursar or the New Exchange." This had reference to Durham House and the present Adelphi, the "Burse" being established on the site of Coutts' Bank. The paper dealt at length upon the historical connections of the locality derived from careful research into original documents and letters. In the endorsement of a letter, dated June 7, 1711, the term "Britannia's Bursar" is used, and is the only example yet found where it is so called. Durham House was given in 1584, by Queen Elizabeth to Sir Walter Raleigh as his London residence, and there he lived for twenty years. Incidentally, Dr. Brushfield remarked that he thought it was a great discredit to Englishmen that there was no memorial in London, or Westminster, to this great man, and he suggested that at least the blazon of his coat of arms might be carved upon his gravestone in St. Margaret's Church.

The business of the Congress was brought to a conclusion, after the reading of the paper with the usual votes of thanks to all who had assisted to make it the success it was generally admitted to have been, the proposed Saturday morning excursion to Harrow being abandoned as so many of the country members desired to depart for their homes early in the day.

THE BODLEIAN LIBRARY, OXFORD

1602-1902.

ON October 8 and 9 the University of Oxford will celebrate the tercentenary of the Bodleian which, then containing 2,000 books, was opened on November 8, 1602, in the building erected in 1487-8 over the Divinity School by Humphrey, Duke of Gloucester. Humphrey and Thomas Kemp, Bishop of London, had been mainly instrumental in the building—1458-80—of the Divinity School, restored, it is said, by Wren. The famous Library has its comparatively humble origin in the bequest by Bishop Cobham of Worcester of some books for which was built in the later years of the fourteenth century a little room in an annex to St. Mary's Church. Some hundred years afterwards the Duke Humphrey, who has justly been called the *Mæcenas* of his age and a pioneer of the Renaissance learning, made large benefactions to the University in the shape of the books and MSS. that were but too zealously destroyed as savouring of Popery by Edward VI.'s Commissioners, who were deputed in 1550 to carry out an edict "for the culling out of all superstitious books, as missals, legends, and such like." They further despoiled the Divinity School of all its stained glass, but fortunately spared the beautiful vaulting in Caen stone with fan tracery, and the curious drop pendentives commonly called "Wolsey's lanterns."

Sir Thomas Bodley was born at Exeter in 1545. His father, John Bodley, or Boddleigh, sought refuge on Mary's accession in Geneva, where his son attended lectures on Hebrew and Greek, with those of Beza and Calvin on divinity. After Mary's death the family returned to Devonshire, and in 1559 Thomas entered Magdalen College, Oxford; in 1563 he was elected Fellow of Merton. Taking political service under Elizabeth, he ultimately became her Minister to The Hague. Disappointed by Burghley of further advancement at home, he retired into private life, with the resolve, as he says, to set up his staff at the library door in Oxford, and to endeavour to reduce that place, then lying everywhere wasted and in ruin, to the public use of students. In 1598 he set about the accomplishment of his purpose—the re-establishment of a library which possessed so exiguous a remainder of the riches bestowed upon it by Roger Lisle, the Duke Humphrey, and other benefactors. In four years he collected and catalogued 2,000 volumes; he had Walter Raleigh and other friends for coadjutors in his scheme. Bodley induced the Stationers' Company to covenant on December 12, 1610, to send to Oxford a copy of every work printed by them. He defrayed the cost of adding a third story to the "schools," but did not live to see the fulfilment of his labours. He provided in his will for the endowment and maintenance of the library, which now has an income of about 9,000*l.* a year, though that revenue is all too little for its later requirements, and forms one

the five that are entitled to receive all new publications under the Copyright Acts.

Thomas Huskenorton, Abbot of Osney, reduced the Public Schools into one building in 1439. The existing buildings of the Bodleian comprise the quadrangle of the (old) schools on the northern side of Radcliffe-square, and beyond, westwards, the H-shaped block, of which the lower portion of the cross-forms the Divinity School. The schools, designed, it is generally believed, by Thomas of York, who there introduced a method of counter-arching openings to resist vertical pressure, and built by J. Aicroid, were erected in 1610-9. The court within measures 115 ft. by 105 ft. Some would ascribe the southern part, distinguished by its four orders, to James de Michael Bentley, who predeceased Holt (died 1624), but it seems that they were builders in the modern sense of that word. On the west side stands the lofty gateway tower, the Tower of the Five Orders,* having on its front a storied line of the orders, with a statue of James I., enthroned, presenting copies of his own works to Fame and to Oxford, the emblems of Plenty, Justice, and Peace. The upper two rooms are housed the University registers and muniments. Mr. T. G. Jackson, R.A., at the time (1876-82) of building the Examination Buildings, which have supplanted the old schools, examined the fabric of the tower, which he found was constructed of Roman cement, carefully modelled, the stonework having decayed. The decay proved to be so deep that a renewal of the whole was necessary. Above the doorways of the quad were inscribed the titles of the various schools and faculties. In renewing the stonework about twenty-five years ago the new label-bosses were left uncarved, albeit in the view of the quadrangle in Loggan's "Oxonia Illustrata," 174, their predecessors were carved, it appears, as conventional heads. In the winter of 1900-1 the bosses were carved by Mr. E. E. Hammond, under the direction of Messrs. Farmer & Brindley, and now present a set of portraits of eminent persons associated in past times with the studies followed in the schools" which once occupied what is now the ground floor of the Library, or with the story of the Bodleian itself, the cost being defrayed by a grant of Convocation and by a Resident Fellow of Oxford. The Hope Collection, in the Bodleian, furnished authority for the loss of the portraits.* A doorway in the western block, which has a pannelled facade, opens into high ambulatory or corridor, the Proschollum, more familiarly known as the "pig market," (the northern end of which is an archway) communicates with a smaller court enclosed by the Sheldonian Theatre; the antechamber of the Convocation House, 1630; and the H-shaped block that includes the Divinity School and the older portion of the Bodleian. The latter, renovated and improved by Mr. V. Jackson and Captain D. Galton, is now used as a reading-room. Beyond, westwards, are the Ashmolean and the gardens of Exeter College, by the remains of the old city wall; northwards, by the corner of Broad-street, is the Clarendon Building.

Archbishop Laud, John Selden, the Earl of Pembroke (Chancellor of the University, 1616-30), and Sir Kenelm Digby rank amongst earlier benefactors. To the contents of the Bodleian have been added during the last three centuries the statues given in 1755 by the Countess Dowager of Pomfret, the antique marbles presented by Selden's executors, and the Arundellian inscribed marbles gathered by Thomas Earl of Arundel at his house in the Strand, London, which his grandson, Thomas Duke of Norfolk, prompted by Evelyn, gave in 1667 to the University. They include also the Gough (topography and MSS., 799), Ballard, Wood, Rawlinson, Malone, Douce, and Sutherland Collections. The cuticularium on the chief staircase has been reserved for the choicest books and illuminated MSS. In the various apartments are many painted portraits. The Picture Gallery contains Bouquet's models of ancient buildings; Allan Ramsay's portrait, painted in 1749, of Flora Macdonald, "in character"; portraits of Mary

Queen of Scots and Sir Kenelm Digby; some fine busts; and the statue executed in brass by Hubert Le Scur, from designs by Rubens, of William Earl of Pembroke. The Hope Collection of 200,000 books and engraved portraits is deposited in an apartment known as the "Old School," which in 1890 was renovated and refitted, and fitted with new presses of iron and wood, under Mr. J. Osborne Smith's superintendence. So largely has the store increased that the printed volumes alone as bound amount to nearly 600,000, and there are upwards of 28,000 MSS. The "overflow" gradually assumes overwhelming proportions. As a remedy, the contents of the adjacent Radcliffe Library were transferred, forty years ago, to the University Museum, erected in 1855-60 in the Park at a cost of 80,000l., after plans and designs by Sir Thomas N. Deane and Mr. B. Woodward. The modern books were then removed into the Radcliffe, now called the "Camera Bodleiana." On June 18 of last year the Drapers' Company formally conveyed to the University the new Radcliffe Library, built by that Company at a cost exceeding 21,000l. after Mr. T. G. Jackson's designs, and forming a wing of the new Museum buildings.

THE HEALTH EXHIBITION, MANCHESTER.

THE last meeting of the nineteenth Congress of the Sanitary Institute was held recently at Manchester, but the Health Exhibition, which, as in former years, is one of the most popular features of the Congress, remains open until September 27. It is well worth a visit, although it does not contain any startling novelties. The exhibits are classified in four divisions—A, Science in Relation to Hygiene; B, Hygiene of Special Classes, Trades, and Professions; C, Construction and Sanitary Apparatus; and D, Personal and Domestic Hygiene. Division A is supposed to comprise ten sections, among which we may mention bacteriology, chemistry, demography, geology, and preventive medicine, but, as far as we can discover, there is only one exhibit in this division, and the owner of this is a "Consulting Oculist-optician." Division A is, therefore, as unconsciously humorous as the well-known chapter on snakes in Iceland. The second division is represented more fully, but here, again, there are sections without exhibits. Division D includes clothing, foods, soaps, disinfectants, and miscellaneous exhibits, many of which, although important in their way, do not fall within our scope. By far the greatest number of exhibits, to which we shall refer, fall within the three classes of the third division. Class I, includes building materials, construction, and machinery. Class II, water, supply and sewerage; and Class III, heating, lighting, and ventilating. Messrs. Mellows & Co., of Sheffield and London (Stalls 2 and 3), have been awarded a bronze medal for their well-known and widely-used patent glazing. It appears to be the only exhibit of its kind, but the award may be taken as a testimonial to the general excellence of the system. The steel sash-bars are entirely covered with "tin-leaded metal" to prevent corrosion, and this is undoubtedly a valuable feature.

At Stall No. 6 Mr. E. R. Palmer, of Beckenham, shows a sewer-ventilating column, in which a fan, driven by a small jet of water, is placed to induce an upward current of air. The waste water from the column may be conveyed to a sewer-flushing tank, so that it serves a double purpose. The apparatus is simple, and gives promise of good results; it has gained for the inventor a bronze medal. Mr. Palmer also shows an automatic alternating apparatus for the distribution of sewage. This consists of a siphon chamber communicating with a distributing chamber, in which are two outlet valves. These valves are connected by a chain which passes over an overhead pulley. The rising and falling of a float in the siphon chamber are utilised to give to the pulley alternately a right and left motion, and thus alternately open and close each valve.

The Offa Ventilating Co., of London (Stall No. 7), show a simple air-inlet, which is well adapted for hospitals and also for domestic and other buildings. The external opening is an ordinary air-brick; the internal opening consists of a piece of coarse sponge-cloth held in position by a movable frame, and screened in front by a plain brass or iron plate, which can be pushed close to the wall to stop the opening,

or drawn out to about 2 in. from it. The plate serves to deflect the air along the walls and thus reduce the risk of draughts in front of the opening. The ventilation is well adapted for the openings at the heads of beds in hospital. Repoussé copper plates are used where more decorative effects are desired.

Messrs. Fletcher Russell & Co., of Warrington (No. 12), exhibit, among other things, their "Rapid" water-heater or geyser for baths. It is fitted with safety taps of good design, and Bunsen burners. The water can be raised to a temperature of about 160 deg. Fahr. They also show the "Hurst" pipe joint for connecting lead and other soft-metal pipes, and also for connecting these to brass, gun-metal, and iron pipes. The joint is also used for connecting indiarubber tubing. For connecting lead to lead, the pipes are passed through two flanged ferrules, and the ends tuffed back against the flanges; one of the ferrules has an outside thread, on to which an ordinary union nut is screwed, drawing the two flanges together and compressing the lead between them. The joint was tested by the judges, and gained a bronze medal for the exhibitors.

Mention may be made of the Crystalline Co.'s glass tiles (Stall No. 18) and "verre-sur-verre" leadless decorated tiles (obtained by superimposing glass of different kinds on glass). Some of the tiles have a dull surface with the ornament in relief; these are decidedly pleasing. Passing Stall No. 22, where a sewage purification plant of doubtful value is shown, we turn to the stand of the Exhibit and Trading Co., of Liverpool. It contains various sanitary fittings, some, if not all, of which are of American manufacture. Among them we noticed a porcelain bath of ordinary type and good quality, a large porcelain lavatory, and a siphonic closet. Messrs. Slack & Brownlow, of Gorton, receive a bronze medal for their "germ filters" exhibited at Stall 24, and Messrs. Wm. M. Glover & Sons, Ltd., of Warwick, a silver medal for their "Champion" dust van, and a bronze medal for their rotary watering van (Greaves's patent). This firm's "Bath" waggon for emptying cesspools, although mentioned in the catalogue, is not exhibited. One of its special features, we may say, is that the rotation of the wheels of the waggon in travelling to the cesspool exhausts the air from the tank. On arrival at the cesspool the latter is brought into communication with the tank by means of a coupling pipe, and, on a valve being opened, the sewage is forced by the normal external air-pressure into the tank. Where necessary, the air in the tank may be exhausted by means of a hand pump supplied with the apparatus.

The Killgerm Co., Ltd., of Cleckheaton (No. 29), show, among other things, some smoke-sockets and small drain-testing grenades, as well as urinal tablets and sulphur candles and cakes. At the next stall the Sanitas Co., Ltd., of London, exhibit Kingzett's drain-testers and sulphur-candles, "Sanitas," and other disinfectants, &c. Whitewashing is a sanitary operation enforced in factories and workshops, and the "Cyclo" whitewashing machine, exhibited by Messrs. John Line, Sons, & McDougall, at Stall 32, is, therefore, not out of place in a Health Exhibition. The machine is simple and portable, consisting of a barrel on wheels, with a hand-pump, hose-pipe, spraying-nozzle and iron extension rod. It is said that two men with this machine can do the work of twenty men with brushes.

Messrs. Burn Bros., of Charing Cross (Stall 36), exhibit different kinds of drain-plugs and bag stoppers, and a good assortment of cast-iron drain-pipes and fittings. For their improved bag stoppers they have been awarded a bronze medal. Among their other exhibits are the "Eclipse" smoke machine and the "Eclipse" double self-sealing manhole cover.

Perhaps the smallest show in the whole Exhibition is that at Stall 39 A, where Mr. W. H. Gibbs, of New Brompton, Kent, exhibits his spiral drain-scraper, but the result is a bronze medal for the exhibitor. Messrs. W. Summerscales & Sons, Ltd., of Keighley, receive a silver medal for their laundry machinery (Stall 44), and Messrs. Matthews & Yates, of Swinton, Manchester, a bronze medal for their "Cyclone" fans. These fans have been used for drawing the shavings and sawdust from wood-working machinery and conveying them to the boiler-house; after passing through the fan, the shavings and sawdust enter a "cyclone" separator, which allows the air to escape at the top and discharges the solid matter at the bottom. At the works of Messrs

* On either side of each door: Old Marble School, Plato and Aristotle; School of Metaphysics, William Lyndale and the Lady Margaret, Countess of Richmond; Old Writing School, Cardinal Wolsey and Bishop Foxe; School of Grammar and History, Sir Thomas More and Dean Colet; Logic School, Camden and Selden; Law School, Lincoln and Sir Henry Savile; Music School, Laud and Lord Clarendon; and Natural Philosophy School, Humphrey Duke of Gloucester and Sir Thomas Bodley.

Henry Hadfield, Ltd., Leeds, shavings from 6 in. to about 30 in. long, and from 1 in. to 12 in. wide are collected in this way.

The Adamant and British Opal Wall Glazing Co., Ltd., Birmingham, have a well-designed stand (No. 51) in which their special manufactures are shown, including British opal glass tiling, fireproof flooring with concrete blocks on steel joists, partitions, &c. Models and drawings of the Horsfall refuse-destructor are exhibited at Stall 51A; two types are shown, the one with back feed and the other with top feed. They have gained a silver medal. Samples of the clinker are shown, screened to different sizes, and also specimens of bricks and flags made from the clinker mixed with lime or cement. At Stall 52 the London Tablet Co., of Sydenham, show their "Mezotil" covering for walls and ceilings, for which a bronze medal has been awarded; it consists of thin sheets of enamelled zinc, measuring 2 ft. by 3 ft., the enamel being of such a nature that it does not crack when bent at a right angle. The cheapness and imperviousness of Mezotil are points in its favour, but the poor quality of the designs is quite enough to prevent most architects from using the material.

Messrs. J. Oakes & Co., of Alfreton (Stall 55), have been awarded a bronze medal for their drain-pipes and fittings. These are of ordinary type, but well made. The most noticeable exhibit is a 2-in. glazed stoneware sink-waste in one piece, nearly 4 ft. long, containing two bends. The exhibit of the Sanitary Block and Tile Pavement Co., Ltd., of Westminster, and Briton Ferry, South Wales, has been selected for further consideration or practical trial. It is an artificial stone paving block made of crushed trap-rock, granite, or other hard material (passed through a screen with $\frac{3}{16}$ -in. meshes), pulverised limestone, and refined Trinidad asphalt, mixed at a temperature of about 300 deg. Fahr., run into moulds, and subjected to a pressure of over 2 tons per square inch. Crushed clinker from refuse-destructors may be used instead of the granite or other rock.

A new drain-testing machine is shown by the inventor, Mr. Richard Ravenor, of Newbury (Berks), at Stall 57. It is a pneumatic apparatus, with a chamber for receiving a smoke rocket; a gauge is attached for registering the pressure up to 10 lbs. Any leak in the drain or soil pipe causes the pressure to fall, and the position of the leak can in many cases be located by the escape of the smoke. The apparatus can be packed into a box of convenient size, and is well adapted for testing old drains and soil-pipes. It has gained a bronze medal for its inventor. We also noticed at this stall some expanding drain-plugs, the metal parts being of aluminium; these are much lighter than corresponding plugs of brass or iron.

Passing mention may be made of the "Webb Patent Sewer-gas Extractor Lamp," which is now in successful operation in various towns, for the ventilation of sewers (Stall 58), and of Messrs. Worrall & Co.'s armoured fireproof door, with a fuse attached to a balance weight in such a manner that the door closes automatically in case of fire (Stall 60).

Messrs. James Stott & Co., of Oldham (Stall 64), exhibit their well-known gas governor, ventilating cowls and fans, and the "Stott" water-heater for heating water by steam for swimming-baths, &c.

Messrs. J. Defries & Sons, Ltd. (No. 67), exhibit different varieties of the well-known Pasteur (Chamberland) filters and of their "EQUIFEX" disinfection appliances, for one of which—the "Improved Saturated Steam Disinfectant"—they have been awarded a silver medal. They also show their EQUIFEX Odourless Tank Wagon for emptying cesspools and gulleys. The air is extracted from the tank by means of pumps actuated by the wheels of the wagon or by hand, and is passed through a spray of disinfectant and through perforated baffle-plates moistened with disinfectant, before being discharged into the atmosphere. Messrs. Mather & Platt, Ltd., Manchester, exhibit a number of engineering specialities at Stall No. 68, among which may be mentioned a patent feed-water filter (Bronze Medal), Ridgeway's patent automatic sewage-distributing valves (Bronze Medal), and a patent water-softening apparatus, with a capacity of 300 gallons per hour (Silver Medal). Their patent Gravity Filter, 12 ft. high and 6 ft. in diameter, has been selected for further consideration or practical trial. Mention may also be made of their patent revolving spreader for distributing

sewage over bacteria beds, the special feature of which is that the arms are open troughs instead of the usual perforated pipes.

Among the constructional exhibits is that of the Fireproof Plate Wall Co., Ltd., Manchester, manufacturers of the Bruckner patent wall-plates. These plates are composed of fire-resisting materials, $\frac{3}{4}$ in. or 4 in. thick, and are bonded together by means of tongues and grooves and cement grout. They have been extensively used, and have been awarded a bronze medal at this exhibition. The same firm shows specimens of "Eubocolith" patent flooring, which has the appearance of cork carpet, but is laid *in situ* without joints, and can be polished if desired.

Day's automatic waste-water closet is shown at Stall No. 70 in an improved form, the pedestal and tipper being removable. Mr. G. B. Wilson, of Barnsley (No. 73), exhibits an ingenious gulley-dredger, which can be converted into a shovel or ladle by pushing or pulling the handle at the top. Mr. H. B. Killon, of Manchester (No. 73A), shows a working-model of his "automatic distributing, holding-up, and discharging apparatus" for bacteria beds, which is so arranged that, while one bed is standing full another is being filled, the third being emptied, and the fourth being aerated; each bed in turn passes automatically through the four stages. At Stall 74 a full-size alternating gear for two sewage-filters is shown at work by the Septic Tank Syndicate, Ltd., of Exeter, together with other apparatus, samples of effluents, photographs, &c.

Various sanitary fittings are shown by Mr. W. E. Farrer, of Birmingham. A bronze medal has been awarded for his patent "bead-rim" lavatories, the special feature being an undercut bead around the rim of the basin; the purpose of this rim is to prevent splashing, but it can scarcely fail to become dirty. A bronze medal has also been awarded to Mr. Farrer for his adjustable cistern-bracket, the top bar of which is made to slide so that the projection can be varied according to the size of the cistern. A new kind of urinal-slab, known as the "Torjet," has been selected for further consideration or practical trial. It is made of compressed peat treated with chemicals, and brushed over occasionally with a deodorising solution, and is intended more particularly for places where the water supply is limited. Among the other exhibits are an automatic siphon flushing apparatus, the parts of which are easily removed and replaced.

Messrs. J. Duckett & Son, Ltd., of Burnley (No. 77), have an excellent show of sanitary ware, including wash-down water-closets, siphonic latrines, urinals, white-glazed manhole-bottoms in one piece, drain-pipes, school lavatories, &c. Bronze medals have been awarded for their isolated siphonic closets, and for their 20-gallon glazed-ware flushing tank fitted with a copper tipper. The tank is ingeniously contrived. The tipper contains a water-chamber and an air-chamber, and is hung on pivots near the top of the tank. When the tank is nearly full, the water flows into the tipper, and causes it to make a partial revolution, raising the back portion in which the air-chamber is placed, and to which a spindle, connected to the valve in the bottom of the tank, is attached. The water escapes from the tipper through a narrow slit of such a size that all the water in the tank is discharged before the tipper returns to its normal position and closes the valve.

A good general collection of sanitary fittings, drain-pipes, "Standard" access-pipes, bends, junctions, grease and other gullies, &c., is shown by Messrs. Wm. Harriman & Co., Ltd., of Newcastle-on-Tyne, at Stall No. 78. A bronze medal has been awarded to Messrs. C. W. Outram & Co., of Woodville, near Burton-on-Trent, for the "Hassall" water-closet suite (Stall No. 81). The basin is of the wash-down type, with a rather small water-area, and is so designed that the contents are cleared with a flush of 14 gallons from a cistern fixed 3 ft. 6 in. above the seat. The makers do not recommend such a small flush. The closet appears to be well adapted for workmen's dwellings and other places where a strong and cheap apparatus is desired.

Messrs. C. Wills & Sons, of Bournemouth (No. 83), show a joint for connecting the outlets of water-closets to the branches of soil-pipes, vulcanite washers being used to protect the rubber ring which closes the joint. They also exhibit a galvanised cast-iron junction-arm

fitted with anti-siphonage pipes. This consists of three pipes (in a single casting) arranged in a triangle—namely, a vertical pipe forming part of the soil-pipe, a branch pipe from the closet connected to the closet below the water level, and an anti-siphonage pipe. The number of joints is therefore reduced as much as possible.

The Candy, Caink, & Whittaker sprinklers for the distribution of sewage over bacteria beds are exhibited by the Patent Automatic Sewage Distributors, Ltd., of Westminster, at Stall No. 84. Messrs. Ewart & Son, Ltd., of Euston-road (Stall No. 86), exhibit a number of geysers of different kinds, including the "Calionit," for which a bronze medal has been awarded. This is heated by gas, and supplies hot water under pressure to fittings above or below the geyser; it is so designed that the gas-flames are automatically turned up when any tap is opened, and turned down when the tap is closed. They also exhibit the "Euston" independent radiator, which is of the American type, filled with water, and heated by a single gas-jet.

Messrs. Shanks & Co., Ltd., of Glasgow (No. 87), receive a bronze medal for their No. 2,080 hospital lavatory, the taps and waste of which are actuated by levers conveniently placed for being moved by the surgeon's elbows. A silver medal has been gained by this firm for a well-made porcelain-enamelled cast-iron bath (No. 2,242), with non-convex taps and quick accessible waste. Among the other fittings at this stall are lavatories and water-closets of different kinds, of which we may mention the "School Board" water-closet for children, which has the trap brought out sideways and fitted with an inspection cap screwed into the crown.

Another good collection of sanitary fittings is shown at the next stall by Messrs. George Howson & Sons, Ltd., of Hanley, to whom three bronze medals have been awarded for high-back enamelled fireclay wash-tubs (30 in. by 29 in. by 15 in. deep inside), enamelled fireclay baths, and stall urinals with accessible channel in one piece with the body. We also noticed a good range of three school lavatories with extending brackets for supporting the waste-pipes, and the "Clifford" range of lavatories with high backs and floral or marble oval panels. A large enamelled fireclay sink is shown with a loose teak drainer over one half; under the sink, and forming part of it, are two L-shaped rails, on which the drainer can be placed when not required in the sink.

Mr. John Jones, of Chelsea (Stall 92), has received a silver medal for his well-known automatic air-tight, double-seal manhole cover, which is now applied to cast-iron access chambers. Bronze medals have been awarded for his patent air-inlets (for drains) with mica folding-doors, and for the "Carlyle" wash-down pedestal closet in vitrified stoneware with a 24-in. seal. He also exhibits a good type of school closet, and various kinds of fittings for intercepting chambers, expanding drain-plugs with the metal parts of aluminium, air-bag drain-stoppers, &c. An ingenious little exhaust ventilating-fan for water-closets is worth mention; it is wound up by pulling a cord, and runs by clockwork for about eight minutes. Mr. Jones has also received a bronze medal for his patent joint for connecting water-closets to soil-pipe branches; the special feature is a split brass socket instead of the usual continuous socket; the new form, among other advantages, allows the joint to be released and the basin removed without difficulty. The Ames Crosta Sanitary Engineering Co., Ltd., of Nottingham (Stall No. 93), exhibit different kinds of drainpipes with special joints, made of Devonshire stoneware by Messrs. Hexter Humpherson & Co., of Newton Abbot, and an ingenious "Midland Stoneware" conduit for electric cables, made by Messrs. Hall & Boardman, of Swadlincote. For this and their cast-iron patent surface-water gully with double trap they have received bronze medals.

The International Purification Syndicate, of Westminster (Stall 94), exhibit specimens of polarite and ferrozene, and drawings and photographs of sewage works and waterworks in which polarite filters are used. A bronze medal has been awarded to the Pendleton Sanitary Engineering Co., of Manchester (No. 95) for a new frame or cage for movable ashbins, designed and patented by Dr. Quine; the original type of tipping bin is also exhibited. The "Loco" Drainage Apparatus Co., Ltd., of

Manchester, show a number of Wynde's patent fittings at the next stall, a bronze medal being awarded for the well-known rust pocket. At No. 98 Mr. Vernon Parker, agent, Westminster, has a successful variety show, including some excellent specimens of Duffy's "Immovable Acme" wood-block flooring, Hamblet's blue bricks and blue drain-pipes (bronze medal), the Howson silica filter for fixing to water tap (bronze medal), Hassall's patent safety joint for drain-pipes (silver medal), and the Shone system of ventilating drains and sewers.

At the next stall Messrs. Doulton & Co., Ltd., of Lambeth, have a large and varied collection of sanitary fittings of good quality, including baths, skeleton, shower, and spray, lavatories, water-closets, urinals, revolving mortuary table with ball bearings, bed-pan sinks, &c. Among the closets we noticed an improved valve closet with a trapped overflow, open at the top and flushed at the same time as the basin, and fitted with a regulating supply-valve and after-shower. A range of two "special spray lavatories" is also worthy of notice; the basins are in strong white-glazed freiclay, and the taps deliver the water in a fine spray and are self-closing and regulated to give a certain quantity of water after the press-knob is released. The Sanitary Appliances Syndicate, of Manchester (Stall 100), receive bronze medals for Brierley's patent coin-receiving lock, and for "The Only" Non-Ball-Valve cylindrical store for water; they also show automatic flush-tanks for water-closets, the tanks being empty until the seat or foot-lever is depressed. Messrs. Oates & Green, Ltd., Halifax, exhibit No. 101 some good lavatories, urinals, and other sanitary fittings, and receive a bronze medal for a salt-glazed manger with patent "give-and-take" fastener. Porcelain-enamelled cast-iron baths, sinks, and other fittings of the usual types are shown by the Cannon Foundries, Ltd., of Deepfields, near Bileton. The Eagle Range and Gas Stove Co., Ltd., of Birmingham, exhibit in addition to their well-known kitchen ranges, several varieties of their "Eagle" fire grate, with falling bars, and two pairs of sliding doors to regulate the draught. A silver medal has been awarded to the British Sanitary Co., of Glasgow, for their self-cleaning earth-closets. The Kitchen Bath Fitting Co., of Sheffield, exhibit two combinations of sinks and baths for small houses. In one the bath is of lead-coated sheet-steel mounted on small rollers and pivoted on the waste outlet, so that it can be turned under the sink when not in use; the sink is of artificial stone or glazed ware. In the other combination the bath is of cast iron and is a fixture, while the sink is of porcelain-enamelled iron attached to a wood drainer, which is hinged at the back, so that the sink and drainer can be turned up and fastened to the wall when the bath is required; water is heated by gas in a boiler fixed over the foot of the bath. The details are not altogether satisfactory, but there is no doubt that the combinations possess considerable merit, and will be very useful in cases where space and money are limited. The last exhibit to which we shall refer is a new patent revolving window, for which a bronze medal has been awarded to the inventor, Mr. G. A. Chaddock, of Liverpool. The window has a central upright bar, through which a vertical rod is passed; the rod has a thread at the top and a cog-wheel at the bottom, and by turning a handle (connected by gearing to the central rod) a top rail is raised into the head of the window frame; air is thus admitted at the top of the sash. By a further turn of the handle the sash is raised above the bottom rail, and can be revolved on the central rod and fixed in any position.

SANITARY HOUSE DECORATION.*

In commencing the sanitary decoration of a house begin at the top, in the loft if there is one, and work downwards, cleaning and removing dirt from all recesses and hidden corners as you go. Such places are often overlooked and left as disease spots in a smart house. The loft especially receives the floating dust and impurities in the vitiated air arising from the lower parts of the house; therefore clean it out, remove all dirt, provide a skylight that can be opened, and brush down

and whiten every part of the walls, floor, and under surface of roof, either with limewash or carbolic distemper. Do not leave the open joisting and rough plaster to accumulate more dirt, but put a thin flooring all over the loft and thus gain useful storage room, which being lighted and ventilated will make the whole house healthier. Where air and sunlight can enter microbes will be conspicuous by their absence. Sunlight is a great germ-killer, therefore all dwelling rooms should have ample windows.

Descending to the sleeping apartments, and having perhaps admired the beauties of the smart new decorations, let us peel off that little piece of loose paper on the wall. To our horror we find that the "decorator" has forgotten to strip the walls before repapering them, and here are five or six layers of dirty old paper and decayed paste, in all probability holding vermin, or even the germs of disease behind the newest paper. Let it here be uncompromisingly stated that every scrap of old paper on walls or ceilings, and all old distemper, should be soaked, scraped, and washed off to the bare plaster, except perhaps in the case of a tightly hung varnished or painted paper, which already presents a solid impervious surface. Insist, as one of the first principles of sanitary decoration, on the stripping of walls and ceilings, and disregard all pleas or fears as to fetching down the loose plaster. If the plastering is so weak that it is held up by the paper or old white-wash, that is surely a pretty good indication that it needs repair. The desirability of enforcing the stripping of old wall paper and distemper, by the passing of a by-law to that effect, may be commended to the attention of Sanitary Authorities. Always use some disinfectant in the water employed in stripping and washing down the interior of a house, both as a sweetener of the rooms and as a protection for the workmen in case there may have been infectious illness on the premises. Safe and effective liquid disinfectants are so cheap nowadays that there is no reason for omitting this simple precaution. A solution of soda in warm water facilitates the removal of old paper and the effective cleansing of the surface. Wherever there is a sign of dampness race and remedy it at its source, to protect health and to prevent damage to the decorations. In slight cases it may suffice to line the damp wall surface with lead foil or pitch-paper or to paint it before repapering, but all serious dampness should be thoroughly removed. Having stopped all cracks or imperfections in the plaster with Parian or Keene's cement, and rubbed down the plaster to an even surface, the walls and ceilings are ready for decorative treatment, which must, of course, depend on individual taste and the finances at command. In "claïrecoling" or sizing walls or ceilings preparatory to papering, and also in the process of distemping, the smell of size is often very offensive, and this is not to be wondered at when its organic nature is considered. This odour can be almost entirely neutralised by the addition of a gill of turpentine to a pailful of melted size or distemper. This is actually an improvement to the body and binding properties of the material as well as a deodorant.

In hanging papers, embossed pulp, or canvas materials on painted or varnished surfaces, a claïrecolle of size and soda should be used—half a pound of soda to a gallon of melted size—to give a "bite" to the material to be hung, and to prevent blistering. The claïrecolle for unpainted surfaces should be melted size with a little whiting and turps as aforesaid, no water. Many of the sanitary, washable distempers or water paints—so justly approved and largely employed nowadays—contain a percentage of turpentine, boiled oil, or other vehicles, as well as an admixture of dry white lead, zinc white, or soluble glass, together with some disinfectant. Such truly sanitary pigments cannot be too highly commended, as they are cheap, produce artistic and durable effects, and possess better covering properties than oil paint. One hundredweight of such a distemper will cover 840 sq. yds., while the same quantity of oil paint will only do an average of 500 sq. yds.

Little need be said as to the composition or application of paint to walls or woodwork beyond urging the use of zinc white (oxide of zinc), or Charlton white, as being non-poisonous and therefore more sanitary than white lead (carbonate of lead), the poisonous nature of which is well known, although it may be safely used with proper precautions. If white lead paint is used it should be genuine old, ground, white lead, mixed with pure

American turps and Baltic linseed oil, with the addition of litharge driers or terebene, according to the weather in which it is used; and such paint gives off little or no odour or volatile particles. Do not use cheap white lead, as it is often adulterated with barytes (sulphate of barium), and avoid "young" or new lead, as it is deficient in covering properties and damages colour in its oxidation. White paint is the most healthful of all paints, because, apart from its artistic effect, it shows dirt better than coloured paint, and thus indicates the necessity for cleaning. A glossy surface is more sanitary than a dull or "flatted" surface, as it affords less hold for dirt. In selecting papers or decorations for the walls of bedrooms, and, indeed, for all living rooms, avoid large, staring patterns, and aggressive contrasts of primary colour in masses. The less pattern there is the better. A simple background of agreeable tone is more restful and suitable to a bedroom than any assertive decorative treatment.

A room simply decorated with a pale cream (not blue-white) ceiling and cornice, cream enamelled woodwork, and papered, painted, or distemped walls in a tint of soft non-arsenical green, or blue, for a warm, sunny aspect, or in warmer tones of terra-cotta, pink, or yellow for cold, dark rooms, will be quieter and more soothing to the senses, and thus more conducive to repose than more gaudy treatments. In purchasing paperhangings take care to procure them from a firm of repute, who can furnish an authentic guarantee that no arsenical colours or other poisonous ingredients are employed in the process of manufacture. The fermentation of the paste used in hanging papers and relief materials is a danger which can be avoided by the addition of a lump of alum, the size of a filbert, to a pail of paste. This helps to thicken the paste, giving better and more adhesive body, as well as having a hardening and non-fermentative action. The addition of a small quantity of oil of cloves also assists in checking fermentation. Lastly we have to consider the floor, which should be sized and varnished all over, merely having a loose rug, thus providing a thoroughly sanitary surface which can be kept clean and germ-free without the use of the scrubbing brush. All open joints should be stopped to prevent dust dropping through into the space beneath. Permanganate of potash is an excellent dark stain for clean floor boards, and has the additional merit of its disinfecting qualities.

The same general principles apply also to the decorative treatment of the reception-rooms, staircase, &c., elaborated to whatever extent artistic inclinations or means may permit. Paperhangings, where used, should be, preferably, those with a hard, smooth, surface, such as the hot pressed silk fibres or oil printed papers, not floccs nor mica papers, which catch the dust, and whose particles become detached in course of time, thus failing to comply with sanitary requirements. Painted and panelled walls and ceilings, hand-painted decorations of flat ornament in monochrome, colour or stencilling, with the embellishment of gilding in mouldings, and other ornamental details; plaster or compo-mounted enrichments, hardwood panelled wainscoting, parquet floors, and every kind of decorative treatment that does not afford absorbent surfaces or dust-collecting ridges, shelves, or scrolls may be freely employed in an entirely sanitary scheme of decoration. In bathrooms and closets, do not have wooden enclosures to baths, sinks, or water-closets, as such places frequently serve to harbour filth, and thus become a nuisance. Let every part of the sanitary fittings be open and above board, so that any leakage can be detected and every part accessible for daily cleansing. Corners behind water-closets, and corners of rooms generally, would be more hygienic if slightly rounded to prevent the collection of dirt. The walls of bathrooms, lavatories, and the domestic offices should be covered with varnished paper, paint, or, preferably, with ceramic or enamelled metal tiling, so as to be impervious and washable. The latter forms of wall covering are strongly to be advocated for larders, pantries, and store cupboards. The floors of bathrooms, water-closets, and lavatories, also larders, should be cemented or asphalted. Mosaic of marble or glass is a material more often employed for the flooring of halls, steps, and lavatories in this country than for mural decorations, due chiefly to questions of cost,

* Abstract of a paper by Mr. Louis Hanks, read before the Sanitary Institute Congress recently held at Manchester.

but it is a matter for regret that this sanitary, artistic, and durable material is not more largely used for decorative purposes.

In conclusion, a word may be given to the necessity for ample inlet and outlet ventilation for every room, to promote the health of the occupants and to preserve the decorative adornments. The least injurious form of artificial lighting in all respects is, of course, the incandescent electric lamp, and where gas is used, every burner should have outlet ventilation to carry off the fumes. Carefully search for cupboards under stairs, also cellars or vaults. See that all such places have cement floors. Limewash them twice a year, and do not let lumber and dirt accumulate. Abolish brick or wood dustbins, and have iron portable bins. Bear in mind that soap and water, fresh air, sunlight, and cleanliness in general are as much to do with health as elaborate drainage and the complications of modern plumbing, and there is the advantage, moreover, that such simple things are within the reach of all—the poor as well as the rich. This rough sketch of a few points in the sanitary decoration and management of houses, while necessarily superficial, will have served its purpose if it provides material for discussion.

Illustrations.

ASCOT PRIORY.

THE new wing shown has been built to provide accommodation for the sisters who nurse and attend to the sick people in the main building. About thirty cells are provided, with workrooms and recreation-rooms, and day-room, or office, for the superior.

The material is coursed rubble masonry with Bath-stone dressings, to match as far as practicable the rest of the building.

Mr. W. Watson, of Ascot, was the builder, and Mr. Leonard Stokes, of Westminster, the architect. The drawing from which our illustration is taken was hung in this year's Academy.

COMPETITION DESIGNS FOR MUNICIPAL BUILDINGS, CREWE.

WE give this week illustrations of the selected design for Crewe Municipal Buildings, by Mr. H. T. Hare, and also one of the three designs which received second premiums—that by Mr. A. E. Dixon, of Leeds.

The following is Mr. Hare's description of his intentions in the design:—

"These buildings are designed to occupy a street frontage with light available on the front and back only. The area of the site is somewhat confined for the accommodation required, and the plans had to be carefully and economically arranged to secure the requisite amount of light and air.

The front is proposed to be carried out in stone and red brick, and the roofs covered with tiles. The floors throughout are to be of fireproof construction, and the internal areas lined with white glazed bricks; the main staircase to be carried out in polished Hoptonwood stone, and the finishings in the Council Chamber and Mayor's suite of rooms to be in wainscot. The heating to be by low-pressure hot water, ventilating radiators being introduced when required. Extraction to be by a fan fixed in the turret to which all rooms are to be connected by flues, except in the case of the Council Chamber, which it is proposed to treat separately."

Mr. Dixon's design is sufficiently explained by the following extracts from the Report sent in with his drawings:—

"The principal entrance from Earle-street is centrally placed, giving uniformity and balance to the elevation. Immediate access is obtained to the rates offices and accountant's departments by placing them on each side of the entrance, approached from a spacious entrance hall. The principal staircase is central, and has top light in addition to windows.

The sanitary department and weights and measures department are placed adjoining the back entrance, and can be reached without passing through the front portion of the building if desired. The council chamber, mayor's parlour, reception-room, public ante room, and cloak-room for the councillors are grouped together in the front block. The waiting-room would be used as a ladies cloak room with a water-closet attached.

The two committee-rooms and the Town clerk's offices and lavatory occupy the rest of the first floor.

The second floor contains the Borough Surveyor's department occupying the north side, staff lavatory and waiting-room in the centre, and the medical officer's rooms and school attendance officer's rooms, and committee-room for the latter, and one extra room, occupy the rest of the floor. The sun-parade is arranged over the waiting-room with circular stairs.

Upon the basement floor are the storerooms, heating-chamber, and general strongroom.

Elevations to be carried out in brick and terracotta. Roofs of green Westmoreland slates. Floors fireproof of steel and concrete, with wood block for the offices, tiles and mosaics for corridors, &c. Oak block for the council chamber floor and oak parquet for the Lord Mayor's room. Principal rooms to have modelled plaster in ceilings.

The total cubical contents amount to 420,000 cubic ft., which at 8d. per cubic ft. amounts to 14,000l., at which sum the author of the design considers the building could be carried out."

COMPETITIONS.

SCHOOL, BARNSELY.—A few months ago local architects were asked to send in competitive plans for a school to be erected on a site acquired in Pitt-street West, Barnsley. These were received, and acting on the advice of the architectural adviser to the Leeds School Board a decision was arrived at in committee as to which plan should be accepted. On the 16th inst. a special meeting of the Barnsley School Board was held for the purpose of confirming this decision. It was agreed that plan No. 4 should be the one accepted, that No. 7 should have the first premium of 25l. No. 1, the second, of 15l.; and No. 5, the third, of 10l. No. 4 was Mr. Ernest Dyson, of Kingston-place; No. 7, Mr. Dixon; No. 1, Messrs. Crawshaw & Wilkinson; and No. 5, Messrs. Moxon & Sons.

BOARD SCHOOLS, BORELAND.—The design of Mr. D. Forbes Smith, under motto X, has been selected by the Kirkcaldy and Dysart Landward School Board for a new school at Boreland, in a competition limited to the architects of the district.

BOER WAR MEMORIAL, HASTINGS.—The design and estimate of Messrs. J. Whitehead & Sons, Ltd., of 74, Rochester-row, Westminster, for this memorial have been accepted.

LIVERPOOL CATHEDRAL.—The following is the text of the Report issued by the assessors on the designs submitted in the preliminary competition for the proposed cathedral for the diocese of Liverpool:—

"GENTLEMEN,—Of the great importance of ensuring a fine design for the proposed cathedral there can be no question. Truro alone in England has had a new cathedral, the first built for many generations. Truro is but a county town, while Liverpool is one of the largest and most important of our cities.

The new cathedral must be a stately, dignified, and a beautiful building. It must be suitable for the services of the English Church, and be capable of holding large congregations. All this is obvious. The Committee having determined on a competition, it is our duty to select the best designs submitted in this preliminary competition, and then to invite their authors to compete for the great work, in accordance with the regulations that may be laid down for their guidance.

What seems to be necessary is a design having a distinctive character of its own, and one not without originality. A design with a striking unity of effect and idea.

We were prepared to find more designs of a Renaissance or a Classical manner. We were surprised to find so few in those styles, and those we feel bound to say, not commanding or remarkable. The main body of the best designs sent in are Gothic. This seemed to point to Gothic as the style from which we should find it practical to select. And, indeed, that manner is accepted by most as generally the suitable one, and under special circumstances, for church building. In making a selection there seemed no doubt but that our own English phase of the style should be adhered to.

Many of the designs sent in have plans more or less like numerous fine modern cathedrals, with many chapels clustering round the eastern end of the choir. It is no doubt an arrangement of much beauty. One or two such chapels may be desirable, as being very useful in bringing comparatively small congregations together for early or evening services, but many such chapels would not seem to be appropriate for the uses of the English church. There should certainly be one or two such chapels, but we suppose not more would be needed. Modifications of many of the plans submitted would, therefore, seem to be necessary. How far what we have said on this point should be embodied in the instructions to be given for the final competition, we leave to the consideration of the Committee.

We feel that the object of the competition is to enable the Committee to find out the best man for the work. What he submits may be thoroughly examined and discussed, and, if it seems desirable, may be modified or improved on.

The opportunity, the great opportunity, must not be lost for the erection of a really stately and beautiful building, one of striking proportions, and of delightful detail. Our old ecclesiastical buildings afford many such examples. Not indeed, that they should be copied, for Liverpool Cathedral must be an original work of art and have a character of its own—one fitted for the requirements of the present age, and one specially designed for its site. The spirit of our best architecture may, however, we be caught, and its magnificent traditions may be recovered and handed on.

Whatever style is adopted there should be the nobility of expression and that refinement of feeling that is so characteristic of all the best architecture of the great times. We may add that a noble simplicity, enhanced by touches of beauty, is not a thing to be afraid of.

In judging the designs one must take care to discern the real effect that the building would have and not be led away by any clever delineation or a conception that may not be really good. This is evident, but a first impression given by a clever architectural drawing, even though it be of a poor design, may be misleading and deceptive.

We shall look forward with interest and pleasure to the work of reporting to the Committee on the designs to be sent in for the selection of one that may be not unworthy of your important and great city of Liverpool.

There has happily been some revival of taste and knowledge of architecture in recent years, and the new cathedral should show a dawn of a new improving state of feeling, and mark the period of one of greater advance towards the beauty and the dignity that characterised the great days of architecture, and above all, it should be an example of culture and religious feeling in church building.

With regard to the plans submitted we beg to report that we have examined the various portfolios of designs, and all the drawings that were hung on the walls, with great care and with the deepest interest. The number in all is 103, of the thirty-three are designs prepared expressly for the competition. They represent much labour, and we may also say a considerable amount of talent. Twenty-three are sent as evidence of skill and ability to design a cathedral, and consist mainly of designs which have been submitted mostly in competition for large churches in different parts of the world.

The remainder are a miscellaneous collection of photographs, drawings, and sketches, partly ecclesiastical and partly secular. Though many of them are of much excellence, they do not show any evidence that their authors have any special claim to be considered aspirants for the work of building a cathedral. It is vain to shut one's eyes to the fact that many of the competitors in this last class have taken absolutely no trouble. They have simply sent in a portfolio containing few, or many, photographs or drawings which they happened to have by them, whereas in the cases to which we first referred, where special designs have been prepared, the competitors have taken much more trouble, care and trouble, and have done their best to respond to the invitation of the committee.

From the plans sent in we have selected five that we consider show their designers to be capable men. They give evidence of considerable knowledge of old work, great care in design, and originality of a sound and practical nature. None of the originality which has little aim beyond being eccentric for the sake of being considered original, but which does not regard beauty and fitness as necessary.

These five, we suggest, should be asked to prepare complete designs for the cathedral, in accordance with the conditions to be laid down by the Committee.

This seems a small number to name out of such a long list of competitors, but on the other hand it may lead to greater effort being made to conceive and delineate, a fine design, and with greater hope on the part of the designer for success, and, for the world, for an ultimate and satisfactory result. These designs are numbered Nos. 20, 45A, 68, 71, 95.

In addition to the above, we consider it would be a gracious act, and one that would be appreciated to nominate a certain number for honourable mention as a distinct recognition of considerable skill shown, sometimes in planning, and sometimes in design, though we were unable to award them a still more honourable place. We selected eight names, namely, Nos. 17, 37, 41, 44, 45, 46, 84, and 94 for such honourable mention.

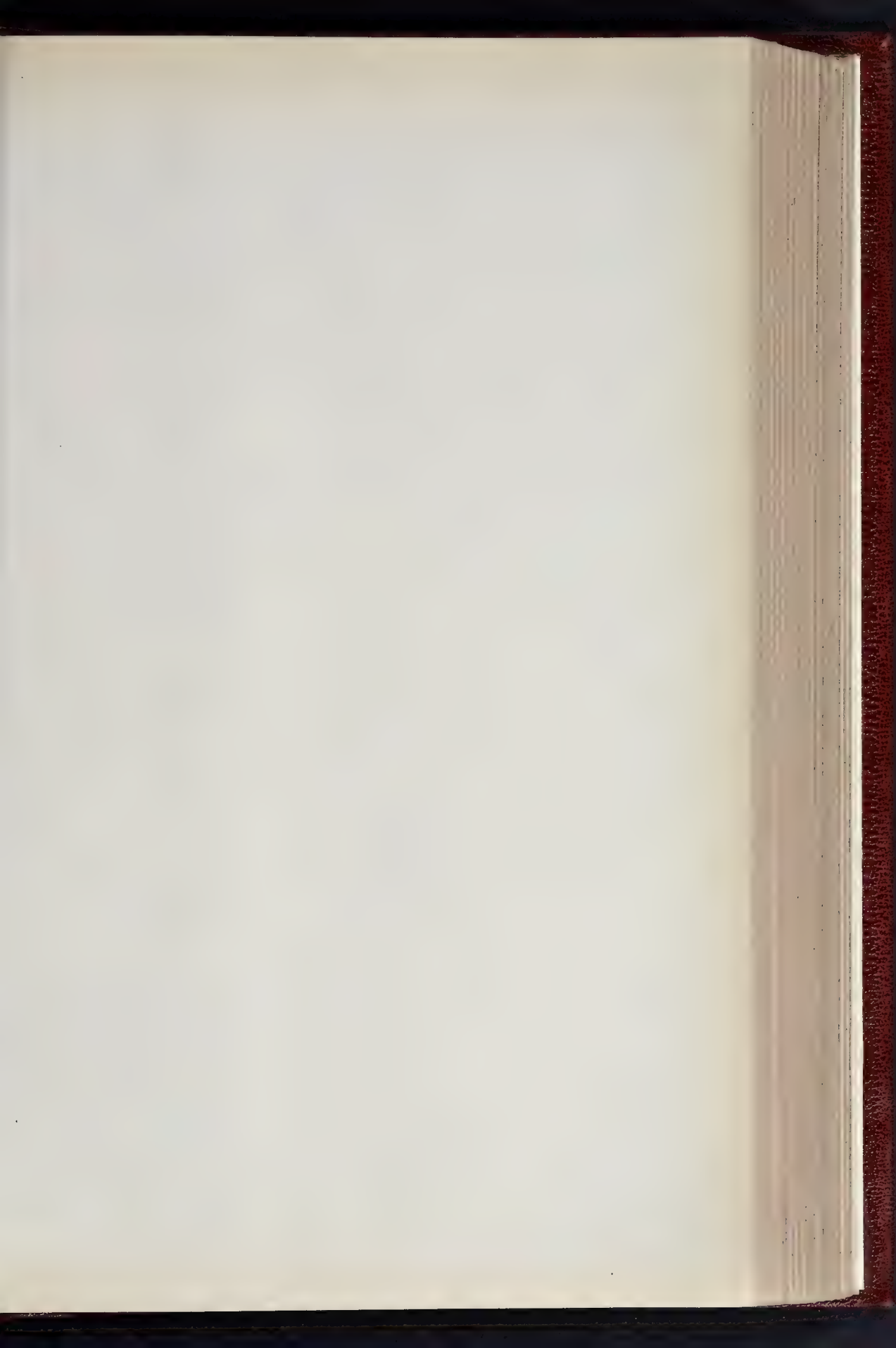
We are, Gentlemen, faithfully yours,
G. F. BODLEY, R.A.
R. NORMAN SHAW, R.A.

London, August, 1902.

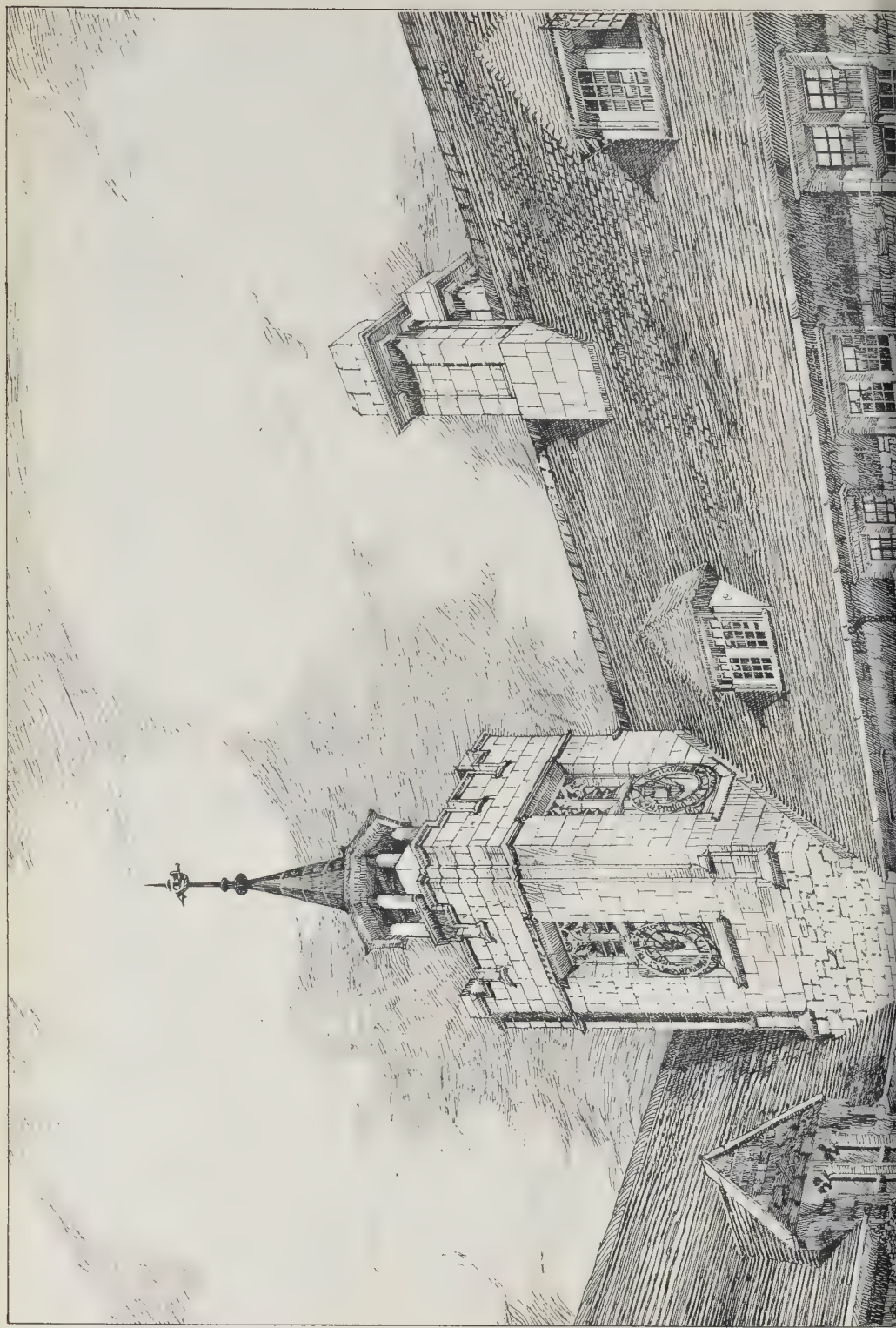
The following are the names of the architects selected for the final competition and for honourable mention:—

Selected for Final Competition:

20. Messrs. Austin & Paley, Lancaster. 45A. C. A. Nicholson, 2, New-square, Lincoln's Inn.

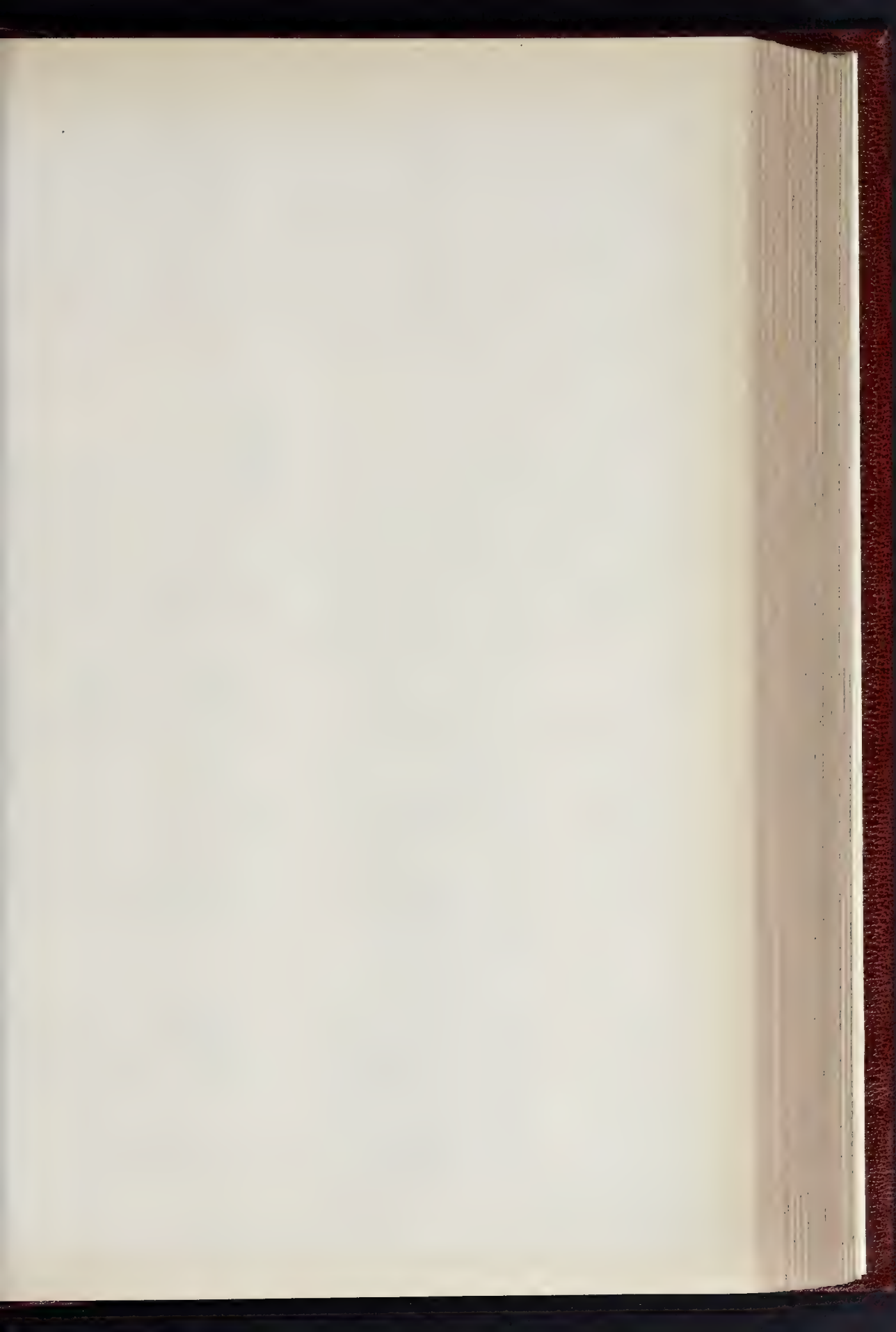


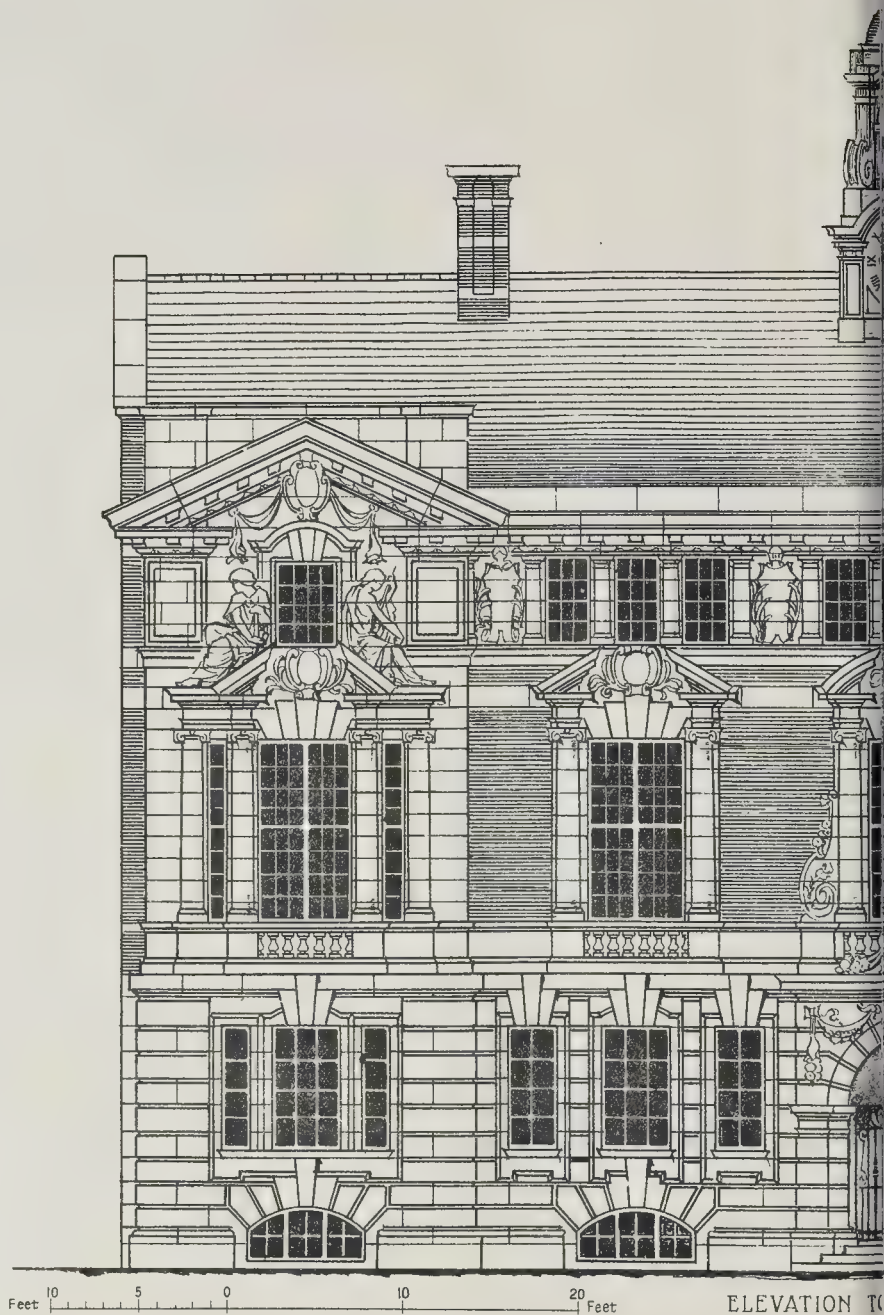
THE BUILDER, SEPTEMBER 27, 1902.

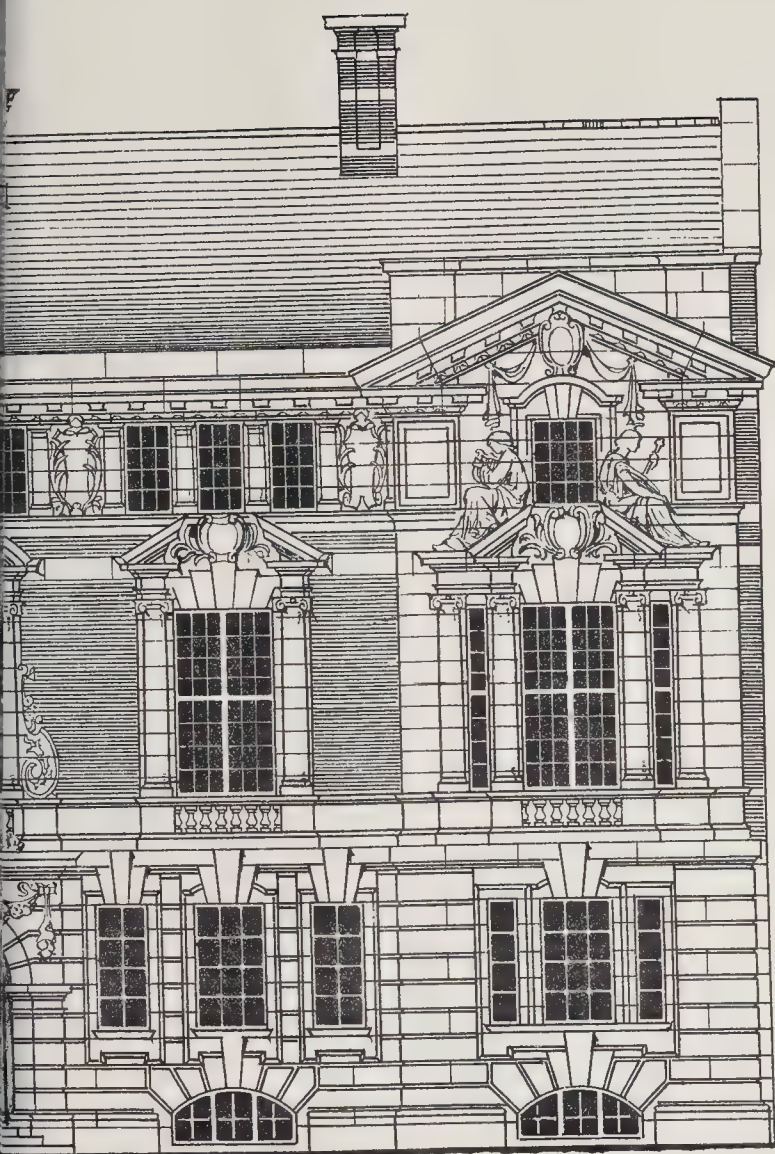




ASCOT PRIORY: NEW WING.—MR. LEONARD STOKES, F.R.I.B.A., ARCHITECT





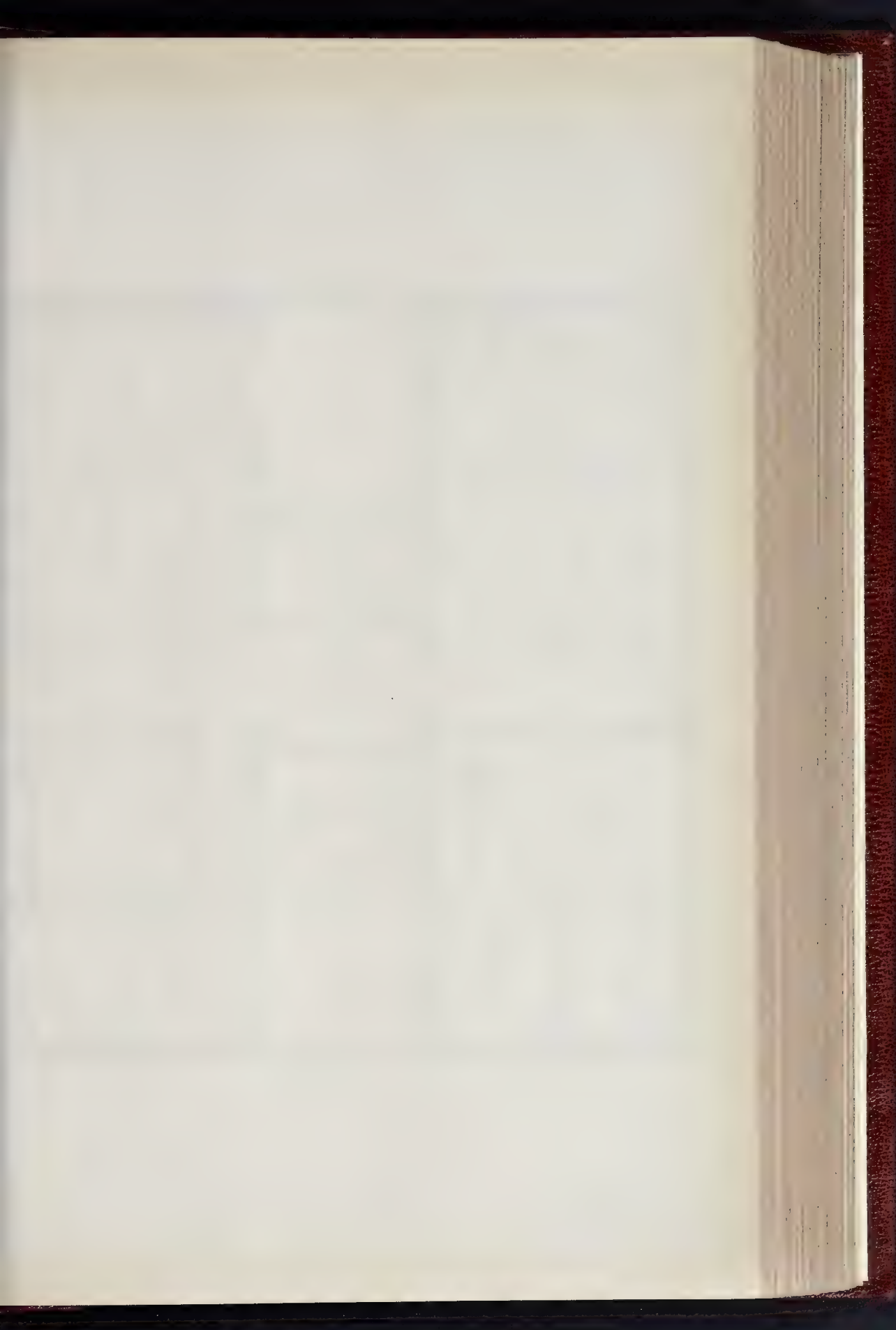


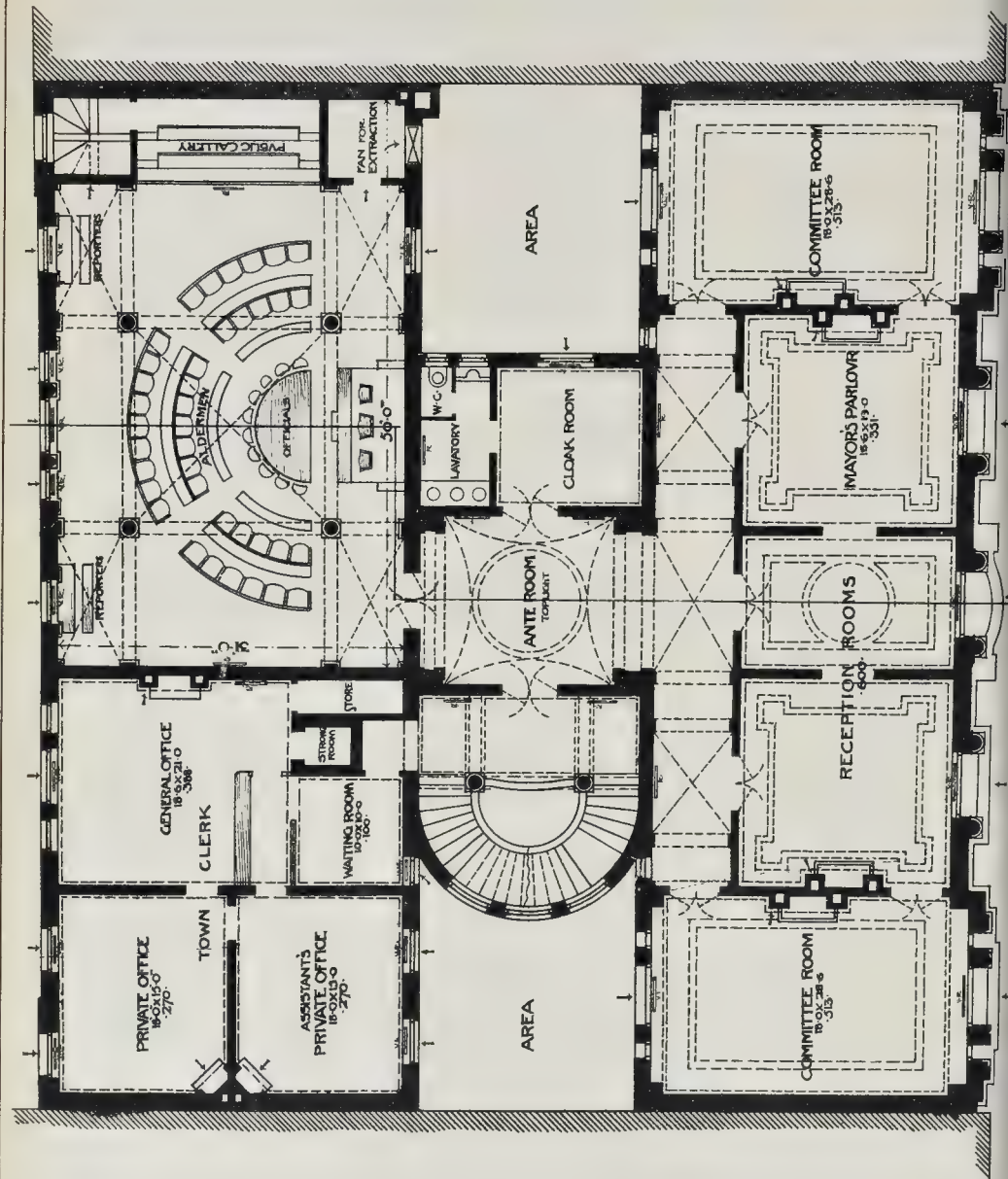
STREET.

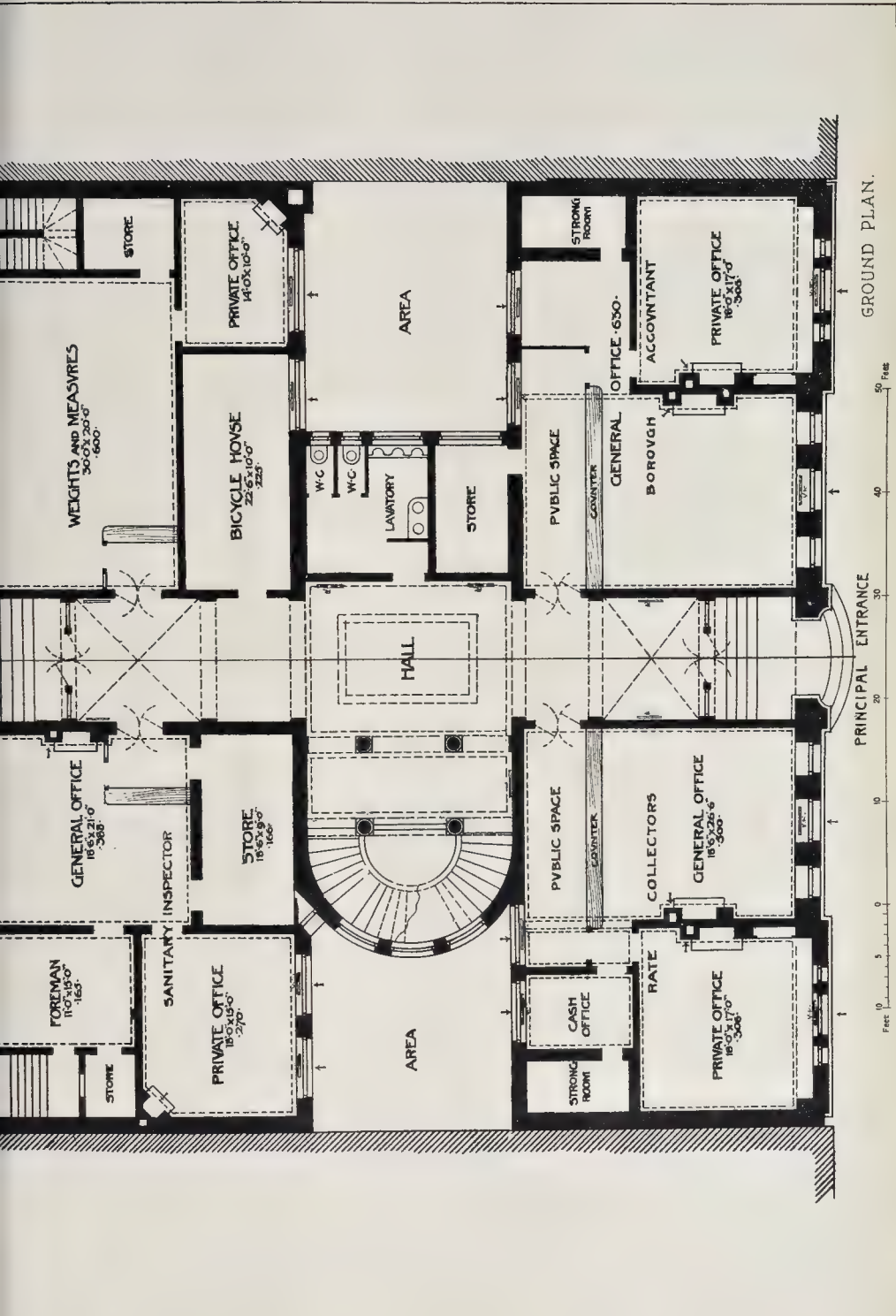
PHOTO LITHO SPRAGUE & CO. LTD. 4 & 5 EAST HARDING STREET, FETTER LANE E.C.

PREMIATED DESIGN.—By MR. H. T. HARE, F.R.I.B.A.

N.

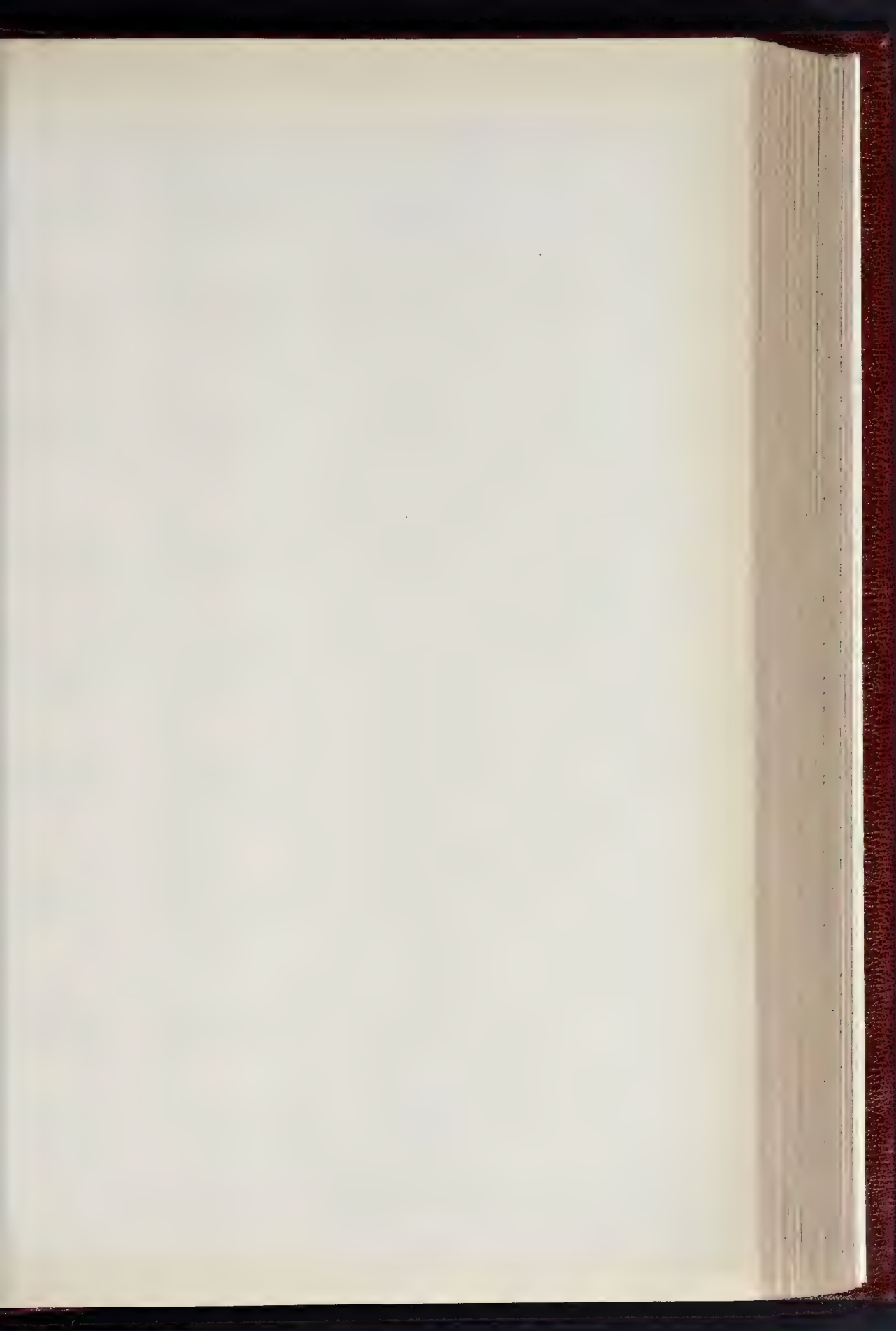




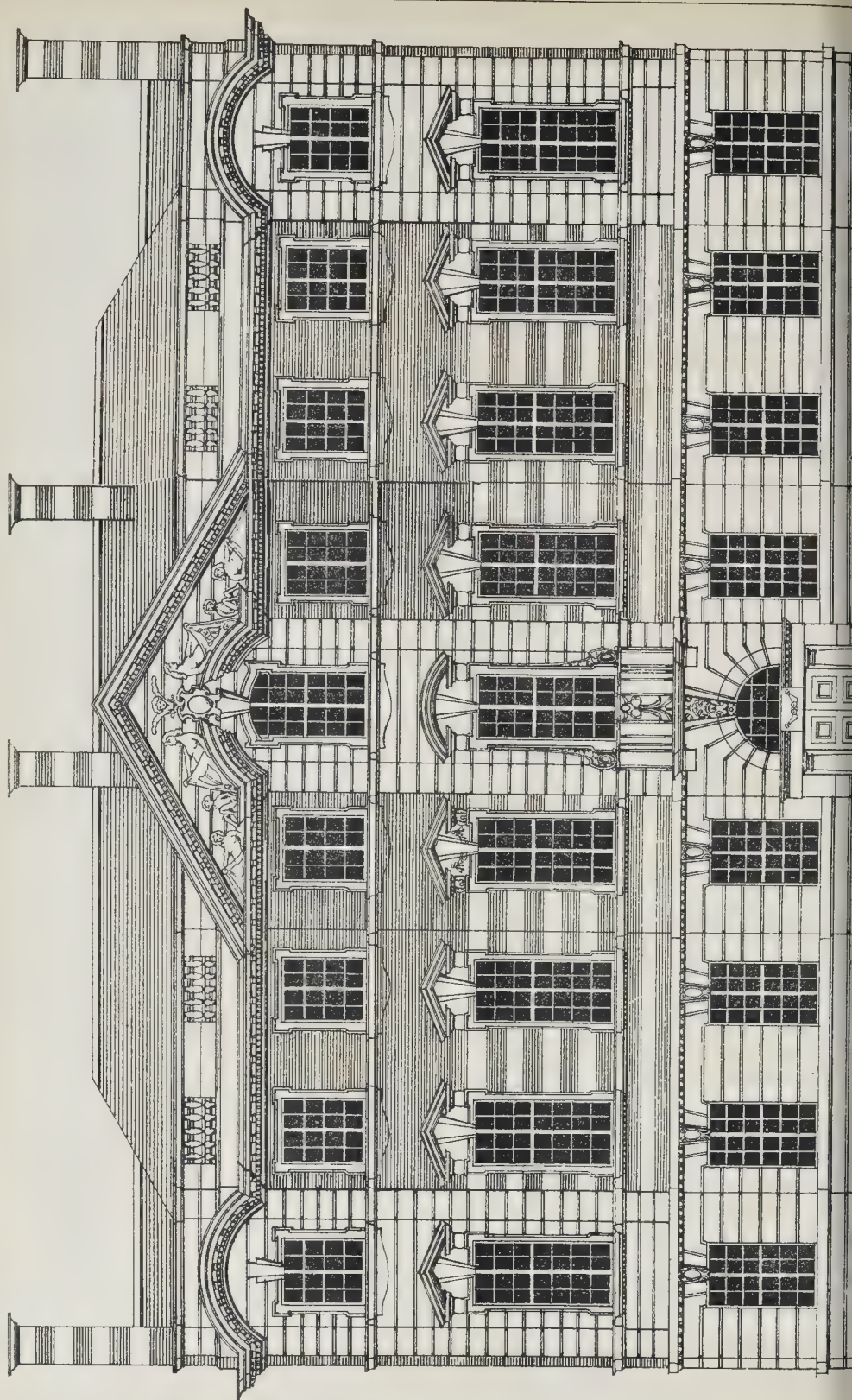


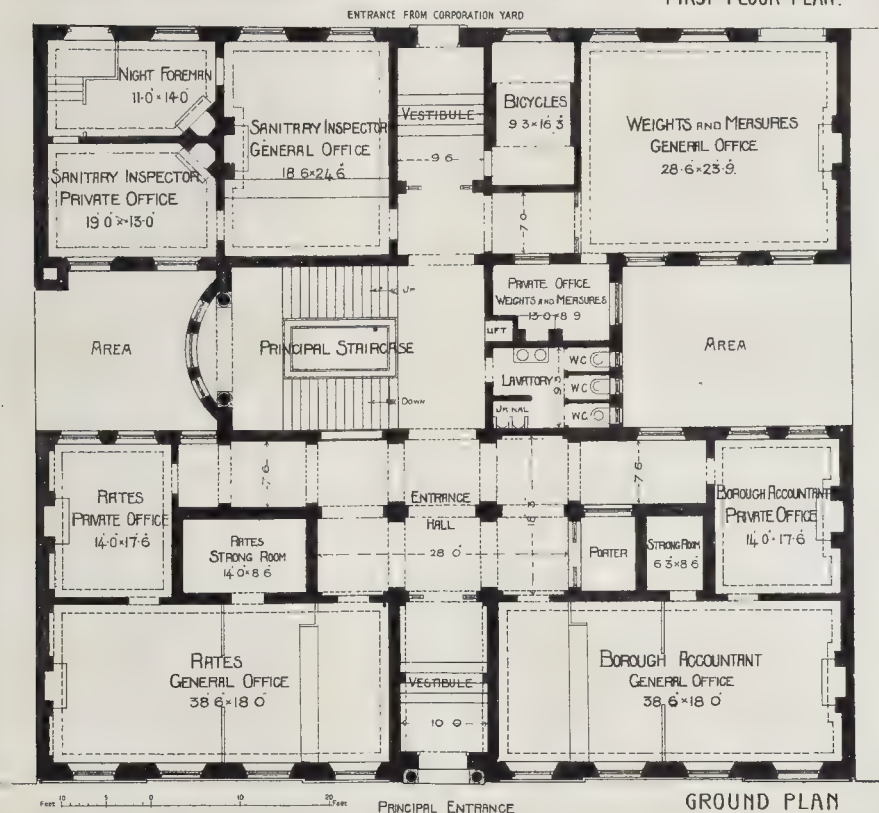
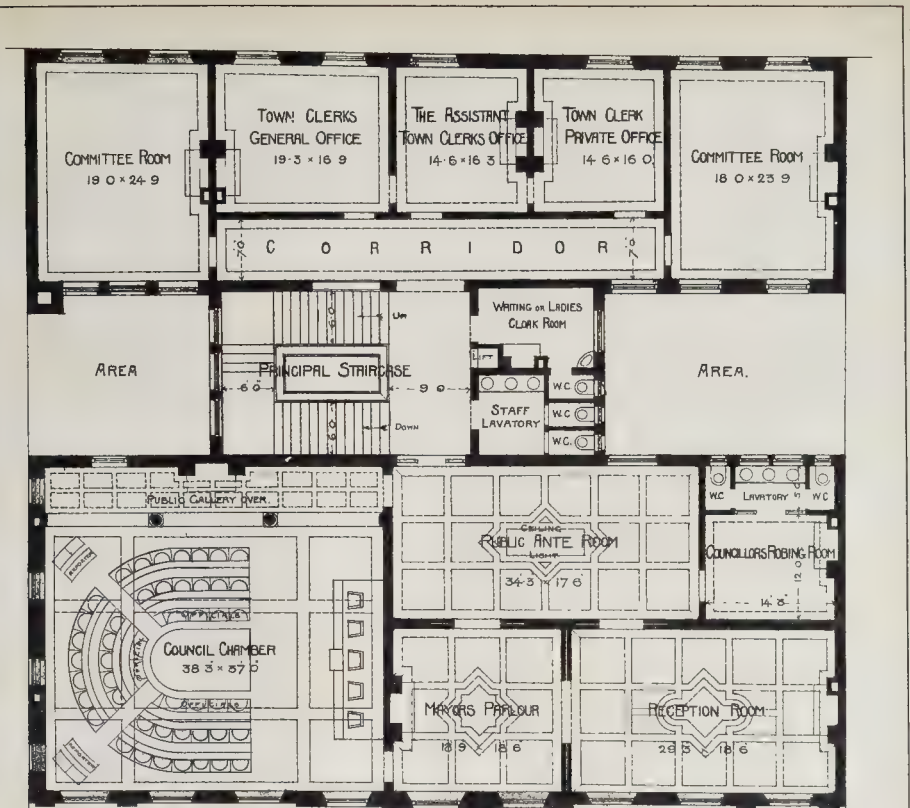
W.N. PHOTOGRAPHIC & C. LTD. 4 & 5 EAST HADDING STREET PETERborough

CREWE MUNICIPAL BUILDINGS COMPETITION FIRST PREMIAED DESIGN.—By Mr. H. T. HARE, F.R.I.B.A.



THE BUILDER, SEPTEMBER 27, 1902





THE PHOTOGRAPHIC & CO. LTD. 4 & 5, EAST HANDING STREET, LIVERPOOL, E.C.

CREWE MUNICIPAL BUILDINGS COMPETITION ONE OF THE SECOND PREMIAED DESIGNS—By MR. A. E. DIXON, A.R.I.B.A.
ELEVATION AND PLANS.

London, W.C. 68. G. Gilbert Scott, 40, York-ansions, Battersea Park, London. 71. Malcolm ark, 11, Little College-street, Westminster, Lon-on, S.W. 95. W. J. Tapper, 1, Raymond-build-
ing, Gray's Inn, London, W.C.

Honourably Mentioned:

17. Sir Thomas Drew, 22, Clare-street, Dublin
18. J. Oldrid Scott, 2, Dean's-yard, London, S.W.
19. A. H. Skipworth, 5, Staple Inn, London. 44.
20. C. Corlette, 2, New-square, Lincoln's Inn, Lon-
don, W.C. 45. C. A. Nicholson, 2, New-square,
Lincoln's Inn, London, W.C. 46. F. Walley, 1,
Ivy-walls, Grey Friars, Chester. 84. Jas. H. Cook,
1, St. George's-crescent, Liverpool. 94. Messrs
Elly & Peach, Victoria Mansions, 28, Victoria-
street, London, S.W.

BOOKS RECEIVED.

REPORT OF PROCEEDINGS OF INTERNATIONAL
ENGINEERING CONGRESS, GLASGOW, 1901. Edited
by J. D. C. Mack. (Glasgow: W. Asher.)
THE ROYAL BOROUGH OF KINGSTON-ON-THAMES.
By Dr. W. E. St. L. Finny. (Homeland Association.)
DESIGNING IRONWORK. Second Series; Part III.
By Henry Adams, M.Inst.C.E. (Published by the
author.)
A TREATISE ON SURVEYING. Compiled by R. E.
Middleton, M.Inst.C.E.; and Osbert Chadwick,
M.Inst.C.E. (E. & F. N. Spon.)

Correspondence.

THE PUBLIC HEALTH ACTS.

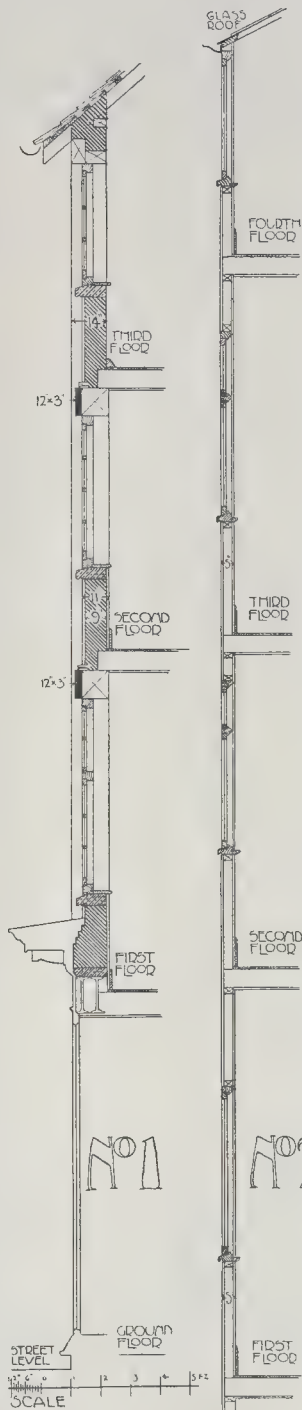
SIR.—The paper upon "The Necessity for
the Reconstruction and Consolidation of the
Public Health Acts," read by Mr. W. H. Wells,
Chief Sanitary Inspector of Newcastle-upon-
Tyne, at the Sanitary Congress in Manchester,
with the subsequent resolution adopted by the
Conference, brings to the front a question
which every one interested in building opera-
tions is doubtless already satisfied requires to
be dealt with promptly; and Mr. Wells's paper
will, I hope, create that general public demand
or a reform which always seems necessary to
induce the Local Government Board and Parlia-
ment to adopt it.

One of the chief difficulties in the rational
application of the Public Health Acts as affect-
ing buildings appears to be that the by-laws
which have been drafted under those Acts,
upon the lines of the Local Government
Board's Model By-laws, are chiefly *positive*
instead of *negative* by-laws. The effect of this
principle of drafting them, coupled with the
infrequency of their revision, is that new im-
provements in construction, which were not
anticipated at the time of the promulgation of
the by-laws, are either excluded from use, or
else, from the obvious absurdity of any other
course, the authorities ignore their own by-
laws, so as to permit of such new methods of
construction being adopted.

For instance, in many by-laws it is stipulated
that walls are to be built of "good, hard,
sound, and well-burnt bricks, stone, or other
hard and incombustible material," and the
thicknesses of the different walls are specified;
consequently it is not permissible to build them
of armoured concrete, for instance, though
equally constructional, excepting upon the
basis of the same thickness as is required for
an ordinary brick wall. Or again, the cover-
ing of roofs is to be of "slates, tiles, metal, or
other incombustible materials," under which
by-law a concrete flat covered with "rock
asphalt"—which is obviously stronger and
more fireproof than a roof formed with
wooden rafters and slates—is not allowable.
Another example: The by-laws seem, to judge
by results, to have the effect of reducing the
air space at the fronts and backs of houses in
our cities to the barest limit, yet the same laws
are ludicrously applied, without modification,
to houses built far away in the country; and
I have known of a building owner being sum-
moned for not providing, within some 2 ft. or
3 ft., the regulation depth of air space at
the back of his house, though the adjacent
and for miles around is agricultural land, and
his own land, upon which the house is erected,
comprises upwards of seven acres. Surely it
should not be beyond the wit of an ordinary
parliamentary draftsman to devise by-laws
which would possess greater adaptability to
altering circumstances, and stronger evidences
of common sense.

Instances of a similar kind are innumerable,
and they are not confined to the ordinary Local
Government Board model type of by-laws, but

also may be culled from those of cities whose
by-laws or regulations have been sanctioned
by virtue of special Acts of Parliament; and
the diagrams accompanying this letter refer to



two of the most absurd results which have
come under my notice of the "cast-iron"
application of by-laws of the "positive"
character, and of the need for those of a

"negative" character respectively. They are
taken from two recently erected buildings in
Liverpool, which, though not quite so building-
by-law-ridden a place as London, nevertheless
possesses many Acts of Parliament to control
building operations which are of a stupid and
antiquated character; and this notwithstanding
that their drafting has greatly devolved upon
that very able Building Surveyor, Mr. W.
Goldstraw.

In regard to diagram No. 1, the building,
which is situate upon a main thoroughfare,
covers about 58 sq. yds., is four stories high,
the lower part a shop, the upper stories three
small workrooms. In this case the building
owner has been compelled to erect two pieces
of wood, 16 ft. 9 in. by 12 in. by 3 in., in the
positions shown by the section, for the follow-
ing three reasons, viz.: (1) that the part occu-
pied by the windows is held to be a "recess";
(2) that the pieces of wood are "important for
the stability of the building"; and (3) that "it
is vital in order to secure uniformity of practice
in the administration of the by-laws."

That the pieces of wood serve no con-
structional purpose whatever, and that they
are harmful as a means of collecting wet, is
obvious; but the building owner has consented
to erect them because it is cheaper to do so
than to defend an action taken by a wealthy
Corporation. The next owner affected by the
by-law in question will probably elect to do
the same, and so the by-law will remain
unaltered, and the absurdities will be repeated.

In regard to diagram No. 2, the building is
situate upon a main thoroughfare, covers about
700 sq. yds., is five stories high, the lower
part shops and the upper stories offices. In
this case the building owner has been allowed
to have the joint use of the wooden staircase of
an adjacent building (six stories high and
covering an area of 1,300 sq. yds.) as his
only means of access to the street from the
upper stories, and the diagram shows the
wooden passage 4 ft. 6 in. wide by 7 ft. 11 in.
long, with external walls (*sic*!) only 5 in. thick,
formed of wooden studding and matched
boarding, which upon each floor affords the
only means of access from this building to the
before-named wooden staircase. The result in
case of fire is obvious.

These two examples are typical, and though
more could be given, they are sufficient to
sharply illustrate the "straining at gnats and
swallowing of camels" which results from the
application of "positive" by-laws.

It is difficult to convince the ordinary lay
mind of the urgent need for the revision of
building by-laws even in the interests of sani-
tation, and it is still more so to convince it in
the interests of architecture. Yet the title of
Mr. Wells's paper must certainly appeal to
architects, and encourage them to renewed
effort towards the reform of building by-laws in
the interests of architecture as well as of sani-
tation.

To give one example from Liverpool on this
feature of the case. Under the by-laws it is
not permissible to bring the frames of windows,
if set in brickwork, within 4½ in. of the external
face of the outside wall; yet there is in Liver-
pool, in a prominent thoroughfare, a new
corner building which has no brick walls
towards the two streets throughout two stories,
and the outer wall (*sic*) or casing of which is
entirely glass (comprising an area of some
3,600 sq. ft.), and is some 3 in. in advance
of the face of the external wall; and this, be it
noted, with the special approval of the authori-
ties.

One could cite numberless instances of this
kind of thing which have occurred under urban
and rural building authorities in the country.
Every architect has doubtless experienced the
need for revision of the building by-laws. Mr.
Lever, Mr. Cadbury, and other promoters of
model towns have, I believe, expressed them-
selves strongly on the subject—and they must
surely be free from the charge of wishing any-
thing but sound building—and the time seems
to have arrived when the question should be
taken up and earnestly pressed to a successful
issue by architects.

Liverpool. T. MYDDLETON SHALLICROSS.

CREWE MUNICIPAL BUILDINGS
COMPETITION.

SIR.—In the *Builder* of the 20th inst. you criticise
our design for the Crewe Municipal Buildings, and
say that borrowed light is used in the public offices
of rates and borough accountant. Such may have
been the impression from a hurried glance at the

designs, but we may point out that direct light is provided to both the above-mentioned departments. The laboratories were placed as shown because, in our opinion, they were required by the conditions.
BANISTER FLETCHER & SONS.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

13.—HARDENING AND TEMPERING STEEL.—STEEL ALLOYS—THE CORROSION AND PROTECTION OF IRON AND STEEL.

STEEL which contains more than 0.5 per cent. of carbon becomes much harder and more brittle when suddenly chilled from a red-hot condition. The larger the proportion of carbon, the greater is the hardness of the rapidly-cooled steel. Steel cutting tools are shaped while the steel is in a condition suitable for forging, and are then hardened and tempered. The following table shows the approximate proportions of carbon commonly present in the hard steel used for different tools:—

Per cent. Carbon.	
1.3 to 1.5	in steel used for razors.
1.2 to 1.4	" " saw files
1.1 to 1.2	" " drills and turning tools.
1 to 1.1	" " spindles and large tools.
0.9 to 1.0	" " cold chisels.
0.8 to 1.0	" " cold sets and shears.
0.7 to 0.8	" " dies.

Mild steel cannot be sensibly hardened by sudden chilling, but the proportions of carbon usually present in mild steel articles of various descriptions are as follows:—

Per cent. Carbon.	
0.3 to 0.5	in steel used for tyres, rails, cannon, &c.
0.2 to 0.3	" " boiler plates.
0.15 to 0.2	" " crank axles.

Hardening.—The steel in a red-hot condition is usually immersed in cold water or oil. As a general rule, the more rapid the cooling of the metal the greater is its ultimate hardness. Red-hot steel is cooled less rapidly when immersed in oil than when immersed in water, and oil is therefore employed when a high degree of hardness is not required. When an extremely high degree of hardness is required the heated steel may be immersed in mercury instead of into cold water, as the steel is thereby more rapidly cooled.

Tempering.—The article, after hardening in this manner, is, in most cases, too brittle for use, and is usually tempered. Tempering consists in reducing the hardness and brittleness by reheating the metal to a moderate temperature and then cooling it. If the temperature to which the metal is reheated does not approach that at which it becomes red hot it is immaterial whether the cooling be slow or rapid. If the metal were reheated to redness and then slowly cooled it would return to the condition in which it existed before hardening. The higher the temperature to which the steel is reheated the less will be the hardness of the tempered steel.

As the steel is heated for tempering it becomes covered with an iridescent film of oxide, the predominating colour of which varies with the temperature to which the steel is heated. The colour of the oxide film affords, therefore, a rough indication of the temperature of the steel, and as different articles require tempering to a different degree, the colour indication is used as a thermometric guide. Phillips gives the following as suitable tempering temperatures for different articles, and the corresponding colours of the oxide film:—

Temp. deg.	Colour of Film.	Articles Tempered.
430 ..	Very faint yellow	.. Lancets.
450 ..	Pale straw	.. Razors and surgical instruments.
470 ..	Full yellow	.. Penknives.
490 ..	Brown	.. Scissors and cold chisels.
510 ..	Brown with purple spots	.. Axes, plane irons, pocket knives.
530 ..	Purple	.. Table knives, large shears.
550 ..	Bright blue	.. Swords, watch springs.
560 ..	Full blue	.. Fine saws, augers.
600 ..	Dark blue	.. Hand and pit saws.

The steel must, of course, be of suitable composition. Satisfactory razors, for example, could not be manufactured with steel contain-

ing only 0.6 per cent. of carbon, even though the greatest care were exercised in hardening and tempering.

Another method of estimating the temperature to which the steel is heated when tempering is to smear the metal with tallow, and observe the effects of the heat upon the fat; or a suitable alloy, which melts at the temperature to which the steel should be heated, may be manufactured, and the steel dipped into the alloy as soon as it assumes a molten condition.

Casting Mild Steel.—Owing to its high melting point, steel has to be cast at a very high temperature. The melting points of cast iron, steel, and wrought iron are:—

Cast iron.....	1,350 to 1,400 deg. C.
Steel.....	1,300 to 1,400 deg. C.
Wrought iron.....	1,500 to 1,600 deg. C.

The milder the steel the most closely will its melting point approximate to that of wrought iron.

Instead of first converting the metal into pigs or ingots, and then re-melting it for casting, as in the case of iron, it is usual to run the steel direct from the furnace in which it is made into a ladle, and from thence into the moulds.

Blowholes.—The metal, while liquid, absorbs some of the air and carbon monoxide with which it comes in contact in the furnace, but as the metal cools the gases are to a large extent expelled. When the molten metal is withdrawn from the furnace the gases escape freely from the cooling but still perfectly fluid mass, but as the metal assumes a semi-solid or pasty condition it sometimes still contains gases which have failed to escape, and which are imprisoned in the metal even after it has completely solidified. These imprisoned gases form the cavities or "blowholes" sometimes found in otherwise excellent castings.

To prevent blowholes a very small quantity of aluminium is often added to the molten steel while it is in the ladle. The aluminium causes the molten steel to cease evolving bubbles of gas, and castings free from blowholes are obtained; but no satisfactory explanation has yet been given as to what becomes of the gases. It is believed that they remain in solution in the solid metal.

Other methods of preventing blowholes are:—(1) Agitating the molten steel while in the ladle; (2) retarding the rate of cooling; and (3) casting the metal under pressure.

Steel Alloys.—Of the innumerable alloys of steel which have been recommended from time to time the following are the most important:—

Manganese Steel is made by adding ferro-manganese to the molten steel contained in the ladles which receive the output from the steel-producing furnaces. The amount of manganese which may be alloyed with steel in this way may be as much as 20 per cent., but steel containing 14 per cent. appears to be the strongest and toughest. Manganese steel is especially suitable for castings, for the alloy becomes perfectly fluid and is less liable to contain blow-holes than ordinary steel. Manganese steel is difficult to work owing to its extreme hardness, and it is practically impossible to weld it.

Chrome Steel contains 2 per cent. or less of chromium, and is made by adding ferro-chrome to molten mild steel. Chrome steel is very hard, but is difficult to work or weld, and does not cast well.

Nickel Steel is made by adding metallic nickel to molten mild steel. When the nickel exceeds 1 per cent. it is almost impossible to weld it. The nickel increases the hardness and toughness of the steel, the hardness increasing until the nickel amounts to about 20 per cent.

Tungsten Steel is made by adding about 2 per cent. of tungsten to molten steel. Tungsten steel is extremely hard, and is used for the manufacture of drills and cutting tools.

Corrosion of Iron and Steel.—The corrosion of iron or steel is usually the result of the joint action of atmospheric moisture, oxygen, and carbon dioxide. Iron rust consists mainly of hydrated ferric oxide, but usually also contains small proportions of magnetic iron oxide (Fe_3O_4) and traces of silica and carbonate of iron.

Cast-iron, wrought-iron, and steel are all subject to corrosion when exposed to the atmosphere. The comparative rates of corrosion of these different forms of iron are a matter of dispute. Mild steel was at one time generally believed to rust more rapidly than iron, but that notion is being abandoned, and steel is now used for both the boilers and the

plates of ships. Nickel steel appears to resist corrosion much more effectively than ordinary steel.

Natural waters always contain dissolved carbon dioxide and oxygen, and, therefore, have a corrosive action upon iron and steel. Sea water is more strongly corrosive than fresh water, and the presence of sewage matter in water also accelerates corrosion.

When the iron, in addition to being exposed to moist air is also in contact with a metal which is electro-magnetic to it—such as tin, lead, or copper—an electrolytic action is set up and corrosion is very rapid. Zinc is electro-positive to iron, and no electric action is produced, therefore, when zinc is allowed contact with moist iron.

Iron is readily attacked by most acids, and is therefore more rapidly corroded in the atmosphere of towns and tunnels than in the open country.

Preservation of Iron.—Iron may be protected from corrosion by covering it with a coat of some more durable material. The protecting coat may consist of (1) another metal, (2) an oxide film, (3) paint or varnish, or (4) enamel.

Tinned Iron.—Articles of tinned iron are made from sheets of wrought iron or thin Bessemer steel which have been tinned by being passed through a bath of molten tin. The tin forms an alloy with the iron, and adheres perfectly to the surface of the sheet metal. Tin is not oxidised by moist air, and so long as this metal alone is exposed to the atmosphere the iron beneath it will not rust. But in practice it is impossible to altogether avoid minute pin-holes in the tin coating, and the iron is sooner or later attacked when the tinned iron is exposed to damp air. As soon as spots of iron rust appear on the surface of the tinned iron, corrosion progresses rapidly.

Galvanised Iron.—Iron coated with metallic zinc is known in commerce as galvanised iron. Instead of making zinc-coated articles from sheets of the coated metal, as in the case of tinned articles, it is usual to first manufacture the articles in sheet iron and, after cleaning them, to dip them into molten zinc. In the case of corrugated iron, the sheets of iron are first "pickled" in hydrochloric acid to give the iron a clean surface, then dipped into zinc chloride, and are finally passed through molten zinc. Small articles are usually allowed to remain suspended in the molten zinc for a short time. Galvanising is sometimes effected by depositing zinc upon the surface of the iron by means of an electric current, i.e., by an electro-plating process.

Oxidised Iron.—Iron may be protected by so treating the metal that a film of magnetic iron oxide is produced upon its surface. The oxide forms a smooth, thin, dead-black coat, completely covering the iron, and so long as the coat remains perfect it completely protects the iron from corrosion. If, after oxidation, the iron were hammered or rolled, it would no longer be protected from atmospheric action, for the film of oxide would be fractured in a number of places.

The film of magnetic iron oxide is produced upon the articles to be treated by heating them to dull redness in a muffle furnace into which a current of superheated steam is blown for one or two hours. The steam converts the surface of the iron into black magnetic oxide (Fe_3O_4).

Painted Iron.—Iron and steel structures are usually protected by painting them. The metal should first be carefully cleaned with steel wire brushes, then coated with boiled linseed oil, then given two coats of red lead, and finally painted with one or more coats of a paint of the desired colour, usually red oxide of iron. Bridges and other structures exposed to wind and rain should be repainted triennially. For iron pipes to be laid underground coal tar, free from water, forms a useful preservative paint. Domestic furniture and utensils of iron are often japanned, i.e., coated with black varnish and heated in an oven at a moderate temperature.

Enamelled Iron.—Iron utensils are often enamelled. A fusible mixture of china clay with suitable fluxes is placed on the article to be enamelled, and the article is then fired in a muffle furnace at a high temperature. The process of enamelling iron is somewhat similar to that already described when referring to the manufacture of glazed bricks. Different firms have each their own particular method of enamelling.

Iron and Steel in Concrete.—Columns of iron

d steel are now commonly used as a core in cwork and concrete, and the metal being parently shut off from contact with the atmosphere is regarded as incorrodible. That corrosion of the metal is entirely prevented is improbable, and it is possible that many large modern buildings which owe their stability to concealed metal, will have become unsafe before a hundred years have elapsed, although it is true at under the most favourable conditions iron embedded in cement may be preserved in excellent condition for centuries.

Microscopical Examination of Iron and Steel.—When examined under the microscope, iron and steel are found to be composed of a number of different crystalline bodies irregularly mixed. During recent years, much attention has been devoted to the appearance of the different descriptions of iron under the microscope, and by observing the relative proportions of the different bodies present, it is possible to obtain fairly accurate conception of the physical properties of the metal under examination.

GENERAL BUILDING NEWS.

CHURCH, LFRACOMBE.—The Bishop of Exeter (Dr. Ryle), on the 15th inst., laid the foundation-stone of the new St. Peter's Church, Lfracombe, which is being erected at a cost of 6,000*l.*, in Highfield-road, on the site formerly occupied by a temporary iron building. It will be a chapel of ease to the mother church of Holy Trinity, The new church will be built of pink limestone facings, with Bath stone dressings. The inside facings are to be of dressed ashlar from Hangman, Combe-martin, the floors being of wood blocks, with tiled aisles. The heating chamber is to be fixed near the south-east corner floor, level with the galleries over, and a portion will be devoted to an organ chamber. There will be a tower in the north-east corner adjoining Highfield-road, and it will be furnished with a battlement turret, surmounted with a vane. Provision is to be made for a peal of bells. The roofs are to be open in construction and covered in red tile. The plan of the new church is: A broad nave, 34 ft. by 24 ft., chancel 34 ft. 6 in. by 21 ft. 6 in., chapel 17 ft. by 10 ft. 3 in., two transepts 35 ft. by 15 ft. each, two aisles 48 ft. by 10 ft. each, giving seating accommodation for about 700 adults. A niche over the front entrance with a canopy will be occupied by a figure representing St. Peter. The chancel screens and seats will be of oak. Mr. G. H. Fellows, Brynne, of Westminster, is the architect, and the builder is Mr. Pickett.

CHURCH EXTENSION, HALIFAX.—The cornerstone of an enlargement of Halifax Church has just been laid. The enlargement will involve an expenditure of 2,500*l.* The scheme includes the addition of a Lady Chapel, which will accommodate several of the eighty pews; two new vestries under it; and a north aisle, with new entrance. Mr. W. C. Williams is the architect.

CHURCH, LISNAKEA, IRELAND.—On the 15th inst., the foundation-stone of the new Church of the Holy Cross, Lisnakea, near Enniskillen, was blessed. The church is being built in the Gothic style, on the site of the old church, under the supervision of Mr. Thomas F. McNamara, architect, Dublin. Local stone is being used in its construction, and it will have cut stone dressings throughout. The side chapels will be separated from the chancel by clustered shafts of polished granite, which will carry the deeply-moulded chancel arch and side chapel arches. A feature of the structure will be the tower and spire, the height of which will be 150 ft.

WESLEYAN CHURCH, HELMSLEY, YORKS.—A new Wesleyan church has just been opened at Helmsley. The cost has been upwards of 2,000*l.*, and seating accommodation is provided for 330 worshippers. The architects were Messrs Horsey & Monkman, York.

CHURCH, DALMUIR, DUMFRIES.—The memorial-stone of a new parish church, Dalmuir, has just been laid. The church will be seated for 750, but can be enlarged later when necessary by the construction of galleries. The architect is Mr. Geo. Paterson, Glasgow.

PRIMITIVE METHODIST CHURCH, LEEDS.—The foundation-stone of a new Primitive Methodist church and schools, to be erected at Harehills-avenue, Leeds, was laid recently by Sir James Kitson, Bart., M.P. The buildings have been designed by Mr. W. H. Dinsley, architect, Chorley, and will be in the Late Gothic style. The church, which will provide accommodation for 550 worshippers, will have a spire about 70 ft. in height. In the schools 300 scholars will be accommodated. Various classrooms, minister's vestry, and other rooms will be provided. The cost of the buildings (exclusive of the site) will amount to 5,500*l.* The contractor for the work is Mr. W. Lowley, Leeds.

CHURCH, IPSWICH.—The new district church of St. Thomas, which was erected beside the Bramford road, was opened recently. The building is faced on the outside with corrugated iron, and the walls rest on a foundation of concrete and brick; the wooden framework is lined with non-odorous

felt and polished pitch-pine; the roof is carried to a considerable height; and the interior is lighted by five double lancet-headed windows on either side. For seating, chairs are provided, accommodation being thus found for about 250 persons. The designs were prepared by Mr. Raymond Winch, and the work has been carried out by Mr. W. H. Death.

CHAPEL, BARRY.—The memorial stones of the new chapel of Bethel English Baptist Church, Barry-road, Barry, have just been laid. The new chapel, which is being built of stone with Bath stone dressing, will provide seating accommodation for about 700 worshippers. Underneath is a school-room which will hold 500. The new building will cost about 3,500*l.*, and is being erected by Mr. J. Prout, contractor, Barry Docks, from plans prepared by Messrs. Morgan & Sons, architects, Carmarthen.

BUSINESS PREMISES, SHEFFIELD.—New premises are being built for Messrs. Marples at the corner of High-street and Market-street, Sheffield. The building, which will contain six stories without the basement, will be 60 ft. high, and a couple of turrets at the corner will be carried 10 ft. higher. The material used for the first story is glazed Doulton ware, of pencilled blue and green in the lower parts, and buff terra-cotta above. The upper portion of the building will be of terra-cotta and red bricks. The buildings have been designed by, and are being erected under the supervision of, Mr. Walter Emden, of London, and Messrs. W. H. Ansell and Son, of Sheffield, who are acting as joint architects. The general contractors for the work are Messrs. George Longden & Sons, Ltd., of Sheffield.

PARISH HALL, CROMER.—A new parish hall has been erected at Cromer, adjacent to the cottage hospital. The hall, which was designed by Mr. A. F. Scott, of Norwich and Cromer, is Gothic in style, and Messrs. Goring & Smith, of Cromer, were the builders. It consists of nave, two transepts, and apse, and has a total inside measurement of 102 ft. by 50 ft., or, exclusive of the apse, it is 74 ft. in length. It is constructed of red brick, with slated roof, and has clearstory windows carried on steel girders, supported by iron columns; and it provides seating capacity for about 800. There are two entrances, the main one facing the north into Church-street, and the other south, giving access from Lowden-lane, and on each side are 4-ft. concrete footways. At the south end of the building are vestry-rooms, on each side of the apse. The ceiling is a coiled one, divided into six panels by moulded ribs. The flooring is wood block. The ventilation of the building is by Messrs. R. Boyle & Son's system. Provision is made for the conversion of the transepts into a series of classrooms, by means of wooden sliding blind partitions. And these, again, it is intended to have made so as to admit of further subdivision, so as to give in each transept three classrooms of a capacity of about 25 ft. by 15 ft. Below the north window is a small gallery that will be of use for magic-lantern purposes.

WORKHOUSE HOSPITAL, SUNDERLAND.—The new hospital which has been erected at Sunderland workhouse at a cost of 40,000*l.* was opened on the 17th inst. The architects were Messrs. W. & T. R. Milburn. The hospital, which is built in a field of about six acres at the west side of the workhouse ground, consists of an administrative block, a pavilion for male inmates, a pavilion for female inmates, and a maternity hospital. The administrative block is in the centre of the site. On the ground floor of this block on either side of the doorway are sitting-rooms for the superintendent nurse and the resident medical officer. On the ground floor are separate waiting-rooms for female and male outdoor patients from other parts of the workhouse, as well as a consulting-room, a surgical room and dispensary for the doctor. The lady superintendent's office is at the back of the building, and in this room is a clock which, by being electrically connected with all the wards, records the visits paid to patients by nurses, when such record is desired. A combined weight and measure apparatus stands in the same room, and the telephone is also fitted, with communication round the buildings. The first floor contains dining and sitting-rooms for the nurses. Storerooms for linen, and a kitchen for the block are also on this floor. A story higher are the nurses' bedrooms, and the attics are for the use of the domestic staff. The various floors are reached by stone stairs, while at every landing is a corridor running at one end to a balcony, from which iron steps lead to the ground, affording a means of escape in case of fire. A covered-in corridor runs along the back of the administrative block, leading up to the male pavilion and south to the female pavilion. The two pavilions are planned exactly alike. They are two stories in height, and will each accommodate about 200 patients. On each floor there are large and small wards, as well as separation rooms. The duty-room contains a small kitchen range for the purpose of heating water, &c. A day-room is also provided where convalescent patients may sit, to read or play games. The buildings are heated by fireplaces in the smaller rooms, Shorland's ventilation stoves in the wards, as well as by hot-water. From any part of the ward patients can call the charge-nurse by means of electric bells. The maternity hospital

stands by itself to the south of the ground in front of the administrative building. It contains ward-rooms, two separation-rooms, ward kitchen, and store-rooms. The whole of the buildings are fire-proof throughout, and hydrants and hose-pipes are placed in positions inside the walls, while an underground tank has been constructed close by for the use of the Corporation fire-engines, should they be required. On the outside of every building is placed iron fire-escape staircases, with easy access to each floor. All the pipes for water, heating, &c., are carried in large subways beneath the floors. In every case the sanitary fittings are built outside of the main buildings in sanitary towers and attached to the hospitals, with cross-ventilated, detached lobbies. The walls are all lined with glazed brick. All the floors are of pitch pine, polished, and all internal walls are finished with Parian cement. There are no corners about any of the buildings, all the angles being rounded off. For the heating of the building radiators are placed in special recesses beneath the window openings, and each is provided with and connected up to a fresh-air conduit, the quantity of air admitted being controlled by a shutter arrangement. The whole of the buildings are lighted with electricity from the Corporation mains. The contractors were Messrs. D. and J. Ranken. Messrs. R. T. Vaux & Sons are responsible for the heating arrangements, and Messrs. Reed, Ferens, & Co. for the electric lighting. The work has been carried out under the superintendence of Mr. A. J. Wilkins, clerk of works.

GRAMMAR SCHOOL, ASHBY-DE-LA-ZOUCH.—New buildings, erected at a cost of over 10,000*l.*, for the Ashby-de-la-Zouch Girls' Grammar School were opened on the 16th inst. The site is situated between the Nottingham and Leicester roads. The school has been designed to accommodate 180 pupils, and is in conjunction with the head mistress's house, which provides accommodation for the school staff, and thirty-eight boarders. The school contains assembly hall, 50 ft. by 28 ft., four classrooms, artrooms, physics laboratory, lecture theatre, cookery-room, chemical laboratory, with balance-room adjoining, five music-rooms, which are separated from the main school by a corridor, the walls of which, together with those around the rooms, are built hollow, and filled in with silicate cotton; a layer of this material is also placed above the ceilings to deaden the sound, and, as an additional precaution, double doors have been arranged throughout this department. Two separate cloak-rooms for day girls and boarders are provided off the main corridor. The house contains, upon the ground floor, entrance hall, dining and drawing rooms, dining hall, 20 ft. by 22 ft., separated by a screen from the kitchen, below which is the provision cellar, and beyond a scullery, larder, tradesmen's entrance, servants' staircase, and domestic offices. On the first floor there are six bedrooms, sewing-room, boxroom, assistant mistress's sitting-room, a rest room, with bathroom and lavatory adjoining. On the second floor are situated four large dormitories, divided into cubicles, for the accommodation of thirty-eight boarders and two mistresses, together with bathrooms and lavatories, also bedrooms for servants, entirely separate from the dormitories, and having an independent staircase to the ground floor. The stairways are constructed in stone, and a separate emergency iron staircase from the dormitories is also provided. Externally, the building is of a Renaissance character, the front elevation having a tower and two gables, with a Mansard roof between, surmounted by a large ventilating turret. The building is of bricks, with stone dressings. The roofs are covered with Staffordshire tiles. Internally, the walls of the main entrance, boarders' hall, cloak-rooms, and lavatories are lined with a cream tiled dado. The assembly hall has a pitch pine dado. The whole of the school floors on the ground floor are of maple boards. The heating is by low pressure hot water, and a special scheme for fresh air inlet and exhaust ventilation has been provided for each room. The general contract has been entrusted to Messrs. W. Moss & Sons, Ltd., Loughborough, and Mr. W. G. Brown, Leicester, as joint contractors, and the whole of the works have been carried out from the designs and under the supervision of Messrs. Barrowcliff & Alcock, architects, Loughborough, Mr. G. T. North, acting as clerk of the works.

VICTORIA HALL, WIGAN.—The new Victoria Hall in Wallgate, Wigan, was opened recently. The hall has been erected in memory of her late Majesty, Queen Victoria, and outside of the building over the entrance is her bust. The edifice will be the headquarters of the Wigan and District Gospel Mission, and has a seating capacity for about 500 persons. The architects are Messrs. J. B. and W. Thornley, of Wigan, and the builders, Messrs. J. Wilson & Co., of the same town.

OFFICES AND WAREHOUSES, PERTH.—New offices and warehouses have been erected for Messrs. Arthur Bell & Son, spirit and wine merchants, in Victoria-street, Perth. The new buildings consist of public offices, with waiting-room, private office, sample-room, &c. Behind are warehouses three stories high, with cellars underneath. The main warehouse is 70 ft. by 30 ft. The front is of Dumfriess red stone. The buildings were designed and are being erected under the superintendence of Mr. David Smart, architect. The contractors are:

Mason and brick work, William Tait, Errol; joiner-work, Stewart & McFarlane, Perth; slater, James Buchan & Son, Perth; plumber, James MacLeish, Perth; plasterer, Alexander McRitchie, Dundee; and iron-work, George Crystal, Perth.

BUSINESS PREMISES, HULL.—Two new shops in King Edward-street, Hull, are to be built by Councillor Costello and Mr. J. W. Powell. The architects are Messrs. Gelder & Kitchen, of Hull.

CARF, HULL.—A new café is being erected for Messrs. Mield, in King Edward-street, Hull. The architects are Messrs. Brodbeck, Lowther, & Walker, of Hull. The decorative work is being carried out by Messrs. G & A. Brown, Ltd., London.

CHURCH INSTITUTE, DURHAM.—The foundation stone of a new church institute for the parish of St. Oswald's at Durham was laid on the 17th inst. by the Dean of Durham (Dr. Kitchen). The plans of the new building, prepared by Messrs. Cowe, of Chester-le-Street, show a hall capable of seating 300 persons, reading, recreation, and class rooms, together with a lavatory, vestibules, and entrance-hall.

SANATORIUM FOR CONSUMPTIVES, DUNDEE.—A new building for consumptives has been erected at Dundee from plans prepared by Mr. Alexander, the City Architect.

MISSION HALL, BRISTOL.—A new building is in course of erection for the work of the City Mission in St. Jude's, Bristol. It is being erected by Mr. W. Foster, under the supervision of Mr. G. H. Oatley, architect (Messrs. Oatley & Lawrence), by whom the plans were prepared. The new buildings consist of a hall, 50 ft. by 20 ft., capable of seating about 250 persons; and by means of sliding screens, between two of the classrooms opening out of the hall, the seating accommodation can be increased to about 300. In addition to the hall there will be on the ground floor four classrooms and a vestry; and upstairs is a classroom, having seating accommodation for sixty persons. This room will be divided from the hall by movable screens, and will serve as a gallery to the main building. By means of folding partitions there is provision for sixteen classes at the sides of the hall, when used as a Sunday-school.

PROPOSED MEMORIAL HALL, LIVERPOOL.—It is proposed to erect a memorial building to the Rev. Charles Garrett, at Mount Pleasant, Liverpool. The scheme will be carried out by Messrs. Bradshaw & Gass, architects, of Bolton. The large hall will seat 2,350. The smaller hall will seat 700. In addition there will be reception and crush halls, meeting-rooms, clubrooms, vestries, and necessary offices. The two principal entrances will face Newington and Brownlow Hill. A feature will be the tower.

POST-OFFICE, YEovil.—A new post-office has been erected at Yeovil. It is situated in Middle-street. The whole of the work has been carried out by Messrs. Bird & Pippard, from designs by Messrs. C. & C. B. Benson, at a cost of between 3,000l. and 4,000l.

BAPTIST SCHOOL BUILDINGS, FISHPONDS, BRISTOL.—On the 22nd inst. Mr. Joseph Storrs Fry opened a new schoolroom in connexion with the Fishponds Baptist Chapel. The room has been built on a site at the back of the chapel, and it has cost altogether about 1,400l. There are six classrooms 12 ft. by 12 ft., two 20 ft. by 12 ft., and one 25 ft. by 14 ft., the centre hall being 45 ft. by 34 ft. When the classrooms are thrown open there is a room 62 ft. by 45 ft. The builder is Mr. E. Clarke, of Fishponds, and he has carried out the work in accordance with the designs of Mr. Wm. Paul, architect, Bishopston.

SANITARY AND ENGINEERING NEWS.

WATER SUPPLY, HAYFIELD, DERBYSHIRE.—On the 16th inst. Major Stewart, R.E., an inspector of the Local Government Board, held an inquiry at Hayfield into the application of the Rural District Council to borrow 6,492l. for the purpose of providing a public water supply for Hayfield.

BOULTER'S LOCK, BERKSHIRE.—In order to provide for the rapidly increasing traffic upon the River Thames, proposals have been made for an enlargement of Boulter's Lock, near Maidenhead. The lock, which is built of stone, is 144 ft. long, and has a fall of about 6 ft. The projected scheme comprises a lengthening of the lock by 80 ft. up-stream, with an additional pair of gates at the northern end, an enlargement of the present means of transport of punts and small boats by the rails and rollers, and an extension of the wall at the lower gates.

STAINED GLASS AND DECORATION.

MEMORIAL PULPIT, CRABTREE.—A carved oak pulpit has been placed in Crabtree Mission Church as a memorial to the late vicar, the Rev. C. E. Turner, who founded the church. The style is Late Gothic. The octagonal body rests upon the eight exposed structural timbers, with carved and pierced foliated tracery springing from the top; the upper portion is divided into two panels in each bay of the octagon. Four of these panels contain painted figures of angels in acts of praise and prayer, treated in a decorative manner, which give life and colour and religious feeling and

interest. It is hoped in time to fill the remainder of the panels with figures of a similar character. The pulpit was designed by Mr. T. Rogers Kitchell, of Plymouth, and executed by Mr. J. Carwardine, of Exeter.

CHURCH OF ST. LUKE, CAMBERWELL.—The new font which has just been placed in St. Luke's Church, Rosemary-road, was executed by the brothers Attillu and Gustino Gueffini, of Malindi, near Florence, after designs made by Mr. H. P. Horne. The font-bowl consists of a block of red Cippo marble, and has at the angles small columns of yellow Siennese marble with inlaid panels of the same marble in its eight sides ornamented with lilies and the Alpha and Omega. As an instalment of the scheme for the aisle windows to illustrate the Te Deum, two stained glass windows have also been presented by members of the congregation: the two windows contain figures of the Apostles St. Peter and St. John.

FOREIGN.

FRANCE.—The town of Reims has opened a competition, open to both native and foreign architects and sculptors, for a decorative fountain to be erected at the junction of the axes of the Place d'Edon and the Rue Buviéte. A sum of 150,000 fr. is set apart for it, and the designs are to be sent to the Mayor of Reims not later than January 15, 1903. The jury in the competition for a Salle des Fêtes and a covered market at Sainte-Savine have awarded the first premium to M. Cavé, architect, of Argenteuil, and a second premium to MM. Bourriéres & Bourliot of Paris; but no design has been selected for execution. The two bridges of the Ile St. Denis, over the Seine, are to be rebuilt. It is announced that the new Metropolitan line from L'Etoile to the Place de la Nation will be open to the public early in October, but as far as the Place d'Anvers only. The remainder of the line will not be open till the end of the year. There is talk of a third Lyric Theatre in Paris, in the new Hippodrome at the angle of Rue de Valenciennes and the Boulevard du Clichy. The Committee formed for the erection of a monument to Prince Henry of Orleans has accepted the model submitted by M. Raoul Verlet. The monument, which is to be erected on the Cap St. Jacques, at the entry of the river Saône, is composed of a stele carrying a figure symbolising France bearing in her arms the figure of the dying Prince draped in a flag. At the foot of the stele is a figure representing Geography. M. Rabel has been elected President of the Society of Architects of the Seine Inférieure. The municipality of Tarbes has commissioned M. Labat, architect, to prepare plans for the rebuilding of the Lycée of that town, at an estimated cost of 900,000 francs. A sum of 420,000 francs has also been voted for the rebuilding of the Hôtel de Ville on the Place de la République. M. Berlier, the engineer, has proposed to the Chamber of Commerce of Havre a project for a subterranean passage under the Seine, towards Tancarville, by means of two parallel tunnels 2,500 metres in length. The estimated cost is 20 million francs.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. A. W. Ackermann, A.M. Inst.C.E., M.S.I., who has been practising as an engineer and architect in Cape Colony for twenty-six years, the last six being in partnership with Mr. W. Adamson, as Messrs. Ackermann & Adamson, has just dissolved partnership, and is returning to England for some time. His business address is now 47, Victoria-street, Westminster, S.W.—Messrs. Colson, Farrow, & Nisbet, architects, have removed their offices from New-court, Carey-street, to 29, New Bridge-street, Ludgate-circus, E.C.—Messrs. Hart, Son, & Peard, metal workers, have removed their establishment from 88, Drury-lane, to 138-140, Charing Cross-road, W.C.—Professor Baresford Pitt, architect, has removed his offices from 48, Harley-street, to 2, York Gate, Baker-street, N.W.

PUBLIC IMPROVEMENTS, BRADFORD.—At the Bradford Town Hall, on the 19th inst. Major J. Stewart, R.E., Local Government Board Inspector, held an inquiry into the application of the City Council for sanction to borrow 25,881l. for works of paving, and 2,390l. for the purchase of land as sites for three district fire stations, and for consent to the appropriation and use for a similar purpose of certain land at Highfield-road, Dudley Hill.

TIMBER TRADE OF GOTHENBURG.—Mr. Dufré, British Consul at Gothenburg, reporting on the trade and commerce of that district for the year 1901, states that traces of the general industrial depression have already been felt in the labour market there. In the timber trade a large reduction has taken place, which has caused the discharge of a number of hands, and a reduction of wages of from 10 to 30 per cent. The workmen of the mechanical establishments and joinery factories have had to submit to shortened hours, and consequently a decrease in wages. The builders' trade is especially suffering from serious depression, and in connexion therewith, many other industries. The year 1901 was rich in surprises, and will not soon be forgotten by those engaged in the wood trade. The immediately preceding years offered

both exporters and importers opportunities of doing good business, while, on the other hand, last year experienced serious difficulties. During the period from February to the end of August, prices incessantly declined week by week, and the fall was so complete that no foresight could prevent the considerable losses which were incurred on the major portion of stocks accumulated, and which made 1901 more remarkable than the memorable year 1893. While particularly extensive sales of timber were made during the earlier part of 1901 for shipment in the spring following, a very small proportion only had obtained buyers at the commencement of last year. Added to this came the fact that stocks at the export centres were largely on hand with the importers. Apprehensions as to the future were certainly felt, but the confidence derived from the preceding advantageous years, accompanied by rising values, perhaps caused the seriousness of the position to be under-rated. The first actual fall in prices took place in February, when large lots of 2 by 4-in. and other 2-in. dimensions were disposed of to London, but the reduction in price then made was found to be altogether inadequate, and during the second quarter this reduction reached 11. 10s. to 21., which, however serious and unfortunate alike for sellers and buyers, may be said to have been warrantable in view of the large stocks then remaining on the hands both of exporters and importers. Towards the end of October and beginning of November an improvement took place, and certain sales were concluded at from 11. to 11. 10s. in excess of the prices ruling in July and August. Appended to Mr. Consul Dufré's report are some notes from the Vice-Consul at Halmstad, who remarks, *inter alia*, that "of square timber large quantities were shipped in 1901 to Denmark and Germany, the largest buyers in this line, and a fair quantity to the United Kingdom. The export, however, was less than during the year previous and prices were lower. The export of sawn goods was also rather less."

AMERICAN ROOFING SLATES.—The British Commercial Agents for the United States (Mr. Ball) writes thus for the last five years that country has exported to the United Kingdom roofing slates of the value of over 1,000,000 dols. per annum. The quantity exported during the last fiscal year was valued at 945,352 dols., practically all going to the United Kingdom. Mr. Ball suggests that if British quarries were equipped with machinery for extracting and transporting the slate of the latest design there ought to be no difficulty, in view of the distance it has to be carried, in shutting out a good deal of the American product.

SCHOOL OF ART WOOD-CARVING.—The School of Art Wood-carving, South Kensington, which now occupies rooms on the upper floor of the new building of the Royal School of Art Needlework in Exhibition-road, has been reopened after the usual summer vacation, and we are requested to state that some of the free studentships maintained by means of funds granted to the school by the Technical Education Board of the London County Council and by the Drapers' Company are vacant. The day classes of the school are held from 10 to 1 and 2 to 5 on five days of the week, and from 10 to 1 on Saturdays. The evening class meets on three evenings a week and on Saturday afternoons. Forms of application for the free studentships and any other particulars relating to the school may be obtained from the manager.

THE PREVENTION OF DUST AND MUD.—The proprietors of the County Gentlemen recently offered to contribute towards the cost of sprinkling two or three miles of main road with heavy oil, with a view to ascertaining whether the oil treatment of roads would be as successful in fixing the dust and preventing the formation of mud in this country as it has proved in some parts of the United States. Arrangements have now been made with the Hampshire County Authorities for oiling a section of the main road from Farnborough Station towards Aldershot. This road forms part of the main line of communication between London, Winchester, and Southampton. It is exceptionally suited for this experiment, as it is a dusty road, much frequented by motorists and cyclists, and one carrying a large traffic. Great interest is being taken in the experiment, for not only does the dust raised by motor-cars on the country roads cause much annoyance, but it is also a serious danger to health. Any one following immediately in the wake of a motor-car breathes for the next few minutes not air, but dust, and the great bacteriological discoveries of Pasteur have proved the presence of myriads of microbes in dust. Dust is one of the means by which diseases are spread, and many organs are communicated. Doctors and Local Authorities have long waged warfare against the introduction of impurities into the human system by water. It is felt by many that it is time action was taken to prevent their introduction by means of dust. The arrangements for the experiment are in the hands of Mr. J. Taylor, Assoc. M. Inst.C.E., the County Surveyor of Hampshire, and of Mr. W. Rees Jeffreys, who is acting for the County Gentlemen. The oil can only be placed upon the roads when they are thoroughly dry and a warm sun shining upon them. The experiment will accordingly not be made until these conditions obtain.

BIRMINGHAM INFECTIOUS DISEASES HOSPITAL.

On the 10th inst. Dr. F. St. George Mivart, Local Government Board Inspector, held an inquiry at the Birmingham Council House in reference to the application by the City Council for sanction to borrow 18,868*l.* for the extension of the Infectious Diseases Hospital at Little Bromwich. The Town Clerk explained that it was originally intended that ten pavilions should be erected, but of those only four had at present been built. The Committee had secured plans for the building of three additional permanent pavilions, making seven in all, an isolation ward, and a home for fifty nurses. The total cost of the work was estimated at 18,868*l.*, which amount was divided up as follows:—Nurses' home, 4,200*l.*; three pavilions, 10,305*l.*; isolation ward, 1,538*l.*; fittings and furniture, 1,575*l.*; clock making, 1,201*l.*; architect's commission and clerk of works, 400*l.*.

MEMORIAL TABLET, WARRINGTON.—On the 23rd inst. Principal Drummond, of Manchester College, Oxford, unveiled a tablet on an old building at Warrington. The tablet bears the following inscription:—"The Warrington Academy was established in this building in 1757, removed to larger premises in what is known as Academy-street in 1762. This tablet was erected in 1902 by the Warrington Society." The tablet is of Wedgwood ware, bears a representation of the founder of the institution—John Seddon—and was designed by Mr. A. Warrington. It has been brought by Messrs. Wedgwood & Sons, of Etruria.

ALGERIAN MARBLES.—Mr. Scratchley, his Majesty's Vice-Consul at Philippeville, draws attention to the marbles that can be obtained in Algeria. The quarries at Chemtoll, he states, produce the most beautiful onyx marbles in the world. The interior of the new Town Hall at Constantine is the work of these marbles. The grand staircase and *salles des fêtes* are lavishly adorned with the most delicately veined and coloured onyx. "It is a great pity," remarks Mr. Scratchley, "that these marbles are not better known. A new quarry has been discovered near Ain M'illa, from which I have seen specimens of pure white, rose, and yellow onyx, quite new to the world."

CEMENT TRADE WITH BANGKOK.—The extensive building which has been going on in Bangkok for some time has caused a considerable increase in the import of cement, which, according to statistics furnished by the authorities, has risen from 11,275 casks, valued at 5,411*l.*, in 1898, to 25,672 casks, valued at 13,795*l.*, in 1901. This latter total, only 31 cases came from the United Kingdom, whereas Denmark sent nearly one half of the whole quantity, Germany sent 6,656 casks, Italy 3,597 casks, and Singapore 1,012 casks.

SICILIAN ASPHALT.—The shipments of asphalt made from the whole of Sicily during 1901 amounted to 62,770 tons, of which 7,630 tons were sent to the United Kingdom—4,930 tons being shipped from Syracuse and 2,700 tons from the town of Mazzaralis. The exportation was less than in the preceding year, the smaller demand being attributed to the failure of several German firms, and to the low rate of exchange. Since 1900, new deposits of asphalt have been discovered at Vizzini, most of which have been bought up by the French company, who have opened new mines at Ragusa. At that place also the Sicula Co. have a steam factory for the extraction of the bitumen from the asphalt rock and compressing it into blocks, and also for pulverising the asphalt rock ready to put into bags.

EXPORT OF WORKS OF ART FROM ROME.—In a recent report on the trade and commerce of Rome, Mr. Morgan, the British Consul, states that the city to some time used to export works of art on a large scale, but that during late years there has been a serious falling-off in that class of business. This, he suggests, is probably due to two causes: the first is the strict enforcement of the rules bearing upon the transfer from the country of works of art, chiefly specimens of ancient art; and the second is the tendency on the part of the present generation to follow commercial pursuits as yielding more tangible and early profits than an artistic career. The value of the paintings, statuary, &c., exported in 1898 was 116,930*l.*; in 1899 it was 113,115*l.*; in 1900 it was 103,483*l.*; and in 1901 it fell to 83,946*l.*.

SIAMSE TEAK.—It is estimated by the British Consul at Bangkok that the export of teak for that port last year amounted to 50,408 tons, of which 13,157 tons were shipped to Europe, 20,043 tons to India, and 17,145 tons to Hong Kong. The export to India has been increasing every year, the timber being largely used by the railways and for house building. The European figures show an increase of nearly 2,000 tons over the previous year, despite the fact that the export of teak into Europe from all countries in 1901 was only about two-thirds of the import of 1900. Apart from ship-building, the demand for teak in England for general purposes, building, furniture, &c., is largely increasing, and many orders now come from Europe for timber cut to special sizes. The f.o.b. value of timber shipped from Siam was about 5*l.* per ton for the European cargoes and 2*l.* per ton all round for the rest. The local market prices for rough logs obtained during the year showed a considerable falling off, especially when the fall in the exchange value of the tical is considered. As to the prospects of the teak export trade of Siam in the immediate future it is difficult to speak, as opinions differ as to the effect that the new Government

forestry regulations will have upon the output. Shipments during 1902 are expected to be moderate, and the output will probably be diminished during the next few years. The teak trade, both in the forests and in Bangkok, continues mainly in British hands. It is one which requires large capital, and the small trader has been almost eliminated. The exports of woods other than teak, *i.e.* agilla, sapan, pado, yellow box, ebony, rose, &c., show no advance.

THE "OWEN JONES" PRIZES FOR DESIGNS.—Six prizes, to consist in each instance of a copy of Owen Jones's "Principles of Design" and the bronze medal of the Society of Arts, will be offered for competition next year amongst students of Art Schools, and will be awarded upon the result of the annual competitions held by the Board of Education, South Kensington. The prize fund consists of a capital sum of 400*l.*, being the balance of the contributions to the Owen Jones Memorial Fund, which the Memorial Committee presented to the Society of Arts, who undertook to expend the yearly interest upon prizes for the best designs in respect of household furniture, wall-papers, hangings, carpets, and similar decorative work, after the principles enunciated by Owen Jones.

NATIONAL ASSOCIATION OF MASTER HOUSE PAINTERS.—The annual convention of the National Association of Master House Painters and Decorators was begun on the 23rd inst. in Newmarket-square, Mr. J. Graham Cole, of Newcastle, presiding. After a municipal welcome by the Mayor (Alderman H. W. Newton), the President said that in his visits to the local associations he was glad to see a general awakening to the fact that, if they wished to be respected and to have their work appreciated by the public, they must not only educate themselves, so far as their own craft was concerned, and keep themselves abreast of the times, but they must see that those who were following them and taking their places were also educated. He had been delighted to find technical schools doing splendid work in most of the cities and towns he had visited, and working under efficient masters of their craft. Up to the present, however, the technical schools had done little with apprentices, and he suggested that the time had arrived when they should institute continuation classes for those who had passed their apprenticeship. He was glad to know that his views in this matter were shared by the Presidents of the Scottish and Irish National Associations. He suggested that in each town and city employers should call meetings of the operatives and confer with them, and so get their co-operation if possible. He had been pleased to see that a great amount of attention was given to colour studies at the various schools and exhibitions. The interiors of our homes were often spoiled for want of this knowledge. Students should study colour as if they were studying music. The decorator who was a master of colour not only had it in his power to make the home beautiful, but was able to dispense happiness in connexion with the work in the schools. He advocated the establishing of a first-class training national technical school in some central position in the country, saying that the reports received from such schools in Germany convinced him that such an institution would be of the greatest value to the craft. The present technical schools were, after all, only of an elementary character.—An exhibition of decorators' work was opened by Mr. J. D. Crace, of London, President of the Institute of British Decorators, who said the Association had never taken up any subject more valuable than that of promoting the education of the workers in the industry. It was impossible to exaggerate the value of technical schools, but only, he held, as supplementary to an apprenticeship. He did not believe that any youth would ever learn a trade from a technical school alone. In technical schools everything was made comparatively easy, but in apprenticeship the boy was left to his own resources, face to face with work comprising all the irregularities and possibilities of failure.

GREENCOAT TECHNICAL CLASSES, CAMBERWELL GREEN.—The technical and art classes held at the Greencoat School, Camberwell Green, S.E., resume work for the twenty-third session on Monday, September 29. These classes are in affiliation with the Technical Education Board of the L.C.C. the City and Guilds' Institute, and the Board of Education; and of late their usefulness has been considerably increased by the help of the Technical Education Board's grants in aid of equipment. By this means a very valuable collection of models and apparatus has been provided for the use of students employed in the building trade.

LEGAL.

CASE UNDER THE LONDON BUILDING ACT.

At the Guildhall, before Mr. Alderman Vaughan Morgan, Messrs. Harrison & Spooner, builders, appealed against a notice served upon them by Mr. Hugh McLachlan, District Surveyor for the western division of the City, objecting to certain works being carried on by them upon buildings situate at Nos. 14 to 17, Holborn Viaduct. Mr. J. F. Grain, who appeared for the appellants, said the Holborn Land Company, who were the lessees of these premises, proposed, by opening the party walls, to

make it into one building. Mr. Savill, chief clerk, pointed out that under the London Building Act this could only be done if the premises were in one occupation or were so adapted. Mr. Grain said he should contend that the Holborn Land Company were the sole occupants. The great point, of course, was whether the building was supplied with sufficient means of escape in case of fire. If the ideas of the builders were carried out the premises would be far safer in that respect than they were at present. The scheme, moreover, was approved by the fire insurance company insuring the property. Legally, the question of occupation was a very wide one, and had never been very clearly defined. The Alderman held that the premises were not in one occupation, or adapted so to be. He therefore dismissed the appeal.

COPING-STONE FATALITY IN SHEFFIELD.

In the Stipendiary Court of the Sheffield Court House, on the 16th inst., the City Coroner (Mr. D. Wightman) resumed the inquest formerly opened on the 6th inst. touching the death of Joseph Stringfellow, labourer, of Eyre-street, who was killed on the 6th inst. by the fall of a coping-stone and some lead from business premises in Market-place, of which Messrs. W. H. Smith & Son, the railway-bookstall owners, are the lessees. A plan and a model, prepared by Mr. E. A. Green, Chief Building Inspector to the Corporation, was used to assist those engaged in the inquiry. According to the *Sheffield Daily Telegraph*, Mr. William Colver had written an account of what he saw of the accident, and this was read by the Coroner. "I should say," said Mr. Colver, "there was only a few minutes' interval between my attention being called by one of the workmen concerned, and the occurrence of the upper part of the building and the occurrence which proved so disastrous. As soon as I saw that it was dangerous I at once sought an interview with the representatives of Messrs. Hepworth and Messrs. Smith & Sons, all in the same building, and cautioned them, doing my best to infuse into them some of the serious apprehension that I had in my own mind. Unfortunately, the principals of both concerns were on their holidays. I, however, did ascertain from one of the assistants that some men, under the direction of Messrs. Wood & Son, of Queen-street, had been working on the back roof. After a few minutes I found Mr. Bradley, who had charge of the work, and Mr. Bottomley, his building superintendent. They came to me, and we had a hurried conference as to what was best to be done. They told me that they had examined the front part of the roof, and found the cornice somewhat bulged, and that they could not do any more that day, as they would require scaffolding out of the upper windows, and further that they would have to get the sanction of the City Surveyor to do so. I telephoned urgently to the City Surveyor's office. Mr. Bradley went to see Mr. Wood, while Mr. Bottomley went for the City Surveyor. I must say that my request was obeyed most expeditiously, and in less than five minutes Mr. Green, the Building Surveyor of the Corporation, arrived. I then left the three together, and returned to my personal duties. However, before any measures could be devised to meet the difficulty, and within two or three minutes of my leaving the street, the crash came."

In answer to Mr. Neal, Mr. Colver added that he had not previously noticed that the roof was unsafe, although several weeks before the accident it was reported to him that the roof was not water-tight. There was a leakage into the rooms which he occupied. It was no part of his duty to repair the roof.

A complaint was made about a month prior to the accident by one of his managers to Messrs. W. H. Smith & Son as to the state of the roof, and several weeks elapsed before the repairs were commenced.

Mr. Tom Lee, assistant to Mr. W. Colver, said about eleven o'clock on the morning of the accident he was on the top floor of the building from which the coping-stone fell when Mr. Bradley and other men came to attend to the leaking roof. Mr. Bradley called his attention to the two rows of bricks which were bulging out. Witness said they should be attended to at once, and Mr. Bradley agreed with him. The accident happened about twenty minutes after his conversation with Mr. Bradley. He had never heard any one suggest danger before that morning. The roof leaked about a year ago, and the last leakage commenced six or seven weeks ago.

By Mr. Neal: Witness complained of the leakage, but nothing was done until the day before the accident, when a workman called to see where the leakage was. The leak was near to and underneath the piece of the coping that fell. Mr. Bradley and Mr. Bottomley agreed with him that there was danger, but they did not give any reason for suggesting that the repair should be left until Monday. He did not think the coping-stone would fall so soon as it did.

Mr. Thomas Bottomley, builder, said Mr. Bradley came to him at nine o'clock on the morning of the accident, and asked him to look as to repairing the roof and skylight of the building. He went on the roof, measured for the skylight, and then went to the front, and found that the gutter had slipped

from underneath the slates. He went into the street, and looking up saw that the brickwork and coping were bulging out about 3 in. He went with the witness Bradley, and reported the matter to Mr. Wood, who returned with them to the place, and said it must be attended to at once. When Mr. Bradley, senior, arrived there was some talk of getting out a scaffold. Asked as to the cause of the accident, witness replied, "Old age." Pressed for particulars, he explained that the coping-stone was held by a piece of lead. The width of a brick was an exceptionally narrow basis for a coping-stone. On that basis it had tilted 3 in., but he thought it might hold until Monday with the lead.

In reply to the Coroner, witness added that after what Mr. Green said the scaffolding would have been put out on Saturday afternoon had the accident not occurred.

Mr. George Bradley, who was called to attend to the leakage, explained to the jury his reason for believing that the coping would stand until the Monday, adding that he, too, thought the coping was of wood, and that Mr. Wood, after Mr. Colver had intervened, said to him, "Whatever is necessary do." In his opinion, there were two causes for the accident, first, that the telephone post had pushed the roof, and second, that there were no through ties.

Mr. Neal said he was informed that the building was put up in 1792.

The report of Mr. Green, Chief Building Inspector for the Corporation, was read by the Town Clerk.

Mr. Neal (to Mr. Green): You have now gone carefully into the cause of the accident?—Yes.

What in your opinion is the cause?—Faulty construction.

Was there any difficulty in that being discovered by a reasonable inspection of the roof?—Yes, there was some.

In reply to the Coroner, witness said he thought it was bad judgment to think it was safe to leave the repairs until Monday.

The Coroner, in directing the jury to the chief points for consideration, said the first was, Was there any neglect in attending to the matter? And he thought they would come to the conclusion that there was no very great neglect as soon as the danger was fully ascertained. The bad construction of the building seemed to have been the primary cause of the accident, and personally he was inclined to think there was no mistake which might not have been reasonably made. If the jury were also of that opinion their verdict would be that Stringfellow lost his life by an accident.

The jury, after over half an hour's absence, returned a verdict that deceased was killed by a falling cope stone from a building which had been allowed to get into such a state of disrepair as to constitute a public danger.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

10,447.—IMPROVEMENTS IN LEVELS: *W. F. Stanley and H. T. Tallack*.—A spindle that carries the plumb of the rack is inserted through the casing, the rack is fitted on to the draw-tube, and the support for the spirit level, the body of the telescope, the centre, and the objective collar are all cast in one piece.

10,450.—WORKING OF WOOD: *A. A. Westman*.—Rotary cutting tools for grooving and tongueing wood consist of two halves, whereof one can be adjusted along the shaft whereby the width of the groove or tongue can be changed. A boss and key-way key the one half on the shaft; the other half, which is adjustable upon the shaft, is joined to the former half through the engagement of a hole and pin. When the two halves are put together, two sets of teeth cut the sides, respectively, of the grooves, and two other sets cut the contact surfaces or shoulders. An arrangement, parallel-wise, of the sets of teeth of the tongueing cutter provides for a constant width of groove when the front faces of the sets are ground off to an equal extent.

10,455.—A COMPOSITION FOR USE IN FLOORING: *P. Confalonieri and N. Confalonieri*.—An adhesive compound for use in laying wooden flooring boards upon a foundation of mortar consists of two parts of dry tar, 3 of pitch, 3 of resin or pitch resin, 1 of light naphtha oil, and 0.50 of ground sulphur. The boards are treated with a hot coating of the composition and are then sprinkled over with sand or dross, or fragments of earthenware, glass, metal, &c.

10,468.—DOORS FOR HOSPITALS, LAVATORIES, REFRIGERATORS, DRYING-ROOMS, AND SO ON: *A. F. Wallis-Taylor and E. Whitehead*.—For maintaining a uniform degree of temperature, preventing the passage of smells, and for similar purposes, the inventors devise a pierced cylinder that revolves upon pivots at its middle between curved wings; the dimensions of the parts are such that a through passage for air cannot be maintained. The cylinder will carry strips of rubber or spring-pressed strips of wood for an air-tight joint between it and the wings, roof, and floor.

10,481.—BRAKES FOR PIT-CAGE, LIFT-CAR, AND SIMILAR MECHANISM: *E. E. Bartlett and W. Shinn*.

—The arms of a shaft are worked with an arm which is moved to apply the brakes by a spring, which otherwise is held back by a rod that is pivoted in the arm, to the arms of the shaft are linked the brake-blocks. The spring will come into play when a handle is worked to open a split nut that retains the rod, and additional pressure ensues when (the split nut being closed) the rod is turned by another handle so as to force serrated blocks against the guides; the latter process serves for the ordinary application of the brake.

10,536.—WHEELS FOR BARROWS: *E. B. Peirce*.—The wheel has flat treads and a groove for a rail, a fork, of which a stud carries a sleeve, supports the axle. A nut above the sleeve enables one to adjust the relative places of the body and the shafts in respect of the wheel of the barrow.

10,543.—BURGLARY-PROOF STRONG-ROOMS: *A. B. Chatwood*.—The inner walls are built up with steel plates around which are secured horizontal rails at distances not exceeding 1 ft. from one another. The rails may be sustained either upon pockets made in the brick or concrete outer walls or upon brackets of the columns that carry the roof girders. Concrete is filled into the roof and the space between the inner walls and the brick walls. For a strong-room separated from an outer wall is provided an outer plate wall fastened on to rails carried by brackets on the inner side of either upon or by pockets in the concrete. In another form two sets of columns replace the shell plates, and horizontal rails are laid on each set at different levels.

10,552.—A CIRCULAR SAW FOR CUTTING WOODEN PAVEMENT BLOCKS, AND OTHER USES: *W. E. Richard*.—A sliding frame carries the common spindle a set of circular saws; reversing gear for the shaft of the reciprocating mechanism comprises open and crossed belts that run upon pulleys, and a sliding bar works a friction clutch block. A nut that is worked by a screw on the shaft and is joined by a rod to the bell crank that reciprocates the frame, will effect the reversal automatically at the end of each stroke as it meets stops upon the sliding bar; or the reversal can be made with a hand lever. The timber is clamped during the sawing process with springs on a shaft worked by a cam.

10,591.—A MOVABLE SCAFFOLD: *J. Rollinson*.—The scaffold, devised for use in the construction of tanks and gas-holders, has three uprights mounted upon wheels and joined by means of radial telescopic tubes or timbers to a plate upon a middle post or pivot which is held up with adjustable stays secured to the bottom of the tank. The uprights have brackets from which planks or platforms may be hung with tackle.

10,614.—AN APPLIANCE FOR USE IN MANHOLES: *H. F. Coates*.—In order to prevent flooding, a stopper is fashioned with discs that are threaded upon a screw and are forced towards one another by means of a screw-handle which presses a rubber ring into grip with the sides of the manhole. A vent for inspection can be made in the stopper. The flange of a disc that presses against a packing-ring, and is fastened with a bayonet-joint, may otherwise be adopted.

10,622.—A NOISELESS PAVEMENT: *P. Timofeff*.—Angular well-washed and finely-sifted quartz sand, wetted with some adhesive liquid, is filled into boxes that are laid as the blocks of a wooden pavement. The sand is wetted and stamped and its surface is then rolled. The framework may consist of a bottom of brick to absorb excess of water with an overlay of rough or hewn stone, and the stability of the pavement can be increased by means of triangular strips disposed along the bottoms of the boxes. For a binding material are specified a variety of substances, such as iron, chrome-iron, ores, and iron shavings. To the sand may be added potato-flour, ground peat, or similar deliquescent or hygroscopic materials.

10,633.—ROOF DOORS OF DUST CARTS: *S. Berger*.—The hinged doors are joined to ropes around pulleys and a roller, and thence to the bottom rung of a ladder at the back of the cart, having teeth set in gear with the wheels upon a roller. The doors are opened by the weight of the dustman upon the ladder, but as he steps off they will become shut through their own weight, and, at the same time, lift the ladder. Bearing-rollers have guides for the ladder, and a hinged door is fitted at the rear of the cart.

10,646.—APPLIANCES FOR WINDOW SASHES: *J. Robertson*.—Means for removing sashes from the frames are provided by rebated pulley-stiles that take a wide lower sash and a narrow upper sash, and the cutting away of the lower parts of the parting-beads. The upper sash is drawn down so as to clear the beads for its removal, and the lower sash is similarly lifted. The sash is removed from turning too soon with spring catches or turn-bushings upon the sash-stiles, which are rebated or checked for the cords.

10,657.—EXTINCTION OF FIRE: *W. L. Young*.—The fire severs a fusible link and thus enables the descent of a spring-piston to explode a cartridge, which may also be exploded with an electrical current that is conveyed by means of a gas pipe. A rod, struck by the bullet, breaks the acid bottle, and the mixture of acid and alkali generates a pressure which discharges liquid through a rotating and

spreading nozzle; the fusing of the link effects contact of the terminals of a circuit that comprises an alarm and an indicator, but the apparatus can be worked by hand, as the automatic starting-contrivance is removable.

10,710.—COVERINGS USED IN BUILDINGS, AND FOR PIPES, BOILERS, COLD-WATER TANKS, &c.: *A. F. Lawson and G. Hutchinson*.—A non-conducting composition which is described as being available for use in the construction of fireproof walls, floors, ceilings, and so on, as well as for covering steam pipes, boilers, cold-water tanks, and refrigerators contains about 55 per cent. of carbonate of lime mud obtained from the decomposition of alkali waste, 15 per cent. of papier mache and of asbestos or other fibre, 10 per cent. of clay, and 5 per cent. of flour, size, or some such adhesive ingredient.

10,776.—CASEMENT AND SIMILAR FITTINGS: *A. Weber and F. Schön*.—In order that French windows and casements may be opened to any extent required the inventors devise two tubular sections having ratchet teeth at their adjacent ends, one section, passed through a bracket and a squared axis, is joined to the window, the other is joined to the frame of the window, and the ratchet teeth of the teeth into gear, and a pull upon the bracket end of a lever whereof the other end is joined to the squared axis raises them out of gear; one closes the window by pulling the chain and so disengaging the teeth; when it is opened the ratchet teeth slide over one another, as the axis lifts its corresponding section.

10,770.—DRY GAS-METERS: *A. Schofield*.—Two dished diaphragm chambers are screwed on to externally threaded nozzles attached to the gas-opening upon the middle partition, an interior annular groove in the upper edge of each chamber holds the flexible diaphragm with a ring that grips the edge; the capacities of the chambers and the diaphragm are about equal, the latter will be quite taken within the former when it is in its inner position, a spring or bayonet-joint fastens the chambers on the passage for the gas.

10,793.—AN INDICATOR FOR ELECTRICAL BELL CIRCUITS: *W. F. Polylabank*.—In one form of the contrivance it is arranged that the operating coil of the bell circuit is wound on a core that is a solenoid on an iron magnetical core. A non-magnetical bar connects the core to the lever of the indicator. The energisation of the coil draws in the magnetical core and so causes the disc to work. All the re-setting coils may be embraced in a single local circuit if a series of indicators is used, and the strength of the field within the coil may be enhanced, for a given strength of current, by securing the coil and bobbin to the base with a sheet-iron strap, or by wrapping the coil within the sheet-iron sheath.

10,831.—JUNCTION-PIECES AND SLEEVE-JOINTS FOR PIPES: *G. Fischer*.—For screw sleeve-joints the screwed sleeve is fitted over the plain ends of the pipes, and hexagonal nuts having projecting flanges at their ends compress rings or washers. The sleeve is hexagon-shaped at its enlarged middle part. The joint is described as being available for use with tees, crosses, bends, and similar junction-pieces.

10,844.—APPLIANCES FOR LIME-KILNS: *W. Sieben*.—The invention relates to kilns that have a semi-circular plate in the opening for discharge, the time being taken out from both above and below it. To the back of the plate are secured two horizontal and curved arches or bars with short bars between them that lie upon the curved bar and upon a bar beneath the transverse support of the plate; by those means the charge is sustained in the middle of the kiln, whilst the lime which has fallen from the back can be taken out from underneath the plate. The diameter of the lower portion of the funnel-shaped throat of the kiln is half that of the body of the kiln.

10,853.—HYDRAULIC LIFTING APPARATUS: *E. B. Ridgway*.—In a machine worked by steam, together with a hydraulic chamber, an auxiliary cylinder, fitted in part with water covered with oil, is joined by a pipe to the hydraulic lifting-chamber. A slide-valve, which is worked with a lever and when a non-return valve is worked in the pipe, admits the steam. The auxiliary cylinder is lined with wood, and to prevent the water in it from rising to a too high level, a chamber containing a ball-cock is set in communication through pipes with both the bottom and the top of the cylinder.

10,857.—MANUFACTURE OF CEMENTS: *Fellner and Ziegler*.—Portland or other cement is made from a molten material, such as blast-furnace slag, which is conveyed from a trough to the middle of a stepped cone which is quickly rotated; centrifugal force and a supply of compressed air disintegrate the material, whilst the air oxidises sulphur in the slag and cools the cone, which has a water-jacket for its casing.

10,946.—GRADUATION OF SCALES UPON RULERS: *E. Perron*.—Reducing or enlarging scales are marked upon the edge of the ruler, and are to be read in opposed directions from a common zero-point. A drawing can be reproduced by turning the ruler about its pivot at that point. Whenever a given point upon the drawing comes into contact with the graduated edge one marks off the corresponding length at the corresponding point of the work scale.

MEETINGS.

FRIDAY, SEPTEMBER 26.

Sanitary Institute (Lectures for Sanitary Officers).—
Dr. E. J. Steegmann, on "Mechanical Physics: Laws of
Hydraulics, &c." 7 p.m.

SATURDAY, SEPTEMBER 27.

Incorporated Association of Municipal and County
Engineers.—Midland District meeting at West Bromwich.

MONDAY, SEPTEMBER 29.

Sanitary Institute (Lectures for Sanitary Officers).—
Dr. E. J. Steegmann, on "Natural Forces; Light,
Heat, Electricity, Chemistry." 7 p.m.

WEDNESDAY, OCTOBER 1.

Sanitary Institute (Lectures for Sanitary Officers).—
Dr. E. J. Steegmann, on "The Atmosphere; Pres-
sure and Composition; Air, Combustion, and Respi-
ration." 7 p.m.

President, Foremen and Clerks of Works Institution.—
Ordinary meeting of the members. 8 p.m.

FRIDAY, OCTOBER 3.

Architectural Association.—Annual general meeting
Address by President, Mr. H. T. Hare; (a) Distribu-
tion of Prizes. 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—
Dr. E. J. Steegmann, on "Meteorology." 7 p.m.

SATURDAY, OCTOBER 4.

Sanitary Institute (Demonstrations for Sanitary
Officers).—Inspection at Wimbledon Sewage Works.
7.30 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

September 6.—By R. GRAY & SONS (at Whitchy).
Elyngdale, Yorks.—Foulside Farm, 106 a. u.t.
240 yrs., g.r. 101, y.r. 554. £1,700
Brook Farm, 26 a. u.t. 20 p. f. 1,750
Rush, a freehold cottage, y. 31. 113
Ugthorpe, Yorks.—Franklands Farm, 31 a. 3 r.
25 p. f. y.r. 304. 1,010
September 10.—By M. B. HODGSON
(at Windermer).

Windermer, Westmorland.—Black Moss Farm,
113 a. 2 r. 2 p. f. and c. 1,010
Heating Field, 5 a. o. r. 5 p. c. 360
September 11.—By COOPER & PRICE (at Ross).

Upton Bishop, Hereford.—Doubie's Farm, 195 a. 1,950
September 12.—By G. B. HILLIARD & SON
(at Chelmsford).

Rettondon, Essex.—Woods Farm, 50 a. 1 r. 38 p.
6 r. y.r. 304. 530
A freehold and copyhold field, 2 a. 1 r. 20 p. 145
Little Baddow, Essex.—Holly Cottage, f. p. 200
Chelmsford.—108, Moulsham-st., f. y.r. 134. 125
Anchor-st., &c., 6 a. 2 p. f. 112
September 13.—By C. M. STANFORD (at
Colchester).

Colchester.—Lenden-rd., Upperville House, f. p. 1,850
Lenden-rd., enclosure of pasture, 2 a. 2 r. 1 p. f. 1,025
Weeley, Essex.—Botany Farm, 121 a. o. r. 30 p. f. 1,500
Hatch, Suffol.—enclosure of meadow
land, 5 a. 3 r. 25 p. f. and c. 750
Freehold residence, with steam mills, farmery,
&c., area 131 r. 17 p. 750
St. Olymph, Essex.—Pannells-gf. enclosures,
625
Amyer's Wick Estate, 92 a. o. r. 30 p. f. 1,850
New House Farm, 42 a. 3 r. 14 p. f. 840
Great Horkeley, Essex.—Enclosures of land,
60 a. 2 p. f. 150
By HOOKER & WEBB (on the Estate).

Edenbridge, Kent.—Stangrove-rd., &c., 22 plots
of freehold building land (in lots). 2,258
September 15.—By NIGHTINGALE, PHILLIPS, &
PAGE.

Kingston-on-Thames, Surrey.—London-rd., Nor-
biton-pl. and 33 a. f. p. 3,000
By A. G. & A. NOTLEY.

Kalgoorlie, Western Australia.—The Lake View
Extended Gold Mine, area 24 a., gold mining
lease for 14 yrs., with option of renewal. 3,400
September 15.—By WHITE & SONS.

Box Hill, Surrey.—Picham-lane, Furbrook and
14 a. u.t. 37 yrs., g.r. 154, y.r. 134. 1,750
Thakham, Surrey.—enclosure of meadow
land, 5 a. 3 r. 25 p. f. 190
By JENKINS & SON.

Brockley.—137, Brockley-rd., u.t. 60 yrs., g.r. 61,
e.r. 400. 300
September 16.—By S. WALKER & SONS.

Minors.—7, King-st. (S), also 7, Little Tower
Hill (S), f. w.r. 154, 148. 1,350
By MORGAN & SONS (at Mason's, East Tavern).

Hackney-rd.—Great Cambridge-st., the Victoria
Tavern, u.t. 24 yrs., y.r. 100, with goodwill
September 17.—By BREADMORE & WEBB.

Willden Green.—250 and 251, High-rd., with
shooting force, yard, stables &c., area
4,750 ft. f., e.r. 654. 700
By FRITH, GARLAND, & CO.

Harringay.—73, Effingham-rd., u.t. 80 yrs., g.r.
74, 55, e.r. 421. 470
Tottenham.—38, Abchurch-lane, u.t. 84 yrs., g.r.
150, e.r. 321. 300
By P. & G. GREEN.

Aldgate.—1 to 9 (odd) and 8 to 20 (even), Aldgate-
av., block of shops, warehouses, and offices,
u.t. 92 yrs., g.r. 1,325, f. y.r. 354. 1,080
By ORRILL, MARBLE, & LAWRENCE.

Brighton, Sussex.—Edward-st., The Great Glove
Distillery p-h, f., y.r. 100, reversion in 59
yrs. 2,000

By SPARROW & SON.

Finchley.—Ballards-lane, Redbourne Cottage, u.t.
78 yrs., g.r. 101, y.r. 654. £805
Alexander-grove, f., e.r. 654. 800
By C. P. WHITTELEY.

Amerham Common, Bucks.—White Lion-rd.,
The Pine Apple b-h, with two cottages and
5 a. 2 r. 10 p. f., y.r. 421. 1,230
By FORSTER & CRANFIELD.

Walthamstow.—Chingford-rd., Aveling's Farm,
building estate, 35 a. o. r. 31 p. f., y.r. 921. 108
Syeonham.—23, Kibbels-l., w.r. 165. 180
Croydon.—20 and 22, Mitcham-rd., f., w.r.
334. 165. 300
By ROBERT & ROBERTS JONES (at Llanrwst).

Eglwysfach, &c., Denbigh.—Dyffryn Farm, 46 a.
2 r. 6 p. f. 1,690
Croesnew Farm, 95 a. o. r. 24 p. f. 1,730
Ffrind Newydd holding, 25 a. o. r. 21 p. f. 470
Ffrind Villas (two), f. 335
By HAWKES, RISSONS, & ANDREWS
(at Tiverton).

Uplowman, &c., Devon.—Hill and Higher and
Lower Murley Estate, 265 a. 1 r. 8 p. f.,
y.r. 2101. 3,700
Samford Peversill, Devon.—Three closes of land,
10 a. 2 r. 45 p. f. 394
September 18.—By H. J. BLISS & SONS.

Clapton.—Dunlance-rd., f.g.r. 54. 108, reversion in
65 yrs. 143
By ALLAN BOOTH.

Kentish Town.—11, Bartholomew-rd., u.t. 56 yrs.,
g.r. 61, p. 625
Hackney.—54 and 66, Lauriston-rd., u.t. 40 yrs.,
g.r. 124, y.r. 724. 700
By MARK LIEHL & SONS.

Clapton.—111, 113, 121, 123, and 125, Glenarm-rd.,
u.t. 73, 75, and 70 yrs., g.r. 244. 108, w.r.
174. 1,355
80 to 86 (even), Dunlance-rd., u.t. 73 yrs., g.r.
161. 168, w.r. 1501. 108. 1,045
Homerton.—2 and 4, Hassett-rd., u.t. 57 yrs., g.r.
81, w.r. 674. 125. 535
15 and 17, Hassett-rd., u.t. 57 yrs., g.r. 81, w.r.
704. 45. 525
19 and 21, Hassett-rd., u.t. 47 yrs., g.r. 111. 115.
w.r. 674. 125. 525
Hackney Wick.—76, 78, and 80, White Post-lane,
u.t. 56 yrs., g.r. 94, w.r. 934. 125. 530
Hoxton.—35 to 45 (odd), 49, 57, 59, and 63, Cus-
tance-rd., u.t. 3 yrs., g.r. 364. 78. 160
Holloway.—181, James-rd., u.t. 31 yrs., g.r.
64, y.r. 364. 225
Clapton.—4 and 36, Victoria-rd., y.r. 601; also i.g.r. of
34, u.t. 31 yrs., g.r. 154. 465
Leyton.—42 and 44, Carlisle-rd., f. w.r. 361. 84
Bow.—34 to 38, Gawnthorpe-st., u.t. 45 yrs., g.r.
161. 158, w.r. 1664. 88. 993
54, Robeson-st., u.t. 65 yrs., g.r. 34. 108. 195
Clapton.—208 and 210, Rushmore-rd., u.t. 73 yrs.,
g.r. 104, w.r. 704. 45. 1,150
West Ham.—1 to 39 (odd), Boleyn-rd., u.t. 80
yrs., g.r. 161. 58, w.r. 1624. 108. 180
Manor Park.—65, Little Ilford-lane, u.t. 97 yrs.,
g.r. 54, w.r. 341. 240
Forest Gate.—33 and 35, Parliament-pl. (S), f., w.r.
414. 128. 410
Leyton.—1 to 8, Myrtle-rd., u.t. 97 yrs., g.r. 324,
w.r. 2434. 25. 1,700

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f. for freehold; c. for copyhold; l. for leasehold; e.r. for
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rent; u.t. for unexpired term; p. for per annum; p. for
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PRICES CURRENT OF MATERIALS.

* * Our aim in this list is to give, as far as possible, the
average prices of materials, not necessarily the lowest.
Quality and quantity obviously affect prices—a fact which
should be remembered by those who make use of this
information.

BRICKS, &c.

Hard Stocks — 1 13 0 per 1,000 alongside, in river
Rough Stocks — 1 10 0 " " " " " "
Grizzles — 1 10 0 " " " " " "
Facing Stocks — 2 12 0 " " " " " "
Shippers — 2 5 0 " " " " " "
Flettons — 1 8 0 " " " " " "
Red Wire Cuts — 1 12 0 " " " " " "
Best Farnham Red — 3 12 0 " " " " " "
Best Red Pressed — 5 5 0 " " " " " "
Ruabon Facing — 5 5 0 " " " " " "
Best Blue Pressed — 4 6 5 " " " " " "
Staffordshire — 4 11 0 " " " " " "
Do., Bullnose — 4 11 0 " " " " " "
Best Stourbridge — 4 8 0 " " " " " "
Fire Bricks — 4 8 0 " " " " " "
GLAZED BRICKS.

Best White and — 1 10 0 " " " " " "
Ivory Glazed — 13 0 0 " " " " " "
Stretchers — 12 0 0 " " " " " "
Headers — 12 0 0 " " " " " "
Quoins, Bullnose, — 17 0 0 " " " " " "
and Flats — 17 0 0 " " " " " "
Ends — 19 0 0 " " " " " "
One Side and Two — 20 0 0 " " " " " "
Ends — 19 0 0 " " " " " "
Two Sides and one — 20 0 0 " " " " " "
End — 20 0 0 " " " " " "
Splays, Chamfered, — 20 0 0 " " " " " "
Squints — 20 0 0 " " " " " "
Best Dipped Salt — 20 0 0 " " " " " "
Glazed Stretchers — 22 0 0 " " " " " "
and Headers — 22 0 0 " " " " " "
Quoins, Bullnose, — 14 0 0 " " " " " "
and Flats — 14 0 0 " " " " " "

PRICES CURRENT (Continued).

BRICKS, &c.

Double Stretchers 15 0 0 per 1,000 at railway depot.
Double Headers — 14 0 0 " " " "
One Side and two — 15 0 0 " " " "
Ends — 15 0 0 " " " "
Two Sides and one — 15 0 0 " " " "
End — 15 0 0 " " " "
Splays, Chamfered, — 14 0 0 " " " "
Squints — 14 0 0 " " " "
Seconds Quality — 7 0 0 " " " "
White and Dipped — 7 0 0 " " " "
Salt Glazed — 2 0 0 " " " "
Thames and Pit Sand — 7 0 0 per yard, delivered.
Thames Ballast — 6 0 0 " " " "
Best Portland Cement — 31 0 0 per ton, delivered.
Best Ground Blue Lias Lime — 22 0 0 " " " "
NOTE.—The cement or lime is exclusive of the ordinary
charge for sacks.

Grey Stone Lime — 108. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 27s. 0d. per ton at rly. dpt.

STONE.

Ancaster in blocks — 1 11 per ft. cube, deld. rly. depot
Bath — 1 7 " " " "
Farleigh Down Bath — 1 8 " " " "
Heer in blocks — 1 6 " " " "
Grinshill — 1 10 " " " "
Brown Portland in blocks — 2 " " " "
Darley Dale in blocks — 2 4 " " " "
Red Corsehill — 1 5 " " " "
Closeburn Red Freestone — 2 3 " " " "
Red Mansfield — 2 4 " " " "
Hard York in blocks — 2 10 " " " "
" " 6 in. sawn both sides — 2 8 " " " "
landings, to sizes — s. d.
(under 40 ft. sup.) 2 8 per ft. super.
at rly. depot.

" " 6 in. Rubbed Ditto — 3 0 " " " "
" " 3 in. sawn both sides — 1 3 " " " "
slabs (random sizes) — 1 3 " " " "
" " 2 in. self-faced Ditto — 0 9 1/2 " " " "
Hopton Wood (Hard Bed) in blocks — 2 3 per ft. cube,
deld. rly. depot.

" " 6 in. sawn both — 2 7 per ft. super.
sides landings — deld. rly. depot.
" " 3 in. do. — 1 2 1/2 " " "

SLATES.

in. in. s. d.
10 x 12 best blue Bangor — 12 0 per 1000 of 1200 sq. yd. dep
" " best seconds — 11 10 0 " " " "
16 x 8 best — 6 17 6 " " " "
10 x 12 best blue Portma- — 11 7 6 " " " "
" " do. — 11 7 6 " " " "
16 x 8 best blue Portmadoc — 6 5 0 " " " "
10 x 12 best Eureka un- — 15 0 0 " " " "
fading greens — 15 0 0 " " " "
20 x 12 " " 10 0 0 " " " "
18 x 10 " " 11 10 0 " " " "
16 x 8 " " 7 10 0 " " " "
20 x 10 permanent green — 10 0 0 " " " "
16 x 8 " " 6 0 0 " " " "

TILES.

Best plain red roof tiles — 41 6 per 1,000, at rly. depot.
Hip and valley tiles — 3 7 per doz. " "
Best Broseley tiles — 48 6 per 1,000 " "
Hip and valley tiles — 4 0 per doz. " "

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Technical Schools and Free Library	Ramsgate Corporation	50L, 25L, and 15L.	Nov. 29

Nature of Work or Materials.	By whom Advertised	Forms of Tender, &c., Supplied by	Tenders to be delivered
Four Houses, Shop, &c., Tinker-lane, Barnsley		Wade & Turner, Architects, 10, Pitt-street, Barnsley	Sep 30
Sewerage Works, Main-road, Mowile, Ireland		P. Nolan, Civil Engineer, care of J. McConnell, Mowile	do.
Fifty Houses, New Tredgar		G. Kershole, Architect, Station-road, Bargoed	do.
Paving Works, Old Cook Yard, Halifax		Jackson & Fox, Architects, Rye-street, Halifax	do.
River Works, Abereon	Mountain Ash (Glan) T.D.C.	J. Williams, Surveyor, Town Hall, Mountain Ash	do.
Causeway-lane, Old Quay	Aberdeen Harbour Commissioners	R. G. Nicol, Harbour Engineer, Aberdeen	do.
Concrete Wall, Kestoe, Ruislip	Swadincote U.D.C.	E. Birks, Town Hall, Uxbridge	do.
Cottages, Darklands-road		J. D. C. Macdonald, 11, Leith, Edinburgh	do.
School, Clifton-road, Irwell		Ansini & Paley, Architects, Castle Park, Leamington	do.
Alterations to Chapel, Biscanov		F. Bennett, 1, Lower Wain-street, Blaenau	Oct 1
Quarries Road Metal	Littlehampton U.D.C.	A. Shelley, Town Offices, Littlehampton	do.
School in Clifton-road, Southall	Norwo 4 (Middlesex) Sch. Bnd.	W. C. Jackson, 4, Buckenham-street, Adelphi, W.C.	do.
Street Works, Clifton-road, Southall	Brechin District Committee	J. Slim, Civil Engineer, Montrose	do.
Paving Works, Fourth-street, &c.	Hove Town Council	H. H. Scott, Borough Surveyor, Town Hall, Hove	do.
Fourteen Cottages	Halifax Corporation	R. Evans, Engineer, 55, South Hall, Cork	do.
Additions to Laundry, Stoney Royal	Blackpool Corporation	J. Lord, Civil Engineer, Town Hall, Blackpool	do.
Street Works, Myrtle-street, &c.	Hybridge U.D.C.	J. S. Brodie, Engineer, Town Hall, Blackpool	do.
Road Metal, Lincoln-road, &c.	Mirdale (York) U.D.C.	S. A. Crawshaw, Surveyor, Council Offices, Weybridge	do.
Council Room, &c.	Metropolitan Borough Woolwich	F. H. Hare, Civil Engineer, Town Hall, Mirdale	do.
Cattle and Sheep Mart, Llanwist Major, Glam.	Wolverhampton Hospital Comm.	A. Bunwell Thomas	Oct 2
Street Works, Municipal Buildings	Ipwich Corporation	A. E. Painter, Architect, 43, Lichfield-street, Wolverhampton	do.
Hospital, Park-road West, &c.	Stockport Corporation	E. Buckham, Borough Surveyor, Town Hall, Ipswich	do.
Granite Setts (5,000 tons)	Croydon Corporation	J. Atkinson, Civil Engineer, St. Petergate, Stockport	do.
Street Works, Myrtle-street, &c.	Wolverhampton Hosp. for Women	Borough R. ad Surveyor, Town Hall, Croydon	do.
Road Works, Lincoln-road, &c.	Mr. B. E. Packer	A. E. Painter, Architect, 43, Lichfield-street, Wolverhampton	do.
New Hospital	Pencoed School Board	J. Lord, Civil Engineer, 28, Clarence-street, Penzance	Oct 3
Stores, Combe, Newlyn, Cornwall	Weston-super-Mare U.D.C.	J. John, Pencoed, Architects	do.
Drainage Works	Widder Town Council	Walsh & Nicholas, Architects, Museum Chambers, Halifax	do.
Four House, &c., Trevear, Cornwall	Wirral R.D.C.	G. Gow, Trogonham Office, Truro	Oct 4
Two Villas, Skirre at Green-road, Halifax	North Derbyshire Hospital Com.	Buckley & Son, Architects, Tower Chambers, Halifax	do.
Correlations to Shops, &c., High-st., Weston-super-Mare	Hoole U.D.C.	Wide & Fry, Architects, Westonsuper-Mare	do.
Labour's House	Margate Corporation	H. Nettleton, Surveyor, Town Hall, Weston-super-Mare	do.
House at Cemetery	Grimsby Corporation	Borough Surveyor, Town Hall, Widmer	do.
Road Works, Gayton Hill-road, Heswall	Farnborough U.D.C.	G. E. Bulshaw, Architect, 189, Woodhouse-street, Leeds	do.
Three Isolation Hospitals	Bishop Auckland R.D.C.	A. E. Caldecutt, 17, Newgate-street, Chester	do.
Street Works, Canal-side, &c., at Jemine-lane, &c.	Huddersfield Corporation	Mary & Lloyd, Architects, Dynevor Post Office, Neath	Oct 6
School, Dynevor, Skewen, Wales	Bromley U.D.C.	H. G. Whymt, Civil Engineer, Town Hall, Neath	do.
Laying Main (Waterworks)	North-Kaern Railway Co.	J. E. Hargreaves, Engineer, Town Hall, Farnborough	do.
Road Works, Pasture-street, &c.	Middlesex County Council	A. Latham, Civil Engineer, Municipal Buildings, Margate	do.
Sewage Disposal Works	Leyton U.D.C.	A. Johnstone, Surveyor, Crofton, Bishop Auckland	do.
Laying Main (34,000 yards)	Corporation of London	G. & C. H. Crowther, Civil Engineer	do.
Sewerage Works, Leasingthorne, &c.	Beckenham U.D.C.	Office of Council's Surveyor, Bromley, Kent	Oct 7
Waterworks, Tank, &c., at Jemine-lane, &c.	Devonport Corporation	Borough Engineer, Town Hall, Boole	do.
Road Works, Stanley-road, &c.	Margate Town Council	W. J. G. Jones, Surveyor, Neath	do.
Subway, Starbeck Railway Station	County Borough of West Ham	County Engineer, Middlesex Guildhall, Westminster	do.
Terminal Works for new Fracton, Bridge Work, &c.	Waterworks Corporation	Council's Surveyor, Town Hall, Leyton	do.
Wrought Iron Fencing, &c., at Jemine-lane, &c.	County Borough of West Ham	G. & W. Stocker, Architects, 90 and 91, Queen-street, E.C.	Oct 10
Erection of Six Masonettes, Wandsworth Bridge-rd.	County Borough of West Ham	Office of Engineer to the Corporation, Guildhall, E.C.	do.
Erection, New Baths, Artisans' Dwellings, Stoneys-lane	County Borough of West Ham	Council's Surveyor, Beckenham	Oct 13
New Sanitary Buildings, Artisans' Dwellings, Stoneys-lane	County Borough of West Ham	Borough Surveyor, Town Hall, Devonport	do.
Road Widening and Paving Works	County Borough of West Ham	A. J. Forster, Surveyor, Town Hall, Margate	do.
Embankment, &c., Camelshead	County Borough of West Ham	Borough Engineer, Town Hall, West Ham, E.	Oct 14
Paint and Granite Road Metal	County Borough of West Ham	F. W. Lucy, Engineer, Town Hall, Burnmouth	do.
Slaking of Road Metal, Jeddah, &c., Roads	County Borough of West Ham	J. E. Rogers, Engineer, Middlesex Guildhall, Westminster, S.W.	do.
Road Works, St. Leonard's-road, &c.	County Borough of West Ham	R. Rickert, Surveyor, 11, Lower-street, Walsingham	Oct 16
New Court House, Harrow	County Borough of West Ham	G. P. Milnes, Architect, Stroud	do.
Waterworks	County Borough of West Ham	J. Cartwright, Civil Engineer, Peel Chambers, Bury	Oct 20
Erection of Isolation Hospital	County Borough of West Ham	W. J. G. Jones, Surveyor, Neath	do.
Storage Reservoir, &c.	County Borough of West Ham	Director of Works Department, Admiralty, W.C.	Oct 22
Car Depot for Tramways	County Borough of West Ham	Manager, Gasworks, Gasrusey	do.
New Coast Guard Buildings, near Dover	County Borough of West Ham	County Surveyor, County Court House, Belfast	No date
Gas Main	County Borough of West Ham	H. Sale, Gas Offices, Shipton	do.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
Drainage Inspector	Eastleigh & Bishopstoke U.D.C. ..	27. per week	Oct. 1
Clerk of Works	Menai Bridge U.D.C. ..	Not stated.	Oct. 1
Surveyor	Amersham R.D.C. ..	1500. &c	Oct. 1
Storekeeper	London County Council ..	24. 2s. per week	Oct. 1

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv. vi. viii & x. Public Appointments, xix.

RICES CURRENT (Continued).

WOOD.		At per standard.	
		£ s. d.	£ s. d.
Shrub—			
rd yellow deals, 3 in. by	12 10 0	13 10 0	
11 in.	12 10 0	13 10 0	
No. 3 in. by 9 in.	12 10 0	13 10 0	
Sea and Petersburg—			
white deals, 3 in. by 11 in.	14 0 0	15 0 0	
11 in.	14 0 0	15 0 0	
3 in. by 9 in.	12 10 0	13 10 0	
cond white deals 3 in. by 11 in.	12 10 0	13 10 0	
3 in. by 9 in.	12 10 0	13 10 0	
pine—deals	16 0 0	18 0 0	
der 2 in. thick extra	10 10 0	11 0 0	
W Pine—First, regular sizes	38 0 0	39 10 0	
boards (2 in. and up)	2 0 0	2 10 0	
boards, regular sizes	24 10 0	26 10 0	
W Pine Oddsments	30 0 0	32 0 0	
Pine—Planks, per ft. cube	0 3 6	0 4 6	
ig and Stettin Oak Logs—			
per ft. cube	0 2 6	0 3 0	
all	0 2 6	0 3 0	
scot Oak Logs, per ft. cube	0 2 6	0 3 0	
Wainscot Oak, per ft. sup. as			
nch	0 7 0	0 8 0	
do.	0 7 0	0 8 0	
do.	0 7 0	0 8 0	
Mahogany—			
boards, Tabasco, per ft. sup.	0 9 0	0 11 0	
ected, Figury, per ft. sup.	0 1 6	0 2 0	
Walnut, American, per ft. sup.	0 10 0	0 11 0	
per ft. sup.	16 0 0	17 0 0	
rian Whitewood Planks—			
3 in. cube.	0 3 0	0 3 6	
ared Flooring—			
n, by 7 in. yellow, planed and	0 13 0	0 16 6	
n, by 7 in. yellow, planed and	0 13 6	0 17 6	
n, by 7 in. yellow, planed and	0 13 0	0 17 0	
n, by 7 in. white, planed and	0 11 0	0 13 6	
n, by 7 in. white, planed and	0 11 0	0 13 6	
n, by 7 in. white, planed and	0 11 6	0 13 6	
n, by 7 in. white, planed and	0 13 6	0 15 6	
6 in. at 6d. per square less than 7 in.			

JOISTS, GIRDERS, &c.

In London, or delivered		Railway Vans, per ton.	
		£ s. d.	£ s. d.
rd Steel Joists, ordinary sections	7 15 0	8 15 0	
ound Girders	8 2 6	9 5 0	
ees and Channels, ordinary	7 15 0	8 15 0	
sections	8 5 0	9 5 0	
Iron Columns and Stanchions,	7 2 6	8 5 0	
cluding ordinary patterns			

METALS.

Per ton, in London.		£ s. d.	
		£ s. d.	£ s. d.
Common Bars.	7 15 0	8 5 0	
affordshire Clowr. Bars, good	8 5 0	9 15 0	
merchant quality	10 10 0	11 0 0	
affordshire "Marked Bars"	9 0 0	10 0 0	
ld Steel Bars.	9 0 0	10 0 0	
oop Iron, basis price.	9 0 0	10 0 0	
galvanised.	10 0 0	11 0 0	
(* And upwards according to size and gauge.			
heet Iron, Black—			
Ordinary sizes to 20 g.	10 0 0	11 0 0	
20 to 24 g.	12 10 0	13 0 0	
24 to 26 g.	13 0 0	14 0 0	
heet Iron, Galvanised, flat, ordinary			
quality—			
Ordinary sizes, 6 ft. by 2 ft.	12 15 0	13 0 0	
3 ft. 10 in. to 24 g.	13 5 0	14 0 0	
22 g. and 24 g.	14 5 0	15 0 0	
26 g.	15 0 0	16 0 0	
heet Iron, Galvanised, flat, best			
quality—			
Ordinary sizes to 20 g.	16 0 0	17 0 0	
22 g. and 24 g.	18 0 0	19 0 0	
26 g.	19 0 0	20 0 0	
alvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 15 0	13 0 0	
22 g. and 24 g.	13 5 0	14 0 0	
26 g.	14 5 0	15 0 0	
est Steel Sheets, 6 ft. by 2 ft.			
to 3 ft. by 20 g.	12 0 0	13 0 0	
and thicker	13 0 0	14 0 0	
22 g. and 24 g.	13 0 0	14 0 0	
26 g.	14 0 0	15 0 0	
nt nails, 3 in. to 6 in.	9 0 0	9 15 0	
3 in. in. usual trade extras.			

LEAD, &c.

Per ton, in London.		£ s. d.	
		£ s. d.	£ s. d.
Sheet, English, 3 lbs. & up.	12 12 6	13 12 6	
ipe in coils	12 2 6	13 2 6	
oil Pipe	16 12 6	17 12 6	
Sheet—			
ille Montagne.	24 5 0	25 5 0	
edian	24 0 0	25 0 0	
PPRK			
rong Sheet.	0 10 0	0 11 0	
hin	0 11 0	0 12 0	
opper nails	0 0 11	0 0 12	
ASS			
rong Sheet.	0 0 0	0 0 0	
hin	0 0 0	0 0 0	
English Ingots.	0 1 3	0 1 3	
Plumbers	0 0 6	0 0 6	
hums	0 0 8	0 0 8	
lowpipe	0 0 9	0 0 9	

PRICES CURRENT (Continued).

ENGLISH SHEET GLASS IN CRATES.		3d. per ft. delivered.	
		£ s. d.	£ s. d.
15 oz. thirds	23d.	11	
fourths	23d.	11	
21 oz. thirds	23d.	11	
fourths	23d.	11	
26 oz. thirds	23d.	11	
fourths	23d.	11	
32 oz. thirds	23d.	11	
fourths	23d.	11	
Fluted sheet, 15 oz.	23d.	11	
21	23d.	11	
Hartley's Rolled Plate	23d.	11	
15 11 18 18	23d.	11	
15 11 18 18	23d.	11	

OILS, &c.

Raw Linseed Oil in pipes or barrels		per gallon	
		£ s. d.	£ s. d.
11 in drums	0 2 8	0 2 8	
Boiled	0 2 11	0 2 11	
11 in pipes or barrels	0 2 10	0 2 10	
11 in drums	0 3 1	0 3 1	
Turpentine, in barrels	0 2 10	0 2 10	
11 in drums	0 3 0	0 3 0	
Genuine Ground English White Lead	20 0	20 0	
Red Lead, Dry	20 0	20 0	
Best Linseed Oil Putty	0 8 6	0 8 6	
Stockholm Tar	1 12 0	1 12 0	

VARNISHES, &c.

Per gallon.		£ s. d.	
		£ s. d.	£ s. d.
Fine Pale Oak Varnish	0 8 0	0 8 0	
Fine Pale Oak	0 8 0	0 8 0	
Superfine Pale Elastic Oak	0 10 6	0 10 6	
Fine Extra Hard Church Oak	0 10 6	0 10 6	
Superfine Hard-drying Oak, for Seats of			
Churches	0 14 0	0 14 0	
Fine Elastic Carriage	0 12 6	0 12 6	
Superfine Pale Elastic Carriage	0 16 0	0 16 0	
Fine Pale Maple	0 16 0	0 16 0	
Finest Pale Durable Copal	0 18 0	0 18 0	
Superfine Pale Copal Body	0 12 0	0 12 0	
Extra Pale French Oil	1 1 0	1 1 0	
Eggshell Flating Varnish	0 18 0	0 18 0	
White Copal Enamel	1 4 0	1 4 0	
Extra Pale Paper	0 12 0	0 12 0	
Best Japan Gold Size	0 10 6	0 10 6	
Best Black Japan	0 16 0	0 16 0	
Oak and Mahogany Stain	0 9 0	0 9 0	
Brunswick Black	0 10 0	0 10 0	
Berlin Black	0 16 0	0 16 0	
Knocking	0 10 0	0 10 0	
French and Brush Polish	0 10 0	0 10 0	

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under-mentioned, unless in some exceptional cases and for special reasons.]

* Denotes accepted. † Denotes provisionally accepted.

BARNARD CASTLE.—For the execution of water supply works, Bow, for the Stanforth Rural District Council. Mr. J. E. Parker, C.E., Post Office Chambers, Newcastle-on-Tyne:—

J. Hardy	£2,368 0 0	C. Hedley	£1,427 12 8
G. Willis	2,111 2 0	Busbey & Sons	1,356 15 8
T. Bell	2,028 3 0	Chas. E. Raine	
T. & H. Lee	1,844 2 6	Barnard	
Smart Walker	1,780 0 0	Castle	1,248 12 0
Jackson & Sons	1,614 11 3	Engineer's	
E. W. Jackson	1,595 7 0	Estimate	1,310 0 0
A. E. Hobbs	1,551 8 9		

BLAENAVON (Mon).—For the erection of two houses, Blaenavon, Mr. E. Blewitt, architect, Blaenavon, Mon.:—
 † Hatherly £1,687 1
 Leadbeater Bros. 659
 W. T. Sier 550

BRITON FERRY.—For the erection of a club building for the Working Men's Club and Institute. Mr. H. Alex. Clarke, architect, Briton Ferry:—
 Thos. Waters £3,472 1
 L. Gower, Briton Ferry £1,350
 Architect's estimate, £1,350.

CHESTERFIELD.—For the erection of infirmary, nurses' home, &c., at the workhouse for the Guardians. Messrs. Rollinson & Son, architects, 23, Corporation-street, Chesterfield:—
 J. Fidler £45,634 0 0
 Shillito & Son 44,800 0 0
 Vickers, Ltd. 43,482 17 5
 Vickers & Son 43,000 0 0
 F. Lee 42,690 0 0
 Lowe & Son £41,561 1 9
 Hudson & Son 39,997 17 6
 W. Maule, Nottingham 39,519 0 0

DOWNE (Kent).—For additions and alterations to a private house. Mr. G. St. Pierre Harris, architect, 8 and 9, Ironmonger-lane, E.C.1:—
 W. Borer £73 17

EPSOM.—For alterations and fitting-up shop, High-street, for the International Tea Company, Ltd. Messrs. William Eve & Sons, architects, 10, Union-court, Old Broad-street, E.C.4:—
 Jones & Son £1,930
 Soole & Son 1,870
 Lascelles & Co. 1,865
 Watts Johnson & Co. 1,820
 Edgose 1,818
 Barker 1,775
 F. & H. F. Higgs 1,740
 Rolls & Taylor 1,697
 Saunders 1,590

FEATHERSTONE (Yorks).—For the extension of North Featherstone-lane Schools, for the School Board. Mr. W. Hamilton Fearnley, architect, Station-lane, Featherstone:—
 W. Barton £9,120 0 0
 M. Dixon 9,097 10 0
 Jackson & Co. 8,999 10 0
 G. Clements, Featherstone £1,818 17 5

FELIXSTOWE.—For the construction of sea-walls, groynes, promenade, and other works, for the Felixstowe District Council. Mr. John Russell, M.Inst.C.E., 15, Victoria-street, S.W.1:—
 T. W. Ped. 15,762 0 6
 Easton, Gibb, and Son 15,683 5 6
 Geo. Double 15,948 13 8
 Grubwell & Co. 14,350 0 0
 J. Moffat 14,244 15 0
 J. C. Truman 13,990 0 0
 C. Durran 13,999 19 6
 Synd. Ltd. 13,276 5 2
 Bradshaw & Co. 12,563 3 2
 Co. 12,539 18 6
 P. W. Sym. 15,326 8 0
 H. J. Linsell 15,319 0 0
 Facey & Son 14,368 9 8
 Hayward & Co. 14,350 0 0
 J. Moffat 14,244 15 0
 J. C. Truman 13,990 0 0
 C. Durran 13,999 19 6
 Moran & Son 13,276 5 2
 Cookes & Co. 12,563 3 2
 Westminster 12,563 3 2

HENDON.—For corrugated fire-escape shed, Institute-road, Hendon. Mr. S. Slater Grimley, Engineer and Surveyor to the Council:—
 T. J. Hawkins £56 10 0
 Norton Bros. & Co. 92 0 0
 Fredk. King 68 12 6

HERTFORD.—For additions, &c., to porter's lodge at workhouse, for the Guardians:—
 Ginn & Son £498 1
 E. Salmon £46 1

ILFRACOMBE.—For the construction of masonry intakes, &c., Chalcacombe, for the Urban District Council. Mr. O. M. Prouse, C.E., Town Hall, Ilfracombe:—
 W. C. Shaddock £19,400 1
 J. Alderman, West J. Dickson 9,435
 O. G. Osenton 6,862
 Loce, Cornwall £6,197 1

LONDON.—For pair of cottages, sewage outfall works, Ringers-lane, Hendon, N.W. Mr. S. Slater Grimley, Engineer and Surveyor to the Council:—
 F. King £1,080 0 0
 J. & W. Easterbrook £937 0
 Grover & Sons 1,065 0
 Turpie Bros. 917 19
 W. Tout 988 16
 F. Perren 845 12

LONDON.—For alterations and re-construction of present lounge bar at Swan and Sugar Loaf Hotel, Brighton-road, Croydon, for Mr. J. E. Brown (structural alterations only). Mr. F. Windsor, architect, 9 and 10, Bank-buildings, Geo. G-street, Croydon:—
 Hancombe & Smith £324
 Huntley, Bros. £298
 Horrocks 310
 Gowman 284
 Page 303

LONDON.—For boundary fencing, &c. at the Hendon Council Offices. Mr. S. Slater Grimley, Engineer to the Council:—

	Oak Carriage Entrance Gates per pair.	Wicket Gates each.	Oak Boundary Fencing (ramped).	Park Pale Fencing.
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Braggins & Co.	41 14 6	16 7 0	101 6 4	14 15 0
E. C. White.	28 10 0	12 5 0	45 0 0	7 10 0
Rowland Bros.	24 10 6	9 13 6	34 2 6	9 10 6
Stratford				

[See also next page.]

NOTTINGHAM.—For the erection of refuse destructor and stables, Wollaton-road, Radford, for the City Council. Mr. Arthur Brown, C.E., Guildhall, Nottingham:—

Contract No. 1.	
G. A. Pillatt	£5,918 13
Woodsend	5,642 0
Wm. Maule	5,510 0
T. Bartow	5,445 0
Vickers & Son	5,149 0
J. H. Williamson	5,090 0
Hutchinson & Son, Gordon-road, Not-	
tingham	4,820 0
[All of Nottingham.]	

Contract No. 2.	
Constructional Engineering Co.	£1,986 0 0
Handyside & Co.	1,042 17 3
Sands & Sons	1,041 0 0
T. W. Ward	1,030 0 0
Westwood & Wrights	993 8 0
Newton, Chambers & Co.	950 0 0
Jesse Tildesley, Ltd.	924 17 6
Baxendale Bros.	924 0 0
Horsley Co., Ltd., Tipton, Staffs.	872 15 2

ORPINGTON (Kent).—For decorations to Village Hall, for Mr. A. Brown. Mr. G. St. Pierre Harris, architect, 8 and 9, Ironmonger-lane, E.C.:—

W. R. Taylor	£160
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OTLEY (Yorks).—For the execution of street works, Jennett's-crescent, &c., for the Urban District Council. Mr. J. E. Shapoe, engineer, Council Offices, Otley:—

Joseph Hannam, 39, North-street, Otley	£698 4 3
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ST. PAUL'S CRAY (Kent).—For the erection of four cottages. Mr. G. St. Pierre Harris, architect, 8 and 9, Ironmonger-lane, E.C.:—

F. Wood	£1,558 15
T. Knight	£1,349 0
Somerford & Son	1,420 0
C. Dabner	1,136 0

SOUTHWAM (Yorks). For the construction of main sewage works, &c., Crownwell Wood, for the Council. Mr. F. Massie, C.E., Tetley House, Wakefield:—

Graham & Sons	£1,300 0 0
Barker Bros.	1,267 0 0
Bedford Bros.	1,150 0 0
J. Bentley	1,106 0 0
Joseph Brook	1,067 1
Henry Tyson	1,060 17 6
Marshall & Rushworth	988 10 9

STANLEY (Yorks).—For the execution of sewerage works, &c., Lee Moor, for the Urban District Council. Mr. Frank Massie, C.E., Tetley House, Wakefield:—

Higgins & Pash	£401 10 0
ley	10 0 0
Binks Bros.	350 0 0
A. C. Harris ..	322 13 4

TRING (Herts).—For the execution of street works, &c., High-street and Frogmore-street, for the Urban District Council:—

Taylor & Smith, Little Missenden	£590
--	------

WALSALL.—For the erection of school buildings and house, North Walsall, for the School Board. Mr. H. E. Lavender, architect, Bridge-street, Walsall. Quantities by architect:—

Williams & Oakley	£12,227 18
J. Dallow	£9,850 0
L. Jones	11,693 0
W. Hopkins	11,500 0
Kendrick & Son	10,925 0
G. H. Marshall	10,500 0
S. Wooton	10,437 0
M. A. Lynex	9,997 0

B. NOWELL & CO.
STONE MERCHANTS & CONTRACTORS.
Chief Office.—Warwick Road, KENSINGTON.
Norway, Guernsey, and Leicestershire
Granite, Kerb, Pitching, and
Yorkshire Stone.
ESTIMATES GIVEN FOR EVERY DESCRIPTION OF ROAD
MAKING.

WAKEFIELD.—For the erection of five cottages, Carlton, for the Leeds Industrial Co-operative Society, Ltd.:—

Binks Bros., Outwood, near Wake-	
field	£695 15 0

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 12s. per annum (25 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Japan, &c., 25s. per annum. Remittances (payable to DOUGLAS FOURDRINER) should be addressed to the publisher of "THE BUILDER," Catherine-street, W.C.

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CHARGES FOR ADVERTISEMENTS.
COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROCEEDINGS OF PUBLIC COMPANIES, SALES BY TENDER, LEGAL ANNOUNCEMENTS.

Six lines or under

Each additional line (about ten words)

Six lines (about fifty words) or under

Each additional line (about ten words)

Terms for series of Trade advertisements, and for front page, and other special positions, on application to the Publisher.

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Each additional line (about ten words)

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*"Stamps must not be sent, but all orders should be remitted by Postal Orders, payable to DOUGLAS FOURDRINER, and addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE noon on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter ONLY should be sent.

PERSONS Advertising in "The Builder" may have replies addressed to the Office, Catherine-street, Covent Garden, W.C. free of charge. Letters will be forwarded if addressed envelope are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

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J. J. ETRIDGE, Jr.

SLATE MERCHANT,

SLATER and TILER.

Penrhyn - Bangor,
Oakeley - Portmadoc,

And every other description of Slates, except American, Ready for immediate delivery to any Railway Station.

RED SAND FACED NIBBED
ROOFING TILES
ALWAYS IN STOCK.

Applications for Prices, &c., to
BETHNAL GREEN SLATE WORKS,
BETHNAL GREEN, LONDON, E.

THE BATH STONE FIRMS, Ltd.
BATH.
FOR ALL THE PROVED KINDS OF
BATH STONE.
FLUATE, for Hardening, Waterproofing
and Preserving Building Materials.

HAM HILL STONE.
DOULTING STONE.
The Ham Hill and Douling Stone Co.
(Incorporating the Ham Hill Stone Co. and C. Trank & Son
The Douling Stone Co.)
Chief Office:—Norton, Stoke-under-Ham,
Somerset.
London Agent:—Mr. E. A. Williams
16, Craven-street, Strand.

Asphalts.—The Seyssel and Metallic Asphalt Company (Mr. H. Glenn), Office, 12, Foultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tin-rooms, and terraces. Asphalts Contractors to the Forth Bridge Co.

SPRAGUE & CO., Ltd.,
LITHOGRAPHERS AND PRINTERS
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VOL. LXXXIII.—No. 3115.

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ILLUSTRATIONS.

St. Andrew's Presbyterian Church, Blackrock, co. Dublin	Messrs. Murray & Forrester, Architects.
House, Rue de la Faisanderie, Paris	M. Doumoulin, Architect.
House, Rue la Botte, Paris	M. Lobrot, Architect.
The Priory, Steyning	Mr. Frank Foster, A.R.I.B.A., Architect.
"The Retreat," Lakenheath, Suffolk	Mr. A. N. Prentice, A.R.I.B.A., Architect.
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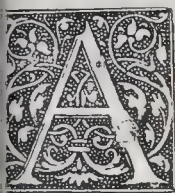
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A Note on City Architecture.



AS has been mentioned in our columns from time to time, the authorities in Paris have instituted two or three years back a system of offering prizes for the new street fronts which

were regarded as architecturally most satisfactory in the judgment of a jury of assessors appointed to award the premiums, which carry with them also certain advantages to the building-owner who, though not the designer, has encouraged and given opportunity for the design premiated. We published for the first time, in our issue of August 23, an illustration of one of the fronts which had received the official imprimatur. We give among our illustrations in the present issue the fronts of two street houses in Paris, built some three or four years ago, which did not receive prizes, and were in fact built, we believe, before this new ordinance came into existence, but which represent pretty adequately the hitherto prevailing type of Paris street architecture dating from the period of the Second Empire and the reign of Haussmann. A comparison of the two is rather curious, as an indication of what seems to be taken as the path of improvement in Parisian street architecture.

There is no doubt that the old picturesque Paris, as we knew it from old engravings and from some of the old streets in Montmartre and elsewhere, was destroyed under the two Empires; the great Napoleon commencing and pointing out the way for the alterations carried out on a much larger scale under the Second Empire. The Haussmann regime took the French Renaissance as a starting-point, and remodelled the principal streets into a prevalent and consistent style which showed indeed little variety, and little of the more refined quality of Renaissance architecture, but had nevertheless the element of style, and a prevailing civility which, it did not rise above a certain level, at all events did not sink below it. The city acquired thus that palatial aspect in its streets which led an English novelist to re-

mark that while Paris was a city, London was only a collection of villages. A great capital should show dignity in its street architecture; and this at least Paris acquired in the erection of the style of street front of which the two houses illustrated in this issue are fairly typical specimens. Many persons, in England at all events, find this style of street architecture lacking in interest; its details seem to come out of the same pattern-book, so to speak; the combinations vary a little, but the elements are much the same—carved decorations in rococo classic, and decorative iron balconies; the difference between the work of one architect seems, for the most part, hardly perceptible. And yet with all these drawbacks, the stone-built streets of Paris have unquestionably the quality of style; they form a city architecture which, if conventional, is always dignified.

It is perhaps partly owing to the feeling that this type of street architecture is monotonous—that it has done all that it can do and leads to nothing further, that the Parisians, always alive to the possibility of improving their city in the artistic sense, have started the idea of premiums for the best-designed street fronts. The idea is an excellent one in itself; it is a practical recognition of the architectural importance of street architecture; but there is certainly a danger connected with it, and it may be doubted whether those who first promoted the idea quite realised where it might lead them. It almost necessarily encourages the development of the personal element in the design, to the detriment of the total effect. At any rate, this tendency is emphatically indicated in the premiated front which we illustrated on August 23. There is certainly life enough in this in a sense—or at all events vivacity (which is not quite the same thing); some of the details are very original and piquant, if not very beautiful. But the notable and unfortunate point about it is that the element of style, which was pre-eminent in the conventional type of Paris front, is here absolutely sacrificed. The design is without style—almost ostentatiously so; it has none of that dominating unity of character which renders the nineteenth century Paris street balanced, dignified, and satisfactory to the eye. The competition for the premium seems

in this instance at least to have had the effect of inducing a desire to do something as different as possible from the ordinary Paris front. If this difference ran all in one direction the ultimate effect might be to produce another unanimity of street style, only of a different type from that now prevalent. But the probability is that the system will not work in that way. It will be more likely, especially after this award, to operate towards making each competitor for the coveted honour endeavour to be "original" and as unlike any other competitor as possible. And with that, if the system is carried far enough, will go the distinguishing quality of the existing Paris street architecture viz., its dignity and uniformity of style, so suitable to the streets of a great capital.

This is not without a lesson to ourselves. The tendency of some of our architects who carry out street fronts is already in the direction which the Paris premiums seem to have encouraged; that of a certain eccentricity in design and an entire disregard to the character of a street as a whole. It is all very well to say that this is picturesque; it may be, but it is the destruction of dignity; and it is the quality of dignity and of a certain unity of style which is really wanted in the streets of a great capital. This equality Paris has, and seems in danger of losing through the misapplication of a well-meant effort. This we, in our far cheaper and humbler way, once aimed at in such efforts as Regent-street and its quadrant and circuses. Regent-street is a poor architecture in detail, but it was worth something as a whole, and that something is now getting entirely destroyed through total indifference to the design as a whole. It was our one attempt at palatial dignity in a city street; a feeble one, carried out when architecture was in a very feeble condition; but still a well-meant attempt, and one that should have been respected. And if we ever offer premiums for the best street fronts, the reward should go not to the best *per se*, but to the best in subordination to the whole street effect. The neglect of that condition is the mistake the Parisians seem to be making in their new move to improve street architecture. We require reform rather in the opposite direction.

HARTLAND CHURCH, NORTH DEVON.



HARTLAND, so well known to West-country tourists for its grand and wild seaboard, is, next to Lidford, the largest parish in Devonshire, extending over an area of 16,700 acres. In the old days, when the Austin canons occupied the abbey of Hartland and held the appropriation of the church, this great parish with its multitude of isolated hamlets was well served. There was not only a formally ordained vicarage at the great church of Stoke, close to the abbey, and about a mile and a half to the west of the town of Hartland, but there were fifteen chapels in as many hamlets where divine service was celebrated. When, however, at the dissolution of the monasteries the great tithes fell into lay hands, all this spiritual provision came to an end, nothing but a very poorly endowed vicarage remained, and one by one the chapels all disappeared. In 1839 the old town hall of the former mayor and corporation, in Hartland proper, was rebuilt as a chapel of ease; but, save for this, the whole of the vast parish, with hamlets five, six, and seven miles distant, is dependent for its church services on the fine church of Stoke St. Nectan, more usually spoken of and rightly considered as the parish church of Hartland.

From the width of the district for which it serves, but more especially from the size and dignity of the fabric as contrasted with those of most of the neighbouring parishes, Hartland Church is often known by natives as well as visitors by the proud title of "the cathedral of North Devon." The ground plan consists of chancel with aisles and north vestry, nave with north and south aisles, north and south transepts, north and south porches, and western tower. The tower, including the pinnacles, is 144 ft. high. The length of the church is about 140 ft., and its breadth, exclusive of transepts or porches, 45 ft.

There are not a few interesting details to be gleaned of the history of this fine and remarkably situated church, and its connexion with the adjacent abbey, many of which have not as yet been published. Our only intention, however, in this sketch is to offer some description of the fabric and its furnishings, more especially as the multitude of guide-books to this district, of all prices, are for the most part so strangely and fantastically wrong in their accounts of a church that is so well worthy of close study.

Without stopping to investigate its origin, there seems no reason to doubt the statement usually put forth that the first church on this commanding site was erected a few years before the Conquest by Gytha, wife of the great Earl Godwin, and that it was dedicated in honour of St. Nectan, in the belief that the influence of that saint had saved the life of the earl in a shipwreck on that deadly coast. St. Nectan, a local seventh-century saint, is also commemorated in the neighbouring church of Welcomb, about six miles distant on the Cornish border, a very small cruciform fabric having undoubted traces of pre-Norman building. Of the church built by the Lady Gytha nothing is left save a considerable number of well-shaped stones, many of them of a large size, which can be readily traced in parts of the walling, and which obviously pertained to an older fabric than that now standing.

The church underwent a severe restoration at a somewhat unhappy and rather pretentious period, viz., 1848-50, which puts considerable difficulties in the way of a right understanding of its features. At that date the east end of the chancel was entirely rebuilt. A walk round the exterior of the church would cause the uncritical observer, possessed of some knowledge of Gothic architecture, to feel confident that here, as with most churches of the district, fifteenth-century work predominated. The window tracery throughout is of the Perpendicular style, but closer observation shows that the whole of it, or nearly the whole of it, belongs to the Victorian restoration, and in some cases is clearly out of keeping with the mouldings of the window jambs. On entering the church it becomes obvious that the arcades between the nave and the aisles are of fourteenth-century date. The fact is that, with the exception of the tower and a Victorian vestry arrangement on the north of the chancel, the whole of the fabric shows that there was a complete rebuilding on an extensive plan in the last-named century.

The mouldings of the nave arcades and of other details are of that simple character which makes any attempt at precise dating difficult; but it seems most likely that the church was replanned and constructed anew at the time when Roger de Salegh was abbot of the monastery in the adjacent valley. He began his rule in 1330, and died of the plague at the beginning of 1350. It is highly probable that the terrible visitation of the Black Death, which raged with particular severity in Devonshire (1349-50), cut short the full plan of rebuilding, so that the church was left without a tower until the next century.

The tower is earlier than most of the Perpendicular towers of North Devon, and was probably erected in the first quarter of the fifteenth century. It is a remarkably good example of substantial building of that date. Evidently the greatest pains were taken to build securely in so exposed a situation. This is especially noticeable in the battlements and pinnacles, which appear to have been from the first well secured with lead-set cramps. The tower is of four stages, with buttresses set on the square at the angles. On the east face of the second stage, just clear of the apex of the nave roof, is a large niche with a crocketed canopy, containing a figure of St. Nectan; the workmanship of the niche is better than that of the image. This is a rather unusual position for the image of a patron saint; possibly it was placed here because of the exposed sea aspect of the west side, and because the church was usually approached from the east, by those coming either from the town of Hartland or from the abbey.

In the church, at the west end, on the south side of the fine lofty arch into the tower, is an interesting old font, which though some two centuries older than the present fabric is in good condition. It is of Late Norman date; the upper part is 2 ft. 2 in. square, and handsomely arcaded on each face; the base pillar has a cable moulding and a chevron pattern on the shaft.

But the special feature of the church is the singularly handsome and effective screen which stretches right across the nave and aisles in a line with the east wall of the small transepts. There is no chancel arch, a feature very rarely to be met with in churches of this district. When this

beautiful screen was erected, probably in the third quarter of the fifteenth century the arches of the arcades through which it passes were somewhat altered for its accommodation. The narrow stairway to the top of the screen is in the thickness of the wall of the south chancel chapel, and is still available. The screen is most rich in its details and has a groined canopy on each side. The length is 47 ft. 8 in., and the width on the top is 5 ft. 10 in. The full height is 12 ft.; it is 8 ft. to the spring of the canopies, and 10 ft. to the centre of each compartment. There are five traceried openings each side of the central doorway. The patterns of the carvings of the different sections of the canopy work are exceedingly varied, no two being exactly alike. The cornice mouldings which are of five orders, are exceedingly rich and minutely executed. The delicacy of the cresting on the west front (it has gone from the inner side) is often pointed out as showing the strength of the wood to resist the effects of time. To our mind it looked suspiciously and awkwardly perfect, and on mounting the screen the cresting turned out to be a gilded length of cast-iron work, an abomination of the 1850 restoration! The cornice is all gilded, but now much dulled in appearance, and there is a good deal of painting in other parts, mainly red and white, and including some upright mouldings done in barber-pole work of red and white and black and white. It would be quite worth while to have the whole repainted with care and taste. As it is, it is neither one thing nor the other, for the present amount of painting is poor and patchy in effect and dingy in appearance. Certain wiseacres might think it rather shocking to do away with the traces of the "original" painting and gilding, as it has often been termed. But there is no great antiquity in this colouring of the Hartland screen. The gilding now apparent has obviously been poor stuff when first applied, and we may be sure that no such contrast in colours of such weak tones as now prevail would have been employed in the days of its first erection. The parish is fortunate in possessing a book of church accounts extending from 1597 to 1706. These accounts show that the screen was twice painted in the seventeenth century, at a cost of about ten shillings each time. They also give the information that "a pair of organs" was set up on the rood loft in 1637-8, and that during the Commonwealth the rood loft was seated throughout. An organ was again placed there in 1845, but removed at the restoration a few years later. All trace of the loft or panelling on the top of the rood screen has long since disappeared; but the great timbers still bear the holes where the supports were fixed, and the larger openings on the top of the centre of the western beam show the exact positions of the rood, flanked by the Mary and John.

Parts of the roofs of this church are well worthy of attention. The original fourteenth-century cradle or waggon roof, with boarded panels, still exists over three bays of the nave, namely, from the rood screen as far west as the line of the porches. The panels, with large stars in the centre, and the ribs of the roof, are painted; the colouring dating, we suppose, from the Victorian restoration. It is difficult to believe that the present colours, though not ineffective at a

distance, are in any sense reproductions of the original design. The north chancel aisle has been very richly treated both in colour and carving. The panels are painted in ultramarine blue, studded with raised gold stars. Each panel is divided by diagonal moulded ribs meeting in a gold boss in the centre; the ribs are beautifully coloured in blue and red and green; each rib is also outlined with gilded fleur-de-lis crestings. It is piteous to see the condition of this exceptionally fine and delicate example of enriched fourteenth-century roofing. Could not something be done to restore the loose pieces to their places, and to preserve the rest? During a recent visit we picked up two delicate bits of carved and gilded cresting from the pavement below, and there are a number of pieces on the top of the organ. Up to the time of the Victorian restoration there was an equally beautiful roof over the south chancel chapel. The main feature of the colouring of that roof was, however, red or vermillion. The Guild of Our Lady made use of the north chancel chapel, where the roof was coloured blue.

The nave is chiefly fitted with substantial oak seats or benches of late sixteenth-century date. In the south chapel are several bench ends bearing the initials H.P., which stand for Hugh Prust. He was an important landowner in Hartland, and the last upholder of the Guild of Our Lady before the Reformation. The seats bearing his initials have been transferred from the chapel on the other side of the chancel. There is a pretentiously carved but ineffective modern pulpit in the nave; this replaced a really fine Jacobean pulpit at the time of the Restoration. Five well-carved panels of this pulpit can still be seen behind the organ, bearing the words, "God save King James Fines." What the word on the last panel means is a puzzle. The suggestion that it is a mistake for *finis*, implying that it was the last panel, seems ludicrously insufficient. It is possibly some forgotten family name, perhaps that of the donor of the pulpit. Ines is a surname not unknown in the West; the carved letters are all capitals; would they have meant F[rederick] Ines?

The monuments are not very remarkable. In the chancel is a slate slab, with an incised cross on a calvary base, and a black-letter marginal inscription. Locally this is known and pointed out as "the bishop's tomb," but there is no episcopal symbol of any kind. The inscription is almost illegible, but we made out the date to be 1465. A beautifully worked table-tomb, panelled, and ornamented with three small uncharged shields, does duty as an altar at the east end of the chancel. The date seems to be about 1400. It is said to have come from the abbey. This is quite possible, but the assertion—universally made in guide-books—that it is an original stone altar, and one of the only ones in all England, is a complete mistake. Another fictitious bit of interest always printed about this church, and apparently believed by every one, is that there is "a sanctuary knocker" on the chancel side of the old door into the north vestry. It is sometimes kindly explained that, of course, the door has been turned round, for a knocker must have been on the outside! The knocker in question is an ordinary and somewhat small example of a scutcheon plate with ring attached, which was for

a long time the invariable accompaniment of every heavy mediæval door—whether church or manor house—and was simply intended for convenience in closing the door. There are several better examples of such ring handles on other church doors in the district, and the church rambler, here and elsewhere, meets with a tendency on the part of incumbents and others to style them "sanctuary rings" or "sanctuary knockers." We were assured, for instance, at Hartland that no one would be touched or arrested even for murder, so long as he had his hand on that knocker. This idea of a sanctuary knocker, which is still so specially insisted on at Hartland, probably had its rise from the large ornamental ring knocker at Durham, which may really have served this purpose. For at Durham, as at Beverley, and at Beaulieu in the south, there were special sanctuary privileges extending over a considerable area, and lasting for an indefinite period, when the sanctuary seeker was duly registered. In addition to this, every church and churchyard in the kingdom, from the days of Alfred to those of Henry VIII., was a sanctuary for a certain defined period, and required no knocker of any kind whatsoever.

Over the north porch is a parvise or room, from which there is a small opening into the church. It was probably occupied by some guardian of the church, and is still known as "the guard chamber." Since we visited it many years ago, it has taken into its keeping the old parish stocks, which are exceptional in possessing an odd number of ankle-holes. The much-respected vicar, Rev. T. H. Chope, who has been in charge at Hartland since 1859, remembers seeing them in use at the beginning of his incumbency, when they stood just outside the main churchyard gates. Over the entrance of the south porch is a mural sundial, of the year 1804, with the appropriate but rarely seen motto, "Life passeth like a shadow."

Under the tower there now stands the great base stone of a fourteenth-century churchyard cross, which was dug up in the churchyard when a well-designed new cross was erected close to the east gates in 1897. This stone has been roughly hollowed out in a circular shape to receive the base of the cross shaft, and has been, strangely enough, declared to be an "old Saxon font." It has been placed in the church with the idea, so we are assured, of being placed on a base opposite the Norman font. As it is neither a font nor Saxon, this would be an unfortunate mistake. If the parish authorities will consult any competent antiquary or architect, they will be saved from such a blunder. In the churchyard, close to the beautiful new cross, a discarded altar stone of slate should be noted. The consecration crosses are irregular in number and position. Can this have been owing to some crack or flaw in the slate, and the impossibility of substituting another one when the bishop arrived?

NOTES

We have received the pro-
Royal Academy spectrum of the Lectures to
Lectures. Students at the Royal Academy
for the Session 1902-3, which is a rather
vague document. The subjects of the lectures on chemistry, by Professor Church, and on anatomy, by Professor Arthur Thomson, are given; but of those on painting (Professor Prinsep) and sculpture (Pro-

fessor Gilbert), it is merely stated that "the subjects will be announced in due course;" and the same statement is made in regard to architecture, without even the name of the lecturer. This looks as if things went on in a very *laissez faire* kind of manner at the Royal Academy, and that the Professors of Chemistry and Anatomy are the only two who are really giving their minds to the business of lecturing to the students. It may be replied that chemistry and anatomy are practical subjects which really admit of demonstration, and that pure art does not; and indeed the artistic lectures have sometimes been of a rather perfunctory kind, and evidently so regarded by the student portion of the audience. The chemistry lectures are announced to commence on October 6; those on anatomy on October 27; and those on painting, sculpture and architecture respectively on January 12, January 26, and February 16 of next year.

THE recent holidays have brought into prominence the question of the speed of motor-cars. The country villages have been invaded by motorists who often consider twenty miles an hour a reasonable speed to pass along even a winding hill through a village, whilst on the level roads they are encountered at speeds of some forty to fifty miles an hour, and the County Benches have at every sitting to inflict a series of fines. On such occasions the motorists urge that no speed limit should be imposed upon them by law, but they support this contention with the fallacious argument that a speed limit discourages a growing industry, overlooking the fact that the best way of encouraging an industry is hardly to make the instruments it produces a terror and nuisance to other people, and motorists must remember that not 1 in 3,000 of their fellow ratepayers use the roads as an express train line. Reasonable beings, however, can hardly resist the conviction that motor cars in increasing numbers have to be reckoned with in the future, but at the same time the ratepayers are entitled to every protection from an ever increasing danger. In cases of fatal accident, now so numerous, it is to be hoped juries will have the courage of their opinions, and in cases of conviction the severest sentences should be passed by tribunals dealing with cases of manslaughter. The question of road maintenance, under these new circumstances, is much exercising the local authorities. In Kent the expense amounts to 155*l.* per mile, whilst in some other counties the cost is as low as 80*l.* It is true the motor car probably wears the road far less than other vehicles; but the amount of wear, and the attendant inconvenience to others, should count for much; and seeing the distances they cover, they monopolise roads which they pay nothing to maintain.

The American
Engineer
in England.

In a paper recently read before the Western Society of Engineers at Chicago, the opinions of an American engineer are expressed upon English methods of conducting building operations. The author came to this country with the contractor who undertook to complete the Westinghouse works in Manchester, and his experience appears to have been gathered chiefly in that city. Sufficient general comment

has already been made in our columns and elsewhere upon the contract in question, and we now propose to call attention very briefly to the points which appeared to the author to be worthy of mentioning to his fellow engineers in Chicago. In the first place he points out that the clerk of works and about a dozen assistants were scattered over the works in little offices, and did not exercise any effective control over the conduct of operations. The interruption to work by the breakfast hour was very great, the amount of work turned out by the men in general, and by bricklayers in particular, was much below the American standard, and mechanical appliances were of inadequate character. Immediately on arrival, the new contractor commenced to reorganise the whole conduct of affairs. The clerks were collected into a central office, and instructed to keep the same hours as the men; the breakfast hour trouble was got over by degrees; and bricklayers were so encouraged by liberal payment that at first double the usual number of bricks per man was laid daily, and later, four times the number. The result is said to have been partly due to the use of thinner mortar, and of the most approved labour-saving auxiliaries in the form of mortar mixers, concrete mixers, brick hoists, painting machines, &c. The opinion is expressed that the fault in this country is slack management, and the employer is blamed more than the man, for it is said that the results attained by the American contractor show what can be done with the British workman when he is properly managed. Structural ironworkers also come in for adverse criticism, especially their deep-rooted antipathy to labour-saving appliances, such as pneumatic tools. Remarks are also made upon the dilatory methods of firms supplying materials for use. It is always instructive to listen to genuine criticism, which in the present case seems to be amply justified by the fact that the American contractors actually accomplished in little more than one year a quantity of work which English builders said could not be completed in less than five years.

FOUR dams have now been completed by the German authorities in Alsace-Lorraine for the purpose of regulating the flow of the streams in the Vosges mountain district. The last dam, which has lately been finished, proved to be the most troublesome of the series to construct, and the methods followed are of some interest. The dam rests upon dense, glassy sandstone in a valley at a considerable elevation, and is a curved structure about 240 metres long, by four metres wide at the top, and nearly twenty metres wide at the bottom. The lines of maximum and minimum pressure fall within the middle third of the dam, and at the overflow sections the masonry is increased in thickness by 75 metre. In consequence of observations made it was considered advisable that the downstream face of the dam should be shielded by an earthen bank for the purpose of minimising the action of the sun, and so of reducing movement due to temperature fluctuations. The reservoir formed by the structure has a capacity of about 197 million gallons, at a level of 1 metre below the crest, and two waste weirs at each end have a combined

capacity of 8,750 gallons per second. Local sandstone, known as "graywacke," was used for the mass of the structure, but some granite was necessary for the facing of culverts, as "graywacke" is not amenable to treatment by ordinary stone-working tools. The coping, parapet, and weir arches are of concrete, in the proportion of Portland cement 1 part, sand or broken stone 8 parts. Trass mortar was chosen in preference to cement mortar, because it could be safely used when a considerable period had elapsed after mixing. In fact, mortar of this kind could be revived after having been made for as long as two days without losing its value. The advantage of this quality will be realised when we mention the fact that operations were liable to frequent interruption by rainstorms. As the mortar was of purely hydraulic character, the water of the reservoir was kept close to the top of the work, with the result that the mortar hardened excellently. The dam contains about 28,000 cubic metres of masonry, and was constructed by the Government, under the supervision of Mr. Fecht, as chief engineer.

ENGLISH electricians would do well to study more closely the progress that is being made on the Continent in the methods of supplying alternating currents for lighting and power purposes. After long hesitation they are adopting polyphase systems in the large power distributing stations now approaching completion, but in the meantime other systems are springing up. So far as we know, the polyphase machines in these stations are hand regulated, and there has been no attempt at compounding them to give constant voltage. In France both Leblanc and Bouchérot have been very successful in building machines on what they call the *compoundage* principle, and there are hundreds of these machines in every-day use. Some eight or ten years ago we suggested a method of allowing alternating and direct currents to flow along the same mains, as by this means greater power can be transmitted by them. The idea was developed by Bedell, in America, and recently great progress has been made in its practical application by Professor Arnold, of Karlsruhe. Instead of using direct and alternating currents, he uses alternating currents of different frequencies, and although theoretically the basis is not so sound, yet a sufficient margin of profit is allowed over a one-frequency system to make its adoption certain in many cases. Any number of currents of different frequencies can be transmitted over one main so that the heating effect is merely that due to the sum of their individual heating effects as they do not practically interfere with one another. To be able to supply economically currents of two frequencies, one for lighting and the other for motors, would be a considerable advance on present systems as the frequency that is best for one of these purposes is quite unsuitable for the other. There are also other applications of poly-cyclic currents. For example, in the sugar factory at Cambrai, alternating currents of three different frequencies are employed when starting and stopping the electric motors coupled to the heavy sugar turbines, and by this means a considerable waste of energy is prevented.

IN this country very little attention is paid to the warming of workshops, the general idea apparently being that the men ought to generate sufficient natural heat by energetic working. Sometimes this is quite easy, but at others a little artificial warmth is really necessary. Men often arrive in the early morning cold and quite disinclined for active effort, and the result then is that until breakfast time has passed very little real work has been accomplished. Employers, who are wise, know that the cost of heating apparatus may be amply repaid by increased production, but such knowledge is by no means universal. Even when heating is attempted, the methods are of the most primitive nature, and ventilation is not infrequently neglected altogether. As an example of a thoroughly adequate heating system we may cite the apparatus installed in the new locomotive shops of the Buffalo, Rochester, and Pittsburg Railway Company. Exhaust steam from various engines is here utilised, and after passing through a feed-water heater, it is conveyed to the locomotive shops and roundhouse, where separate air-heaters are provided. The machine shops contain some 2,440,000 cubic feet of space, into which warmed air is delivered at the rate of 59,000 cubic feet per minute, at a pressure of $\frac{3}{4}$ oz. per sq. in. Two duplicate fan units are provided for the distribution of the air, each blast-wheel being 10 ft. diameter, direct connected to $9\frac{1}{2}$ in. by 10 in. horizontal engines working at 150 revolutions per minute. Each fan exhausts through an air-heater composed of eight sections of steam coils in series. From the fan air is drawn directly upward through a 72-in. pipe to a point above the roof truss, where the pipe divides into two smaller branches having outlets from which air is delivered at a velocity of 1,200 ft. per second outward in all directions, and downward at an angle of 35 deg. The air is thus spread out and diffused through the shops, and it returns at low velocity along the floor from all parts towards the apparatus. Air supplied to the heaters comes directly from the building, and the greatest distance to which it is blown is 120 ft. No special arrangement is made for the admission of fresh air, the assumption being that sufficient ventilation is provided by the numerous doors and windows. The installation is capable of changing all air contained in the buildings once in twenty minutes, the air discharged from the pipes overhead is at 160 deg. Fahr., and by diffusion it maintains a temperature of 65 deg. Fahr. throughout the shops. The warming of the roundhouse is similarly effected, but the warm air is delivered to the pits through brick and tile pipe ducts laid underground in Portland cement.

Re-Heating
Compressed
Air.

SOME recent tests conducted at Cornell University bear upon the gain to be expected from the re-heating of compressed air used in various mechanical appliances. The results arrived at may be thus briefly summarised:—The net gain in economy was 31·7 per cent. with air at 57 lbs. pressure, and 38·4 per cent. when the pressure was 82 lbs. Economy was found to be increased with rise of temperature, but the increase was gradually lessened after the temperature had reached 300 deg. Fahr. Although it is

able that the advantages mentioned may be influenced by increase in volume of the water. It is probable that the high results are attributable to other changes of condition in the working of the engine. Thus re-heating has been calculated to obviate difficulties due to the freezing of moisture in the exhaust passages, and the choking up of the valve. Three important points appear to be secured by the employment of a re-heater in the manner described: (1) absence of freezing in the engine, (2) reduced cost of plant generally, and (3) permanent increase of economy in working.

AN unwonted spectacle may be just now to be seen in New Bond-street in the shape of a large number of water-pipes which have been dug up in the course of laying down the iron tubes for telephone wires for the General Post Office by Messrs. J. Mowlem & Co., contractors. The pipes, for the most part of oak, elm, and beech wood, consist of links—a few of them yet retain their bark varying up to some 7 ft. in length, and reduced to a diameter of from 6 in. to 8 in. The joints are made by the simple means of inserting the tapered ends into the sockets, and are latterly in a few instances being strengthened with an inlaid ring of metal. The pipes in New Bond-street, which of late years had belonged to the Grand Conduit system, are, it would appear, relics of the old water service belonging to the City of London, which gave a name to the Conduit Mead estate still owned by the Corporation. Old Bond-street was built in 1686, Conduit and New Bond streets in 1718-20. The mead included the ground now covered by Bond-street, Hay Hill, Stratford-street, portions of Conduit and Aldborough streets, Mill-street, and other thoroughfares in the vicinity. The Tyburn, or Aye Brook, supplied many conduits in the City and in London, nine of them being in the western parts of the town. There were three conduit-heads in Mill Hill Field, where is now Stratford-place, Oxford-street. On the site of Aldborough House, at the end of Stratford-place, stood, until 1737, when the sisters beneath the banquetting-house were arched over, the house in which the City Chamberlain used to entertain the Lord Mayor and Common Council when, on September 18, they made their annual visitation to the conduit-heads and disported themselves in hunting foxes and hares before and after dinner. The old conduit, formerly in South Molton-street, is in the Guildhall Museum. Within the Park railings, a short distance westwards from Hyde Park Corner, may still be seen the building for the tank that collected spring water for St. James's and, latterly, Buckingham Palaces, the supply being derived from the conduit-head at Bayswater (Lancaster-gate), which from a very remote period had supplied the Abbey at Westminster.

WE read that the site and enclosure of Cooke's School of Anatomy, one of the last after its kind in London, are soon to be incorporated with the surrounding burial-ground that belongs to the church of St. George-the-Martyr, Holborn, in Queen-square. The school was established about

thirty years ago in a part of the burial ground. The graveyard, situated in St. Pancras parish, and adjoining the parochial burial-ground of St. George, Bloomsbury, on the north side of the Foundling Hospital, was originally laid out in pursuance of the Act 10 Anne, cap. 11, six years after the building of the church as a chapel of ease to St. Andrew, Holborn, and having been finally closed against interments in 1853 was opened as a public resort about fifteen years ago. For some while a strong prejudice prevailed against the use of the ground. In order, it is said, to conquer that unreasoning objection the first grave dug there was that of the author of "Fasts and Festivals of the Church," concerning whom the parish register of burials contains the entry—"1714, January 28, Robert Nelson, Esquire, of Gloucester-street. *Vir Insignis.*" His conspicuous monument, bearing a Latin epitaph composed by Bishop Smalridge, was restored by the late William Butterfield in 1888 for subscribers to a fund collected in that behalf. Close by is the grave of Edward Dilly, the bookseller. A marble tomb, described in Noble's "Life of Cromwell," and to be identified by the coat-arms of Gibson and Cromwell, partly per pale, carved in stone at either end, marks the resting place of Dr. Thomas Gibson, Physician-General to the Forces, and author of "The Anatomy," who died, *s.p.*, on December 27, 1727, in Bedford-row, and of his widow Anna, the sixth and favourite daughter of Richard Cromwell. The latter was born at Hursley Park, near Winchester—her mother's inheritance—on March 27, 1659, during her father's Protectorate. Amongst other notable burials we may mention those of Dr. Stukeley, the antiquarian, and during many years rector of the parish (1765); Jonathan Richardson, the painter (1771); Dr. John Campbell (1775), editor of "The Lives of the Admirals" and "The Biographia Britannica"; and Zachary Macaulay, father of Lord Macaulay, who occupied a house—since pulled down—in Great Ormond-street, whence he removed to Clarges-street, Piccadilly, where he died in May, 1838.

ACCORDING to a paragraph in the *New York Times*, a large church is to be built at Patras, in Greece, and it has been decided to open a competition for the design to American architects. The wording of the paragraph implies that the competition is confined to American architects, though this is not distinctly stated. It is desired that the church should be in the Byzantine style. Why American architects are especially desired we do not gather; but if any of the best American architects compete we have no doubt they will produce something worth having. The church will apparently be a large one, as it is to seat 5,000 persons and to cost 50,000*l.* Premiums of 400*l.*, 160*l.*, and 80*l.* are offered.

PUBLIC HALL, ALFORD, ABERDEEN.—A new public hall for the Alford district has just been completed. The architect was Mr. G. F. Milne, Aberdeen. The hall is built of Syllavethie granite, and the builder was Mr. Alex. Grant, Alford. The other contractors were:—Carpenter work, Mr. A. Fowle, Alford; slater work, Messrs. Christie & Sons, Dyce; plumber work, Mr. William Leask, Alford; plaster work, Mr. Wm. Moir, Inverurie; painter and glazier work, Mr. T. Fyfe, Alford. The hall is 87 ft. in length, and 43 ft. in breadth, and consists of two halls, the larger of which is seated for 500 persons and the smaller for 100.

LETTER FROM PARIS.

M. DAUMET, the architect, is putting in hand the work of restoring the important buildings of the old Palais de Justice at Paris. These buildings are in a most neglected state, and the work will occupy some time.

M. Berlier, the well-known engineer, has now explained to the Chamber of Commerce of Havre the details of his scheme for the construction of the tunnel proposed to pass under the River Seine, at Tancarville, near Rouen. The tunnel will take the form of a round tube, 17 ft. in diameter, placed on a foundation of concrete embedding the lower portion of the tube. For a distance of 800 yards under the bed of the river the tube will be formed of a series of segments of cast-iron solidly bolted together, and the exterior of this portion will be protected by a thick coating of hydraulic lime mortar, forced in by means of a special apparatus. The two end portions of the tunnel will be constructed of armoured concrete 10 in. thick. The cost of the two tunnels, each of a length of about 2,700 yards, is estimated at 800,000*l.* The Chamber of Commerce has voted the sum of 400*l.* to M. Berlier for the purpose of defraying the expenses of his further study of the problem.

It is proposed to transform the new hippodrome at Paris into a theatre to contain 15,000 seats, 3,000 of which will be at the popular price of 50 c. The scheme has been sketched out, and the cost is estimated at 20,000*l.* The State has been asked to contribute, and the Minister of Public Instruction has promised to support the request.

The Minister of Public Instruction has presented to the Louvre Museum the table and clock of marqueterie work which belonged to the office of the manager of the Imprimerie Nationale in the old Hôtel de Rohan. These objects formerly belonged to the family of Rohan.

The Société Nationale des Architectes has decided the competition organised under its auspices for a "Maison Maternelle," to cost the sum of 10,000*l.* The first premium is awarded to M. Parenty, architect, of Paris, who will also receive a prize awarded by the Minister of Public Instruction, and a silver medal from the Société. The second and third premiums are awarded to M. Dugué and M. Gaulard respectively.

It is stated that a decision has been come to regarding the immediate demolishing of the Galerie des Machines in the Champ de Mars, and that the building will have disappeared by next spring.

The Place du Carrousel in its present arid state has long been an eyesore to the Commission du Vieux Paris, and one of its members has put forward to the State a demand that the large open space be decorated as soon as possible with grass plots and flower beds.

The interior and exterior of the Cluny Museum are undergoing a thorough restoration, for some of the older portions are beginning to fall into a disastrous state of ruin. The state of the Carnavalet Museum building is also becoming a matter for serious alarm, and it is proposed to consolidate the threatening portions of the basement and the double depth of cellars on which this interesting building is constructed.

The publication of the new rules concerning the heights and projections of buildings at Paris, prepared by M. Louis Bonnier, architect to the City of Paris, has caused a certain dissatisfaction, as it is immediately applicable on publication. A number of architects, who, having already prepared their designs and details for work to be put into hand at once, are unable to comply with the new rules, have sent in a request that an exception be made in their case, so as to avoid an inconvenient modification of their designs. A conference on the subject of the new rules is announced.

The large hall of the Treasury Department at the Ministry of Finance in the Louvre is being entirely re-arranged and modernised as regards the arrangement of the paying and receiving offices. The foundations for the new pillars to support the upper portions have been constructed on the Cottancin system of armoured brick caisson work, permitting of shallow distributing foundations in the floor above the basement.

The acceptance of the Thomy-Thiery legacy by the Conseil d'Etat has made the long-discussed question of the departure of the Minister of Colonies from the Pavillon de Flore in the Louvre one of urgency. The

matter will now probably be decided at once, and M. Redon, the architect to the Louvre, has been commissioned to prepare the rooms for the reception of the collection and the public.

The numerous cases containing the objects of art left to the City of Paris by the late M. Dutuit have just been deposited at the Petit Palais, where M. Girault, the architect, is carrying out with all possible expedition the work necessary for their installation. There is, in fact, no time to lose, since if the collection is not open to the public by December 15 the legacy is void and the collection goes to Mme. Dutuit's residence at Rome. Unfortunately the Petit Palais, though externally a beautiful building, presents internally a bare interior in which everything has to be done; the State has presented to the City no more than the mere walls and floors; and before either the Dutuit collection or the municipal art treasures can be arranged there an amount of work must be done involving both much time and much expenditure.

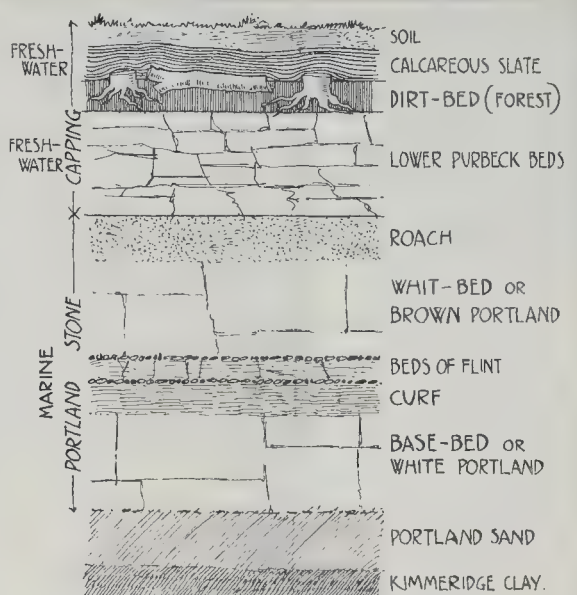
The general arrangement proposed is as follows: the great gallery along the principal front will receive the works in sculpture and the tapestries, with M. Fremiet's St. George and the Dragon as the central object. The Dutuit collection will occupy the southern portion of the interior, next the Cours la Reine. The large inner gallery will contain the antiquities, pictures, examples of French art of the seventeenth and eighteenth centuries, and the more remarkable of the works in enamel and faience. The engravings (including a number of etchings by Rembrandt), the drawings, and coins, will be placed in the gallery parallel with this. The modern pictures belonging to the Municipality, the number of which is continually on the increase, will occupy a neighbouring gallery and also a portion of the north side of the building, next the Champs Elysees. It is proposed to form in the basement a collection of sculptural and architectural models, reserving also a space for temporary art exhibitions.

At the Hôtel de Ville the recess of the Municipal Council has afforded opportunity for finally completing the interior decorations, which will be done when M. Olivier Merson has finished his paintings on the State staircases which were commissioned in 1899. On the same staircases M. Joseph Blanc has just completed a large cupola painting in which a group of female figures represent the Months of the Republican calendar, and M. Schommer a corresponding one in which the figures represent "Les Chansons des Rives de Seine." The large paintings by M. Chéret, representing Italian comedy, French comedy, and Pantomime, are being fixed up in a room decorated otherwise with white and gilded woodwork. M. Detaille's two great paintings of this year's Salon are now fixed in the Salle du Budget, where they have a very fine effect, and will probably be the prelude to other important official commissions to this artist.

M. Pascal, who completed last year the new buildings of the Bibliothèque Nationale parallel with Rue Colbert, has commenced the remaining block along the Rue Vivienne. The plan will necessitate the formation of two stories below the ground level. This block will complete the quadrangle.

M. Saglio, the curator of the Cluny Museum, is arranging, in the part of the museum known as the "Thermes de Julien," a new gallery which is intended to receive various ancient sculptures and engravings which, for want of space, have hitherto been hidden in a store-room inaccessible to the public. The exhibition of these objects will be of much interest to archaeologists, who will also be able there to see a portion of the ancient building in an unrestored condition.

The Champ de Mars continues to present the lamentable spectacle of the ruins of the last exhibition buildings; and at the Trocadéro, though M. Bouvard has restored the lawns and plantations to their former condition, the sculptures and the cascade seem to be left to go to ruin. It is much to be wished that the Municipal Administration would revive and carry out the scheme of the late M. Alphand for treating this piece of ground, for which he obtained from M. Fremiet a very decorative model for the basins of the cascade itself. Equally neglected is the scheme which Dalou had made for the treatment of the site around his great sculptural group in the Place de la Nation, with cascade effects resembling some of those of Versailles.



Section of Strata in Portland Quarries (No Scale).

While referring to the Trocadéro, we should not omit to call attention to the interesting loan exhibition of Russian art at present on view in Ethnographic Gallery.

The monument to Balzac is at last erected, though not in the position originally granted to the Société des Gens des Lettres. It appears that the Metropolitan Railway was the obstacle to the site on the Place du Palais Royal, for which has been substituted a site at the junction of the Avenue de Friedland with the Faubourg St. Honoré. There is a suitability in this site owing to its proximity to the house long occupied by Balzac, and in which he died. The monument to Musset, which M. Mercie is just completing, is still to come, though it is not known yet whether it will be under the trees of the Place du Théâtre Français, the site originally proposed. At the Luxembourg Garden a sculpture representing a peasant woman of the Cevennes seated on a rock and caressing a goat, forms a piquant contrast to the Watteau memorial on an adjacent site. This new group, which has just been erected, is the work of M. Marquette, and forms a monument to the novelist Ferdinand Fabre, who died some years ago. The monument to Charles Garnier, at the junction of Rue Scribe and Rue Anber, in the courtyard in front of the Opera Library, is still veiled; the date of the inauguration is not fixed, but it will probably take place before the end of the year.

The death is announced, at the age of forty-six, of M. Courtois-Suffit, the well-known architect. He was an architect "diplomé" by the Government, and also an official architect of the City of Paris. He was a pupil of his father and of M. Pascal. The large quantity of work executed at Paris by the late architect is easily recognisable by the special characteristics visible in all the designs executed by M. Courtois-Suffit. He carried off a medal and a travelling scholarship at the Salon of 1883, and a medal at the Salon of 1886. He was Chevalier of the Légion d'Honneur, and member of the jury at the Exhibition of 1900.

CREMATORIUM, DARLINGTON.—The Darlington Crematorium, at the West Cemetery, Darlington, is the outcome of a limited company, formed in 1893, but which only decided to erect a building for the purpose intended in 1900. The crematorium was erected from plans prepared by Messrs. Clark & Moscrop, the incinerating apparatus being supplied and erected by Messrs. H. Simon & Co., Ltd., of Manchester. The cremating apparatus is a furnace of the regenerative type. There are three interior chambers.

THE ARCHITECTURAL ASSOCIATION SUMMER VISITS: PORTLAND STONE QUARRIES.

A SPECIAL summer visit was made by members of the Architectural Association on Saturday last, the 27th ult., to the Isle of Portland to inspect the stone quarries and working plant belonging to the Bath-stone firms. The party, numbering twenty-eight, including the new President, Mr. H. T. Hare, assembled on the previous evening at Weymouth, and made an early start the following morning at the express invitation of the owners, by whom a good supply of brakes was provided for the purpose of making the tour.

The working of a cable tramway was first explained, followed by a short inspection of the shipping wharves and the tackle employed. Incidentally the Government coaling station and the magnificent new breakwater were noticed. Practically speaking, the whole of the building stones of the Portland formation are quarried at the highest part of the island, which takes the form of a large table-land rising some 700 ft. and falling gently to the south. The tramway for a considerable distance is in common use by the various quarry-owners, and descends rapidly on the north side for convenient delivery of material to the shipping and rail wharves.

In making the ascent of the hill, a fine view of the famous shingle, Chesil Bank, was obtained, to which reference was made in our issue of September 6; a marked feature of this natural breakwater is the presence of the larger shingle at the end of the current which washes the shore of the island, the smaller stones being found at the western end of the bank some eleven miles distant. Here also was seen the general bare character of Portland, with almost an entire absence of trees and with cold colour effects produced by the silver-grey weathering of the stonework of the dwellings and boundary walls of the fields. It was also noticed that very few buildings showed up the fine qualities of the material so abundantly found at hand.

At the summit of the island the members were driven round to the numerous quarries and workshops of the Bath Stone Firms. The quarrying of Portland stone has been going on for some centuries, but it was not till about A.D. 1619, during the building of the Banqueting Hall at Whitehall, that an extensive use of the stone appears to have been made; later, a very large supply was shipped to London for St. Paul's Cathedral: the approximate position of the quarry from which this material was

rawn was pointed out, and some large stones lying in the quarry were stated to be material issued or rejected by Wren.

In almost all the quarries a clear view was had of the various strata comprising this important formation, which for all practical purposes referred to under three heads: the top layers are called the *Capping*, which is entirely waste material, overlying the *Whit-bed*, and under this is the *Base-bed*.

The capping, varying in depth from 15 ft. to 6 ft., consists of a loam resting upon beds of soft freshwater calcareous slate, below which is the "dirt" bed about 18 in. thick, containing remains of an ancient forest: the silicified stumps and trunks of coniferous trees are frequently found, partly buried in the vegetable earth of the dirt bed and partly covered by the base slate; the remainder of the capping is made up of freshwater lower Purbeck beds. We were much struck by the enormous amount of waste in these useless layers before the best beds were reached.

Then follows a peculiar shelly stratum of stone, termed *Roach*, averaging 4 ft. thick, overlying the famous *Whit-bed*, or brown Portland. The roach formation proved a source of much interest to the party; a discussion of its properties led to the expression of a general desire for using it in ashlar, as being coarser, and, by reason of its shells and small cavities, as possessing greater texture than the beds in general use. At present it is not employed as a dressed stone, though in roughly squared blocks it is very suitable for engineering works; a large quantity is now being used in the construction of the new Portland Harbour breakwater, after having been subjected, with granite, to a gun-test. Although seen in cottage walls, roach is not to be found in any large building on the island, with the exception of the ashlar on St. George's Church, a small Classic edifice with domed crossing, commenced in 1754 and finished in 1766; from the present condition of the work the material has not been affected in any adverse way during the 148 years that are elapsed. The working depths of the *Whit-bed* or brown Portland vary from 7 ft. to 6 ft.; the material is quarried by a wedging process, to which it is well adapted by reason of the fissures in the rock; the larger blocks seldom exceed 20 tons in weight, and the average contents is about 145 cubic ft.; 16 ft. to 20 ft. is the quarry weight of the stone.

Well defined solid beds of flint separate the *Whit-bed* from the *Base-bed* or white Portland; this is a stratum of similar depth of a much finer quality, more easily worked but of smaller capacity for weathering, than the *Whit-bed*; until recent years it has scarcely ever been quarried, for which no explanation has been found beyond the reasons just stated. Like the overlying stratum, the upper layers of the *Base-bed* consist of an inferior material called "curt." Portland stone ends in this *Base-bed* and is followed by a very deep bed of sand to which the term Portland is applied by geologists.

Not the least interesting were the quarries recently opened at the edge of the sea-cliff near the south end of the island, for they afforded an excellent study of the formations and of the action of seawater upon the material.

No pains were spared by the owners and their representatives to make the visit both interesting and instructive. Mr. Sansom, the manager, carefully explained the methods of quarrying and hauling; the means by which the respective beds are recognised; matters relating to cost in production, and gave much other useful information arising out of the questions asked by the visitors. Amongst the latter, the fact that the better kinds of Portland stone can be laid in a building "face bedded" as well as on the "natural" bed, occasioned general surprise, and suggested economy in use. At the workshops and sawing yards the steam plant, comprising horizontal quick and slow stroke saws, moulding and sinking machines, lathes, &c., were keenly inspected; but the chief interest centred round a 9-ft. diamond-toothed circular-saw, which, at varying speeds, cuts through a 4-ft. block of Portland stone at the rate of 6 in. per minute. Another machine attracting great attention was a steam "channeller." In quarries where natural fissures are absent, this powerful machine, running along a small railway cuts channels, by vertical strokes, for wedging purposes, 4 in. wide at the mouth, diminishing to 1 in., and to a depth of 10 ft. if necessary. The

steam-cranes were specially set to work and large blocks were dislodged and hoisted with remarkable ease and rapidity.

By far the greater part of the stone quarries of the island are now owned by the Bath stone firms—representing, roughly speaking, an area of about 700 acres—who, during their brief ownership, have cleared a very large amount of "capping," ready for expeditious quarrying of the stone. About 100 steam and hand power cranes are at work, and 450 quarrymen, besides a large staff of masons, are employed, giving an average output of 300 tons per week. A great number of blocks were seen squared up and stacked ready for dispatch to the various Government buildings now in course of erection in London. After lunch, which was kindly provided by the proprietors, a visit was made to the church already referred to, and to the quarry museum. This latter is located in a disused tramway arch passing under one of the main roads, and contains specimens of fossil trees, ferns, marine and fresh water shellfish, stalactites, stalagmites, and other remains. Returning to the station, a close inspection of the Chesil Bank was made, bringing a thoroughly enjoyable and instructive day to a close.

THE WOLVERHAMPTON ART AND INDUSTRIAL EXHIBITION.

It is perhaps to be regretted that this exhibition, following so closely on the heels of that at Glasgow, will inevitably be compared with it. Undoubtedly the palm must be awarded to Glasgow, but when the population of the two towns is taken into consideration, it must be admitted that Wolverhampton has done exceedingly well. The comparison extends not only to the number and variety of the exhibits, but also to the design of the buildings in which these are shown. The architects of the Wolverhampton buildings, Messrs. Walker & Ramsey, have flattered Mr. Miller by imitating the general character of his designs for the Glasgow Exhibition, and have succeeded in producing buildings which are not only interesting to the architect, but well adapted for their purpose. The construction is, of course, flimsy—wood framework for the walls, light wood trusses for the roofs, and corrugated iron for the roof-coverings. The walls are cased externally with fibrous plaster, and the exposed woodwork is painted—but our readers will guess the colour. The roof-trusses of the Industrial Hall have semi-circular arched ribs built up of boards, like those of the Grand Avenue at Glasgow, and many of them have buckled laterally to a very serious extent, although the roof covering is so light. The spans are a little over 50 ft. The trusses over the Machinery Hall have longer spans, and are of the arched lattice type with horizontal tie-beams. We believe that some of the materials from the Glasgow Exhibition have been used in the Wolverhampton buildings, and, if this is the case, it accounts for the similarities we have noticed. But there is undoubtedly a good deal of new work, for which credit must be given to Messrs. Walker & Ramsey.

The different classes of exhibits are, on the whole, grouped in a convenient manner, so that the visitor desirous of inspecting all the exhibits in any class has not much difficulty in finding them. Nearly all the exhibits are to be found in the two main blocks, known as the Industrial Hall and Machinery Hall. A separate building of smaller size is devoted to Canada, and some other exhibits are placed in small buildings scattered about the grounds. The "Art" collection is in the permanent Art Gallery in the town.

The first exhibit in the Industrial Hall to which we shall draw attention is that of the Cannon Iron Foundries, Ltd., of Deepfields, near Bilston. The stand (No. 2) contains a miscellaneous collection of "porcelain" ware—such as to say, porcelain-enamelled iron—among which are a well-made bath with exposed standing waste and overflow, a range of three round-fronted lavatory basins, and a wash-down water-closet (galvanised outside) with S-trap in the same piece as the basin; the trap has an inspection-cover bolted to the crown, and a "porcelain" rim is bolted to the top of the basin. Messrs. M. Cockburn & Co., of Falkirk (No. 8), and Messrs. Ward Bros., of Wolverhampton (No. 9), exhibit the commonplace kinds of registers, mantels, and lavatories, which are found in the catalogues of so many builders' merchants; the former firm has some ingenious close or open

kitchens, one type being adapted for coal or wood fires. Messrs. Parkinson and W. & B. Cowan, Ltd., of Birmingham (No. 10), show a number of gas-fires and stoves of the usual characterless designs, and some good gas-cookers, wet and dry meters, &c. Stand No. 12 (Messrs. Benjamin Parkes & Sons, Ltd., Woodsetton Works, near Dudley) contains a very ugly hat and umbrella stand, and a good hammered-metal fire-grate interior with curb and dogs, in addition to some well-designed wood mantels executed by Messrs. Phillips & Jones, of Wolverhampton.

From the architect's point of view the exhibits of Messrs. Martyn & Co., Ltd. Cheltenham (No. 13) are much more satisfactory. They include a massive "Georgian" door and frame designed by Messrs. A. B. & E. M. Thomas, of London; a quaint chimney-piece, designed by Mr. E. Goldie, F.R.I.B.A.; a coved plaster ceiling, by Mr. R. A. Briggs; a wood mantelpiece (of a stone character rather than wood), by Messrs. Banister Fletcher & Sons; a model of the exhibitors' first premiated design for the Queen Victoria Memorial at Liverpool; and photographs of works executed for Mr. Fellowes-Prynn and others. Stained glass windows, by Mr. Martin Dunn, of West Bromwich, are shown at Stand No. 15, and among them we noticed some well-designed and effective leaded lights with bevelled glass and lead only 1½ in. wide. Messrs. Walters (Wolverhampton) Ltd., show a number of ventilating appliances at the next stall. The extract ventilators are of the well-known type, with vertical batle-plates. An attempt has been made to give some variety to the designs, but the Russian-looking bulbous tops are not very pleasing. Among the other appliances are mica-flap air-inlets for drains, and various kinds of air-inlets for rooms.

Perhaps the brickmakers in the country around Wolverhampton think that their goods are too well-known in that town to need any advertisement. At any rate, the only exhibit of this kind which we noticed is that of Messrs. Peter Wood, Ltd., of West Bromwich (No. 21); a varied assortment of bricks, paving, coping, &c., is shown (chiefly "blue"), and all appear to be true in shape and of good quality, but it would have been better to show a few "bats."

Messrs. George Howson & Sons, Ltd., of Eastwood, Hanley, have a good show of sanitary fittings at No. 22, but as the exhibits do not differ materially from those shown by this firm at the Manchester Health Exhibition and noticed in our columns last week, we need not review them in detail. The bricklayer and general contractor will pause to look at the pickaxes and spades shown (among other things) by Messrs. John Perks & Sons, of Wolverhampton, at No. 26, and the painter will find something of interest in stall 38, where Messrs. Read Bros. & Co., Ltd., of Wolverhampton, exhibit varnishes of different kinds. The next stand is of more interest to architects and surveyors, as it contains a good collection of instruments of various kinds by Messrs. J. Halden & Co., of Manchester.

Messrs. Parker, Winder, & Achurch, Ltd., of Birmingham (No. 40), show a number of Messrs. Shanks & Co.'s sanitary fittings, together with Eagle ranges and grates and stable fittings. Brass, copper, and steel tubes for different purposes will be found at No. 41 (Messrs. Earle, Bourne, & Co., Ltd., Birmingham). The Carron Co. (No. 43) exhibit stable fittings, stoves, ranges for coal, steam, and gas, and a good porcelain-enamelled iron bath; among the most interesting exhibits of an ornamental character is a hammered copper "interior" for a fireplace. Some excellent beaten copper and brass interiors will also be found at Mr. J. H. Butler's stand (No. 46), together with oxidised copper electroliers of good design. The "Homely" sunk fire made by the Griffin Foundry Co., of Birmingham, is also shown; the fireclay back is surrounded with small peacock-blue glazed bricks and pilasters, which support a wood overmantel with beaten copper panels, the whole having a touch of originality. Among the smaller articles some quaint coal scuttles of beaten copper are worthy of mention. Mr. Butler's works, we are pleased to note, are at Wolverhampton.

Among a miscellaneous assortment of commonplace firegrates, &c., at the next stall (Messrs. S. Smith & Son, Ltd., Smethwick), there are a few exhibits of very good design, including a simple cast-iron bedroom mantel, an armoured steel interior, and two or three panels of cast-iron railing.

The Silicate Paint Co., Ltd., of Charlton,

London, show at No. 49 some decorative designs in duresco, which show that effects brilliant or subdued can be obtained with the material; the artists' names are given. At No. 59, Mr. G. Faulkner Armitage, of Altrincham and London, exhibits a building of two rooms fitted up as "an entrance hall and a sitting-room," but the stairs are partly open to both rooms, and this is an arrangement which appears to sacrifice comfort and utility to picturesque effect. The whole is a good example of domestic design. In close proximity to these are the exhibits of cabinet work by Messrs. Thomas Edwards & Son, Messrs. R. Stroud & Son, Ltd., and Messrs. Phillips & Jones, all of Wolverhampton. The first-named firm has a well-designed stand containing some oak sideboards of quiet design.

The next firm is in the "wholesale" trade, and much of their work is such as it is impossible for us to admire; a dressing-table, however, furnishes an interesting exception. Messrs. Phillips & Jones exhibit three rooms decorated and furnished as drawing, dining, and bed rooms. The dining-room furniture is of good character, but the imitation-wood dado is like the fly in the ointment. The drawing-room suite is overloaded with ornament, and the brass handles, &c., look tawdry and cheap.

We pass on to No. 72, where Messrs. Pilkington's Tile and Pottery Co., Ltd., of Clifton Junction, near Manchester, exhibit specimens of their well-known wall and floor tiles, mosaic, &c. The stall is a simple but pleasing structure, with two arches on one side and one wide arch on the other, and is faced outside with egg-shell-glaze tiles of different tones of yellow. Inside these are several coloured ornamental panels. The tiles are of good quality, and the designs generally are worthy of high praise.

The locks and latches on all the doors in the exhibition buildings have been supplied by Messrs. Chubb & Sons' Lock and Safe Co., Ltd., of Wolverhampton and London, and other specimens of this firm's goods will be found at Stand 77. The principal exhibit is a strong-room, with artillery-tested door controlled by three locks, namely, a chronometer or "time" lock, a keyless combination lock, and a lever lock with keys so small that one of them is mounted under the signet of a finger-ring. A safe, specially designed for architects, surveyors, and engineers, is also worthy of notice; it is fitted with fourteen sliding metal trays for plans. Among the other interesting exhibits are many different kinds of locks and "safe deposit" fittings. Safes and locks of various kinds are also shown by Messrs. Geo. Price, Ltd. (No. 94), Mr. R. M. Lord (No. 97), Messrs. Cyrus Price & Co., Ltd. (No. 99), and Messrs. Thos. Skidmore & Son (No. 118), all of Wolverhampton. Messrs. Lowe & Fletcher, of Willenhall (No. 85), Mr. James Gibbons, of Wolverhampton (No. 95), Messrs. Thos. Sutton & Son, of the same town (No. 119), and the Co-operative Padlock Society, Ltd., of Walsall (No. 132), exhibit locks and other brassware and builders' ironmongery in considerable variety. Mr. Gibbons also shows some good faintly openers, and copper and brass door-handles and plates, to which the much-abused word "artistic" may fitly be applied. At No. 96 Messrs. Green & Russell, of Wolverhampton, have an exhibit of builders' black ironmongery, including Norfolk latches of good design. Other examples of local industries will be found at No. 102, where Messrs. Wm. Miller & Sons, Ltd., show various kinds of hurdles, unclimbable railing, gates, &c., of the ordinary type of design, but well made, and at No. 120, where there is a good display of galvanised iron sheets, &c., by Messrs. Geo. Adams & Sons, Ltd.

Another local industry represented in the Exhibition is that of enamelled-iron advertisements and signboards, but the productions are in the main so hideous that it will be a kindness to withhold the names of the exhibitors; one of the firms has the hardihood to include the word "Art" in its name, and if this indicates that it has some worthy aspirations in this direction—although there is no evidence of it at present—we venture to suggest that it should apply to the Municipal School of Art, whose exhibit (No. 104) shows that Wolverhampton need not continue to offend the eyes of railway travellers with such glaring examples of ugliness as it has produced in the past.

In the Machinery Hall there are not many exhibits of particular interest to our readers. Electrical engineering is represented by the Electric Construction Co., of Wolverhampton

(No. 225), Messrs. Heenan & Froude, of Birmingham (No. 226), Messrs. D. Bruce Peebles & Co., of Edinburgh (No. 227), Messrs. Crompton & Co., Ltd., London (No. 238), Messrs. Ferranti, Ltd., of Hollinwood, near Oldham (No. 244A), Messrs. Bever, Dorling, & Co., Ltd., Dewsbury, and the Phoenix Dynamo Manufacturing Co., Bradford (No. 260), Messrs. D. Selby Higge & Co., Newcastle-on-Tyne (No. 261), the Hiram Maxim Lamp Co., Ltd., London (No. 267), the Edison & Swan United Electric Light Co., Ltd. (No. 275), and others. Gas engines by Messrs. Crossley Bros., Ltd., of Openshaw, near Manchester, the National Gas Engine Co., of Ashton-under-Lyne, and Messrs. Tangyes, Ltd., of Birmingham, are shown at Nos. 210, 211, and 256. Messrs. R. Becker & Co., of London (No. 239) have an interesting display of Kiessling's wood-working machinery, including a copying-machine, dovetailing-machine, and sand-papering-machine, in addition to machines for circular sawing, band sawing, planing, moulding, tenoning, &c. At the next stall English wood-working machinery is exhibited by Messrs. J. Sagar & Co., Ltd., of Halifax. It is interesting to find that a family which originally gained its name from its inherited trade of sawyer (for *sagar*=sawyer) should to-day be making woodworking machinery. But sawing is not the only branch of the existing firm's work; among the exhibits are machines for dovetailing, planing, moulding, boring, mortising, and other details of the joiner's trade. Another exhibit of the same class is that of Messrs. Thos. Robinson & Son, Ltd., of Rochdale (No. 243). A fine band-saw operated by a skilful workman is an interesting feature at this stand.

Messrs. E. J. & J. Pearson, Ltd., of Stourbridge (No. 209), have a display of freelay ware, including "Teale" and other firebricks, and patent angular-contact boiler seating blocks with asbestos packing. Excellent salt-glazed and enamelled bricks are shown by the Farnley Iron Co., of Farnley, near Leeds, at No. 213, together with a combination sink, and other glazed ware. Wrought-iron and steel tubes for different purposes, and various kinds of flanged joints, coils, &c., are exhibited at No. 216 by Messrs. Lloyd & Lloyd, Ltd., of Birmingham and Halesowen. The Smoke Prevention Co., Ltd., of Blackburn, exhibits a working model of the E.S.E. patent mechanical stoker, which is worth inspection. Mention should also be made of the goods and passenger lifts of Messrs. Holt & Willett, Cradley Heath (No. 246); Messrs. Hughes & Lancaster's "Shone" pneumatic ejector for raising sewage (No. 258); Messrs. Edward Preston & Sons' rules and hand-tools for carpenters and joiners (Birmingham); Mr. C. H. Matthews's joiners' cramps, vices, hand-power machines, and ingenious brackets for supporting planks from ladders (Wolverhampton); and Messrs. James Stott & Co.'s ventilating fans and cowls and gas-governors.

In the Canadian pavilion there is not much of special interest to the architect, engineer, or builder. The large collection of Canadian timbers is well worth study, but that labelled "yellow pine" is not the wood known by that name in this country. Gilmour's patent doors, made at Trenton in Canada, are a novelty. The framework has a core of soft wood, either solid or built-up, and is ploughed longitudinally to afford a key for 1-in. hardwood facings, the backs of which are ploughed to correspond. It is claimed that the doors are lighter and cheaper than solid hardwood doors, and that they cannot warp or twist.

In the Exhibition grounds we noticed a one-storied club-house, by Messrs. Humphreys, Ltd., of Knightsbridge, London, constructed of timber framing, covered outside with felt and corrugated iron, and inside with matchboarding. Another building, exhibited by Mr. C. N. Parkin, of Wolverhampton, has the walls formed with "Mack" patent partition slabs, and a flat vulcanite roof, and appears to be thoroughly satisfactory. Messrs. Davies Bros. & Co., Ltd., of Wolverhampton, have a corrugated iron shed containing a good selection of galvanised-iron sheets, tanks, dust-bins, barrows, &c. Messrs. C. Wiist & Co., of Seebach-Zurich, exhibit electrical machinery in a small timber building of characteristic Swiss type. The "Little Giant" pneumatic tools and compressed-air appliances are shown by the International Pneumatic Tool Co., Ltd., of Westminster; and Messrs. Lockerbie & Wilkinson, of Birmingham, have an interesting display of automatic and non-

automatic acetylene-gas generators, including portable lamps for contractors, in addition to abattoir fittings and folding partitions. A peal of six bells by Messrs. Charles Carr, Ltd., of Smethwick, is shown in a picturesque little tower with octagonal spire.

The sanitary fittings throughout the Exhibition have been supplied and fixed by Messrs. George Jennings, Ltd., of Lambeth. We noticed a new kind of independent urinal, in form like a sugar-loaf hollowed out on one side; it stands clear of the wall and is about 3 ft. 6 in. high, and the base is formed into a tray and provided with an outlet-grate. The plumbing is well done.

Reference should also be made to the railings and gates supplied by Messrs. Bayliss, Jones, & Bayliss, of Wolverhampton, and to their two well-designed electroliers and brackets in wrought-iron and copper which sweep up the faces of the two towers flanking the main entrance of the Machinery Hall, to the height of about 30 ft.

An interesting feature of the Exhibition is the method adopted for driving the various machines. Instead of the usual arrangement of shafting and countershafting and a crowd of belts, it was decided to establish "a thoroughly up-to-date electricity station," such as might be erected in a town of moderate size. Different firms have co-operated in carrying out this idea, and the result has proved eminently satisfactory. Main underground cables have been laid down by the British Insulated Wire Co. from a central switch-board (lent by Messrs. Ferranti, Ltd.) to convenient distributing centres, from which energy is taken for lighting and motive power. Exhibitors of machinery have provided their own motors, but current has been supplied free. The wire for the arc-light circuits inside the buildings has been supplied by Messrs. Isidor Frankenburg, Ltd., and that for the overhead circuits in the grounds, consisting of a single strand of bare aluminium wire, by the British Aluminium Co. The arc lamps in the main halls and in the grounds are those of the Brookie-Pell Arc Lamp Co., of London, "Edison-Swan" and "Hiram-Maxim" incandescent lamps have been fixed in the smaller buildings and offices.

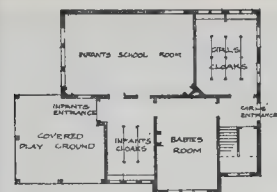
The Exhibition will remain open to the end of this month.

ARCHITECTURAL SOCIETIES.

NORTHERN ARCHITECTURAL ASSOCIATION (NEWCASTLE-ON-TYNE).—Architectural classes in connexion with this Association are to be conducted by Mr. R. P. S. Twizell, who will give instruction at the Durham College of Science, on Tuesday evenings in design, on Thursday evenings in the principal architectural styles. It is announced also that a friend of the Association has offered a prize of £5. towards the expenses of a student who will spend at least a fortnight in England or ten days abroad, and who sends in, under motto, by not later than July 31, 1903, a set of drawings consisting of three single and separate perspective architectural sketches, in pencil, ink, or colour, each on sheets size 15 in. by 11 in.; and three sheets of measured drawings, each sheet not larger than 40 in. by 26½ in. It is proposed that the successful competitor receive a book value 10s., suitably inscribed, and a sum of at least 2l. 10s. towards his expenses at the commencement of his tour, and the balance at completion, on his submitting approved evidence of his having made measured drawings or sketches during his tour. It is also desired that the student shall keep a diary, with architectural notes, to be submitted with his other work, so that the whole may be brought before a general meeting should the Council desire it.

BUILDING TRADES EXCHANGE, HARROGATE.

The members of the various businesses connected with the building trades of Harrogate and district have secured rooms in the Central-arcade, Chapel-street, on a lease, and have established a Building Trades Exchange and Club. One of the principal objects has been to have a suitable meeting-place for the members to have business and social intercourse, and the club is to be run on similar lines to the one at Halifax. The suite includes large billiard-room, smoke-room, reading and committee rooms, and stewards' rooms. The capital is 1,000l., divided into 1,000 shares of 1l. each; each member will be a shareholder, but no member is to hold more than twenty shares. Mr. Riley Fortune (President of the Harrogate and District Builders' Association) presided, and the Mayor (Alderman D. Simpson) declared the premises open.



Ground Plan.

New **GIRLS and INFANTS** **SCHOOLS** *St Peter's in Thanel*



First Floor Plan.



NEW GIRLS' AND INFANTS' SCHOOLS, ST. PETER'S-IN-THANET.

THE foundation-stone of these new "voluntary" schools was laid last October by the Archbishop of Canterbury, and the building is now nearly completed. It is situate in Ranelagh-grove, St. Peter's, on land presented by Mr. Anthony Cobb, of Margate.

The accommodation required by the managers was for 122 infants and 214 girls, and they have been placed on the ground and first floors respectively. The area of the upper floor is therefore considerably greater than that of the lower, and this has allowed of a covered playground being provided, as well as cloak-rooms on the ground floor. A teachers' room, with inspection windows into each infants' room, is arranged on a mezzanine floor over the girls' cloakroom, with lavatory, water-closet, and stockroom adjoining. Latrines for the children are arranged in the playground behind the schools.

The walls are built of stock brick, and dis-tempered internally. Externally the upper portion is rendered with rough-cast, the plinth being of hard blue brick, and the portion below the same is faced with red brick, as are also the

external arches. The warming is effected by slow-combustion fireplaces, and ventilation is provided for by extract flues arranged alongside smoke flues, with Tobin's tubes as inlets in the angles of the rooms.

The cost, including tar-paving of playground, &c., amounted to a little over 2,500*l.*, or about 7*l.* 12*s.* 6*d.* per head. The builder is Mr. J. T. May, of Broadstairs; and Mr. J. E. Newberry, of Westminister, and Mr. H. Bertram Langham, of Ramsgate and Broadstairs, are the joint architects. The drawing from which the illustration is taken was in this year's Academic Exhibition.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A MEETING of the Midland Counties' District of the Incorporated Association of Municipal and County Engineers was held at West Bromwich on Saturday, September 27. The members assembled in the Institute, where they were received and welcomed by the Mayor (Mr. J. H. Chesshire). The President (Mr. T. H. Yabbicom, C.E., of Bristol) was in the chair, and among those present were Messrs. J. Price, Birmingham; J. T. Eayrs,

Birmingham; A. D. Greatorex, West Bromwich; J. Lobley, Hanley; J. Lemon, Southampton; A. T. Davis, Shrewsbury; E. P. Hooley, Nottingham; A. E. Collins, Norwich; J. S. Pickering, Nuneaton; W. H. Hopkinson, Keighley; J. S. Yates, Waterloo; T. Henry, Retford; T. W. Franks, Lewes, and many others.

The Mayor, in welcoming the members, expressed his conviction that the meeting would be an instructive one, especially the visit to the sewage farm to inspect the bacteria process.

The President, in acknowledgment, said it was the aim of the Association to acquire information by visits to works.

On the proposition of Mr. J. T. Eayrs, Birmingham, Mr. J. S. Pickering, of Nuneaton, was re-elected Honorary Secretary for the Midland District.

Mr. A. D. Greatorex, Assoc. M. Inst. C.E., Borough Engineer, read a paper on "Municipal Work in West Bromwich." He said the town was well supplied with the various public institutions necessary for a well-governed town, such as a town hall, law courts, free library, and institute. The new art school, the generous gift of Mr. G. H. Kenric, just completed,

from the designs of Messrs. Wood & Kenrick, was one of the most complete and up-to-date of its kind in the country, affording every facility for the teaching of arts and crafts. The historic building known as Oak House was purchased and presented to the town by the late Alderman Reuben Farley, J.P., in 1898. The work of restoring the building and laying out the grounds occupied nearly three years, and was carried out under the supervision of Messrs. Wood & Kenrick, at the expense of the donor. The building is used for a museum, and is well patronised. The Council owned the gas and electricity works; water was supplied by the South Staffordshire Water Co.; and as regards parks and recreation grounds, the town possessed four, having a total area of about 96 acres. The sewers were constructed from designs and under the supervision of Mr. J. T. Eayrs, M.Inst.C.E. A sum of 120,724l. had been expended by Mr. Eayrs in the construction of the sewers, purchase of land for sewage farm, laying out areas, house connexions, and other works, up to March, 1898. Since that date a further sum of 5,111l. had been expended by him in under-draining additional areas, erection of bailiff's house, farm buildings, laying out water supply, and construction of bacteria beds, &c., making a total to date of 125,835l. The sewage farm (Friar Park) was situated in the valley of the River Tame. The area of the farm was 230 acres, of a very variable character, including agricultural land, woods, waste ground, and pit mounds; some portions had been laid out for intermittent filtration and broad irrigation, whilst some portions of the pit mounds had been levelled, and were at the present time used for sewage treatment, but with unsatisfactory results. The sewage was delivered at the farm by two main sewers, a high and low level, the average daily dry-weather flow of both sewers being:—Low level, 800,000 gallons; high level, 400,000 gallons—a total of about 1,200,000 gallons. The low-level sewage, as was indicated by the analysis of the effluent, was comparatively weak, although it contained a certain amount of manufacturers' waste, including waste products from tar distillation works.

The Corporation did not allow acid or wash water from galvanising works to discharge into the sewers. The mean of eighteen analyses, after the removal of suspended matter, gave—

	Parts per 100,000.
Oxygen consumed in four hours...	3.251
Albuminoid ammonia ...	0.319

It was treated on the intermittent principle on the low-lying areas at the farm, which had an area of about 43 acres, and some portion was also pumped on to two areas at a higher level, which had an area of about 21 acres. The high-level sewage was also a dilute one, though of rather a stronger character than the low-level; it was free from admixture with manufacturers' waste except from breweries, the mean of eighteen analyses after the removal of suspended matter giving—

	Parts per 100,000.
Oxygen consumed in four hours...	5.034
Albuminoid ammonia ...	0.026

It was delivered by a 24-in. hydraulic main on to the top of the farm, where there were two small detritus tanks having a capacity of about 25,000 gallons each. The sewage was distributed on the filtration areas, which had been prepared by levelling some of the pit mounds, but this land was entirely unsuitable for the purpose; the sewage percolated through it in dry weather, and in wet weather it lies on the surface, thereby creating a nuisance. Owing to the large quantity of sewage delivered by both levels on the sewage farm, to the great majority of the houses being now connected to the sewers, and to complaints, it was found impossible to deal with the sewage in a satisfactory manner. It was impossible to obtain additional land suitable for the purpose, and it became necessary, if a good effluent was to be produced, that a precipitation scheme or some form of bacterial treatment should be adopted.

In April, 1897, he prepared and submitted to the Town Council a report on the then present and proposed treatment of the sewage at Friar Park. In this report two schemes were suggested, one a chemical and the other a biological scheme. The working expenses of the chemical scheme appeared so very large, as against the working expenses of a biological

scheme, that he, in view of the experiments successfully carried out, strongly recommended the Council to adopt the latter, and in October, 1897, submitted a scheme in detail. After duly considering this scheme, the Committee recommended the Council to approve of the construction of one coarse-grained, bacteria bed and one fine-grained bed on the high level, at an estimated cost of 2,000l. The Council approved of the Committee's recommendation. Both the coarse-grained and the fine-grained beds on the low level were 120 ft. long by 60 ft. wide, constructed at right angles to the main outfall conduit, the walls being built of 18-in. brickwork in cement mortar on 6-in. Portland cement concrete foundations, the floor of the beds also being of concrete 6 in. thick, the substrata being clay. The average depth of the filtering material in the coarse-grained bed, which was screened engine-ashes from 1-in. to 2-in. mesh, was 3 ft. 6 in., and the average depth of the material in the fine-grained bed, which consisted also of screened engine-ashes from 1-in. to 1-in mesh, was 3 ft. The sewage reached the coarse-grained bed by means of three 15-in. penstocks, direct from the main outfall sewer. The troughs for distributing the sewage were iron, 15 in. wide, laid upon the surface of the filtering medium. The beds were not under-drained, but had six 4-in. sluice valves on either side connected to 6-in. and 9-in. cast-iron pipes, which discharged into manholes at the bottom end of the beds. This system of emptying the beds had been found to be highly satisfactory. The coarse-grained bed discharged into the fine-grained bed, and the fine-grained bed discharged into a 12-in. earthenware pipe which was connected to a pump-well near the engine-house, from which the effluent was lifted. Each of the beds had an effective area of 800 square yds., or one-sixth of an acre. The coarse-grained bed construction on the high level was 60 ft. long by 42 ft. wide, adjoining the existing detritus tanks, built in a similar manner to the low-level beds, with an average depth of filtering materials of 3 ft.; the sewage passed first through the detritus tanks, then through two 15-in. valves on to the bed, being distributed by means of two 15-in. cast-iron troughs; the outlet for the filtrate was by means of six 4-in. valves connected to 6-in. and 4-in. cast-iron pipes, discharging into two manholes, and thence by means of a 9-in. earthenware pipe on land which took the place of the fine bed. The sewage flowed into the coarse-grained bed until the water level had nearly reached the top of the material; the inlet valves were then closed, and the bed allowed to stand full during about two hours. The water was then emptied into the fine-grained bed, and a rest-period of equal duration allowed. The beds were allowed to stand empty for three hours, and were used three times every twenty-four hours. The final effluent was clear, entirely without odour, remained perfectly sweet on keeping, and was fit to discharge into the river Tame, however small the relative volume of the river. The object of these beds was to determine whether the sewage of West Bromwich could be successfully treated by the biological system at all times of the year. A further object of the fine-grained bed on the low level was to prove whether the effluent could be satisfactorily purified without any application to land, so that by the construction of such beds a saving could be made in pumping. The beds constructed were so arranged that they would be permanently utilised to purify sewage; consequently, no expenditure on structural works or materials had in any case been wasted or lost. The average amount of suspended matter contained in the sewage was 77.39 parts per 100,000, or 54.17 grains per gallon, and the analyses showed that the matters in suspension in the crude sewage were reduced in the filtrate from the coarse-grained bed to 9.34 per 100,000, or 6.54 grains per gallon, and were still further reduced to 0.95 parts per 100,000, or 0.68 grains per gallon in the final filtrate from the fine-grained bed. The effluent from the land contained traces only. The reduction of the oxidisable matters in solution was from 3.251 to 1.512 parts per 100,000, and then to 0.457 parts per 100,000, thus showing an average reduction equal to 53.4 per cent. by the coarse-grained beds; and a total reduction equal to 85.9 per cent. by the combined beds. The total purification after land treatment was 88.9 per cent., the oxidisable matter being reduced to 0.360 parts per 100,000. The reduction of the nitrogenous matter, as indicated by the albuminoid am-

monia, was in like manner 47 per cent. by the coarse-grained bed, and 78.6 per cent. by the combined system. The total purification after land treatment was 82.4 per cent. In addition to the above test, on six occasions samples of the effluent from the fine-grained bed were at a later date submitted to the incubator test of the Manchester experts, and the results were satisfactory. The results had been all that could be desired, and after twelve months working the beds were in as good a condition and as free from nuisance, as they were after the first filling. The analyses showed distinctly that the effluents attained such a degree of purity that they could be safely discharged into any watercourse, even should such become dry during the summer. The degree of purification effected was such as to reduce the quantity of organic matter in the effluent to one-third of that generally considered permissible in a first-class effluent, whilst, on the other hand, the degree of aeration maintained by the effluent was such that fish could live and thrive in it, the aeration in the effluent after it had been kept for twenty-four hours in a quiescent condition being from 67 to 72 per cent. of the total maximum possible. The bacterial treatment had been found to be efficacious at all seasons of the year, the temperature of the sewage being sufficient both to prevent any stoppage of the beds by the forming of ice and also to maintain the necessary activity of the bacteria, even in the coldest weather. On no occasion had any difficulty been experienced in working the beds during frost. In order to obtain some reliable data as regards the capacity of the beds, a 6-in. Siemens patent water-meter was fixed on the outlets to the beds at various dates during the experiments, in order to ascertain the quantity of water dealt with by the beds. The percentage of loss on the high-level coarse bed had been 36.83 per cent. and 43.77 per cent.; on the low-level coarse bed it had been 43.90 per cent., 43.13 per cent., and 53.14 per cent.; and on the fine bed 25.92 per cent., 31.36 per cent., and 44.12 per cent. He was of opinion that the detritus tanks provided for in the new scheme would improve the capacity of the beds. The experiments showed that the sewage of West Bromwich could be successfully purified by the bacterial process at all seasons of the year, and that the final effluent from the fine-grained bed on the low level was sufficiently pure to discharge into the stream without undergoing subsequent land treatment. In November, 1900, the author reported on the result of the year's working of the experimental beds, and recommended the carrying out of the whole scheme at an estimated cost of 19,000l. The scheme was adopted.

In West Bromwich there were some old blast furnace slag mounds, which were being worked for ballast purposes, &c., and as the slag could be obtained very cheaply, graded to any size, there would be considerable economy from its use as a filling material. The beds were to be filled with the blast furnace slag $\frac{3}{4}$ in. to 1 in. for the coarse beds, and from $\frac{1}{8}$ in. to $\frac{3}{4}$ in. for the fine beds. In 1898 the Corporation obtained a Provisional Order for the establishment of an electric lighting undertaking. A Committee was appointed, and, after they had visited several installations, two engineers were requested to submit reports and schemes for their consideration, and in due course Mr. Robert C. Quin, M.I.Mech.E., M.I.E.E., was appointed Consulting Engineer. The compulsory area was the main street from the works to Roebuck-street, a distance of 1½ miles, with several short streets adjoining the Town Hall. The system of supply adopted was that known as the continuous current three-wire system, with an electric pressure of 460 volts between the outer conductors, each dynamo having a series winding in addition to its shunt winding, so as to enable it to develop electric pressure up to 560 volts for power purposes. The tramways in West Bromwich were constructed in 1882, and formed part of the tramway undertaking owned and worked by the South Staffordshire Co., Ltd. The Corporation purchased and paid for the whole of the tramways 38,038l. 15s. After the purchase had been completed, the Corporation instructed the author and Mr. Quin, consulting engineer, to prepare the necessary plans and specifications for the reconstruction and electrical equipment of the various lines. In due course these were submitted to the Council and approved by them, and as part of the agreement was that the lessee company



Bardic Chair.



Budic Crown.

Prizes Given at the National Eisteddfod.

ould approve of the scheme, they were submitted for their approval, and an arrangement was arrived at between the company and the Corporation for the work to be carried out at cost not exceeding 100,000. Contracts were then entered into, and the works are now in hand. An experiment had been made with blue brick paving for carriage-ways. The paving afforded a good foothold for horses, and was clean, but in the opinion of the author the bricks were not at present made suitable for roads of very heavy traffic, and the cost, as compared with granite setts paving, was against its adoption in large quantities.

In the discussion which followed, Mr. J. Price, Birmingham, said he noticed the Corporation had sustained a loss on the electric lighting. After the articles which had appeared in the *Times*, he might be permitted to say that was a question of policy for the members of the Corporation, and not for their officers. If they charged too low a price, the consumers were receiving a subsidy at the expense of the general body of ratepayers.

Mr. J. T. Bayers, Birmingham, remarked that those who did not live in mining districts had no idea of the difficulties to be overcome in the construction of sewers in such districts. They often found a sewer suddenly collapse or drop 4 ft. or 15 ft.

Mr. J. Lemon, Southampton, was of opinion that the Corporation made a huge mistake when they reduced the price of the electric light from 6d. to 4½d. per unit. They were playing into the hands of the opponents of municipal trading by lowering the price, because the effect of it was to throw a deficit upon the rates, which was precisely what the *Times* said they did. All municipal undertakings should be carried out on commercial lines only.

Mr. A. H. Campbell, East Ham, regarded the working expenses of the bacterial scheme as exceedingly moderate.

Mr. Lacey, Oswestry, remarked that information which he had been collecting and tabulating showed that great difficulty was being experienced by the setting up and decreased capacity of septic tanks.

Mr. Smith, Kettering, Mr. Pickering, Nantaton, Mr. Dickinson, Thame, and others took part in the discussion.

Visits were made during the day to the new Art school, the baths, the electric light works, and the sewage disposal works.

The Mayor entertained the members to luncheon, and Mrs. Greatorex entertained them to tea.

PRIZES AT THE NATIONAL EISTEDDFOD.

At the National Eisteddfod held in Wales annually it is the custom to present a chair and a crown to the two successful bards. The designs in previous Eisteddfoddi have been of the poorest description. In connexion with the Eisteddfod held this month (September) in Bangor the Executive Committee have ventured to strike out a new line.

The Bardic Chair, here illustrated, was designed and made by Mr. Robt. Hilton. The chair is of oak, wax polished, dull. The ornaments and finials are of copper and translucent enamel. The back of the seat is of cow-hide, fastened with copper studs. The rail in front contains a bronzed copper panel of a dragon. The symbolism is Druidical of Celtic. On the back is the cauldron of Ceridwen, and, in connexion with it, the oak and mistletoe are used. On the finials are two eagles.

The Bardic crown has been designed and made in beaten copper by Mr. R. Ll. B. Rathbone. It is formed of eight rectangular panels, in which are designs of interlaced Celtic ornament in repoussé. The panels are hinged together, and the four principal ones are connected at the top by four shaped straps, which meet together under a boss and are ornamented with a conventional treatment of bay leaves and berries.

All the medals given at the Eisteddfod have been made from the design of Mr. Goscombe John, A.R.A.

In connexion with the Arts Competitions, Mr. Frank Brangwyn has kindly given his services as chief adjudicator.

HAROLD HUGHES.

COMPETITIONS.

HOSPITAL FOR CONSUMPTION, LIVERPOOL.—The Committee of the Liverpool Hospital for Consumption and Diseases of the Chest recently invited three firms of local architects to submit plans for rearranging and partly rebuilding the hospital. The assessor, Mr. Henry Hartley, F.R.I.B.A., awarded the first premium to Messrs. Grayson & Ould. The Committee have adopted the award, and have instructed Messrs. Grayson & Ould to prepare working drawings. The hospital, which is worked in connexion with the branch in Delamere Forest, Cheshire, will provide accommodation for thirty patients, fifteen of each sex. The existing out-patients' department will not be interfered with, and part of the old hospital buildings are to be converted into an administrative block.

ARCHÆOLOGICAL SOCIETIES.

ESSEX ARCHÆOLOGICAL SOCIETY.—A quarterly meeting and excursion of the Essex Archæological Society was held recently, when the members paid a visit to Mount Bures, Lamarsh, Althamstone, and Pebmarsh, making Bures St. Mary their centre. Most of the visitors reached Bures shortly before noon, and at twelve o'clock were conducted to Mount Bures Church, which was duly inspected. The church, however, has been so much altered that it has lost its distinctive charm, although it still retains sufficient traces of the original construction to indicate its Norman origin, in various small windows of characteristic style. The party then proceeded to inspect the High Mount—all that is left of the Castle of the Sackvilles. Here a short paper was read by Mr. J. C. Gould, of Loughton, who, with Mr. F. Chancellor (Mayor of Chelmsford), gave much interesting and erudite information to the party. An adjournment was made to the Eight Bells Hotel at Bures St. Mary, where luncheon was had. During the proceedings Mr. Chancellor proposed that the Society should hold a meeting on December 12 to celebrate its fiftieth anniversary, the idea being warmly received. Mr. Gould

read another short paper, drawing attention to the fact that they were upon the dividing line between the ancient kingdoms of the East Saxons and the East Anglians. The party then took to the road, the next place visited being Lamarsh, where the church was shown by the rector, the Rev. A. D. Schreiber. He stated that the church, of which the oldest date known was 1555, was dedicated to the Holy Innocents, and was said to date from 1100; it was restored in 1868 or 1869. It was chiefly remarkable for its round tower which was probably constructed in that form, as the only building material readily accessible was flint-rubble, which did not admit of square corners. It was of the Early English period, and had been surmounted by a modern Flemish spire. The original tower arch was small, and was removed at the restoration of the church, a larger one being substituted by the architect, Sir Arthur Blomfield. It contained one bell by Henry Pleasant, bell founder, Sudbury, dated 1603. In 1849, during some excavation, many fossils were found, the bones of a mammoth being discovered. Mr. Chancellor made some supplementary remarks. He considered the tower to be Late Norman. It was considered that these round towers were very old, and in fact some of them had been attributed to the Danes, but he did not think there was any evidence to prove that. On the contrary, when there was any architectural feature about them it was usually of the Norman period. He thought it was a great pity that Sir Arthur Blomfield altered the old arch. They had done the same thing at Mount Bures, and absolutely altered the character of the church. Alphamstone, which was the next church visited, was found in the hands of the masons. Mr. Chancellor declared the edifice to be of the Early Decorated period, and made some interesting comments. Mr. Schreiber gave a brief account of the church, which, he said, was quite unrestored, and dated to 1218. The ancient dedication had not been ascertained. The Rector, the Rev. W. Earee, stated that he had been told at one time a great quantity of stained glass belonging to the church was buried, and a good deal of it was now in the windows of Middleton Rectory. Mr. Chancellor also said he had no doubt the church was built in the early part of the twelfth century. The last visit of the day was paid to Pebmarsh Church. Mr. Chancellor termed it an exceedingly fine specimen of a Decorated church, being entirely of the Decorated period. The chief feature of the church was its brass, which was considered one of the finest brasses they had in Essex.—*East Anglian Times.*

Illustrations.

ST. ANDREW'S PRESBYTERIAN CHURCH, BLACKROCK, CO. DUBLIN.

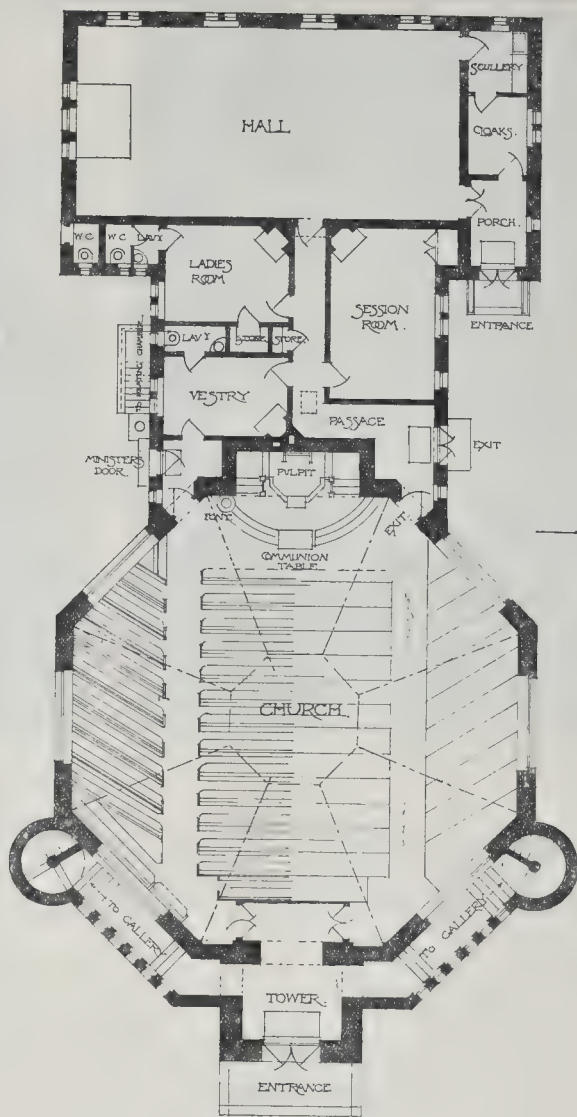
THIS church is built on the south side of Mount Merrion-avenue, Blackrock, and placed 30 ft. back from the frontage line so as not to interfere with the trees on the site.

The church is an octagon, 50 ft. in diameter, covered by a cupola, with a lantern at the apex. The tower, 80 ft. high, is placed in the side of the octagon next Mount Merrion-avenue, and the base forms a porch giving access to the building. On each side of the porch are passages leading to turret staircases to gallery. The organ will be placed in the tower at the gallery level. A hall and retiring-rooms are arranged at the rear. Seating accommodation is provided in the area for 300, and when the gallery is erected 100 more seats will be available.

A free adaptation of Romanesque has been employed for the general design. The walls are built of local hammer-dressed grey granite with Portland stone dressings. The main roof is constructed of steel and covered with Killaloo slates, and the dome of lantern with copper. Over the main entrance is a hammered copper panel bearing the symbol of the Irish Presbyterian Church. The interior and cupola are finished in plaster, and the whole of the interior woodwork stained green.

The cost of the building, exclusive of the hall, which is not yet built, was £4,000.

The main building was executed by Mr. Patrick Caulfield, of Booterstown, and the



GROUND FLOOR PLAN.

St. Andrew's Presbyterian Church, Blackrock, Co. Dublin.

rooms at the rear by Mr. George Langley, of Dublin; the heating by Messrs. Musgrave & Co., of Belfast; the copper panel over entrance door by Mr. W. B. Reynolds, of London; and the gas fittings by Messrs. Curtis & Son, of Dublin. Mr. Daniel Devlin acted as clerk of works, and Messrs. Murray and Forrester, of Westminster, were the architects.

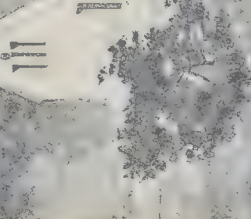
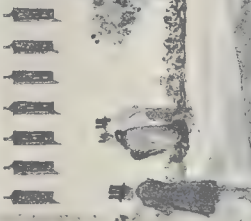
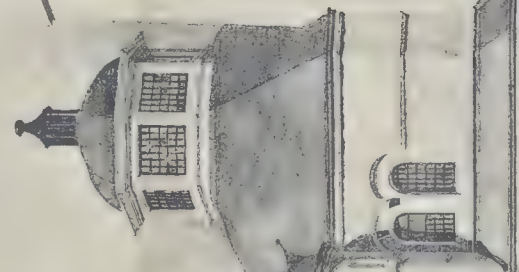
TWO STREET FRONTS, PARIS.

THE two houses shown here are from photographs of street fronts in Paris, erected within a recent period; one in the Rue de la Faisanderie, of which M. Doumoulin is the architect; the other, in Rue la Boétie, designed by M. Lobrot. Some further reference is made to them in the first article in this issue.

PROPOSED RESIDENCE IN SUSSEX.

THIS residence, externally, was designed to be built in red brick facings with Portland stone dressings, the whole of the bays to front and back elevations to be in stone, the window openings to be of iron casements and heavily-leaded glazings. The roofs were to be covered in with green Westmoreland slates. Internally, the woodwork was to be mainly fumigated oak, with high oak panelling in large hall and dining-room, with oak beams exposed on ceilings. The chimney-pieces were to be in carved stone, and, generally speaking, the details were to be treated in a broad yet simple manner, with a minimum of moulded surfaces.

The design was exhibited at the Royal Academy in 1900, and was prepared as a com-

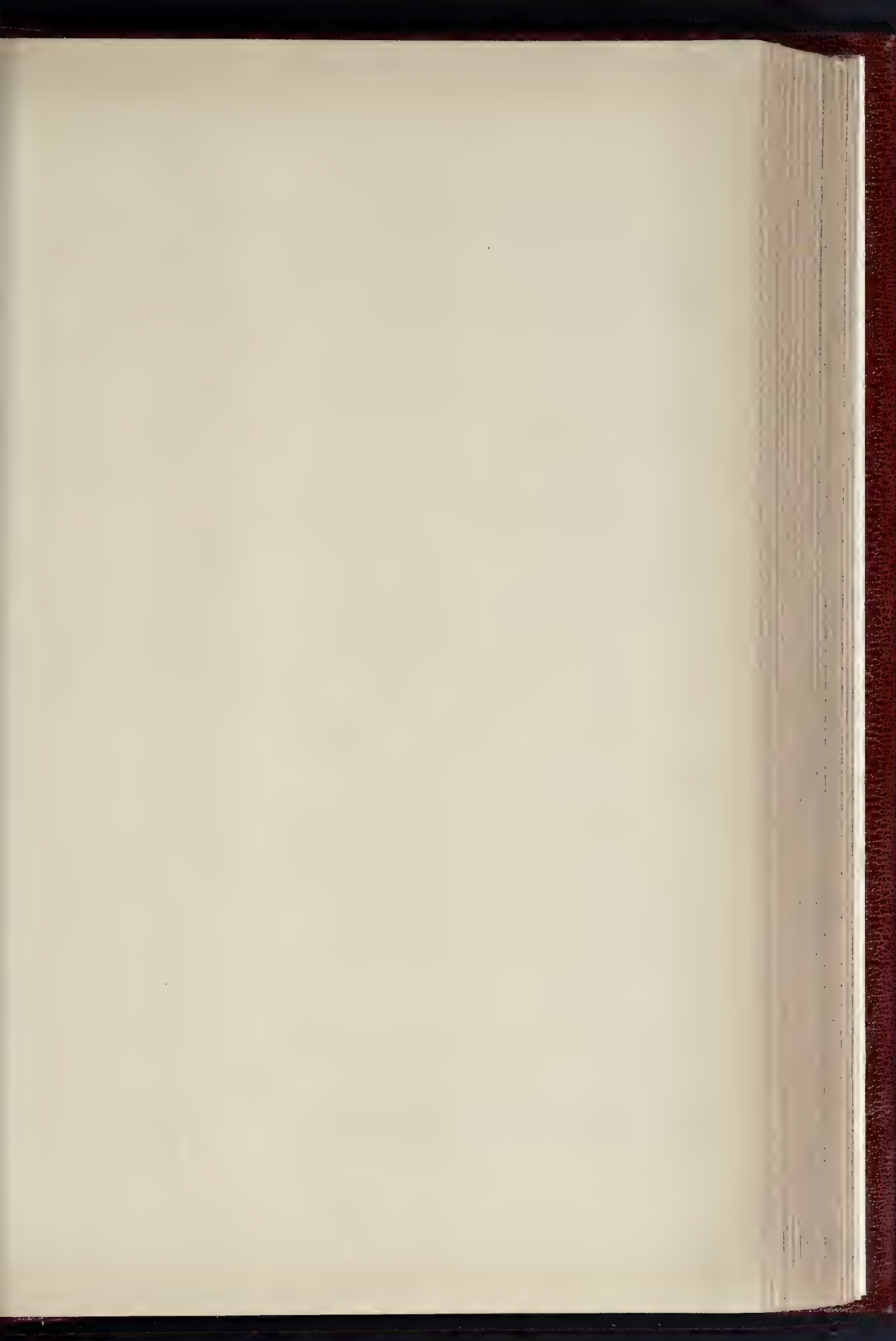


STATIONERS, PRESIDENTS, BLACKROCK, COUNTY-DUBLIN, MARYA S. FORSTER, Architects.

THE PHOTOGRAPHIC & C. L. 4 & 5 EAST HARDING STREET SEVEN LANE E.C.

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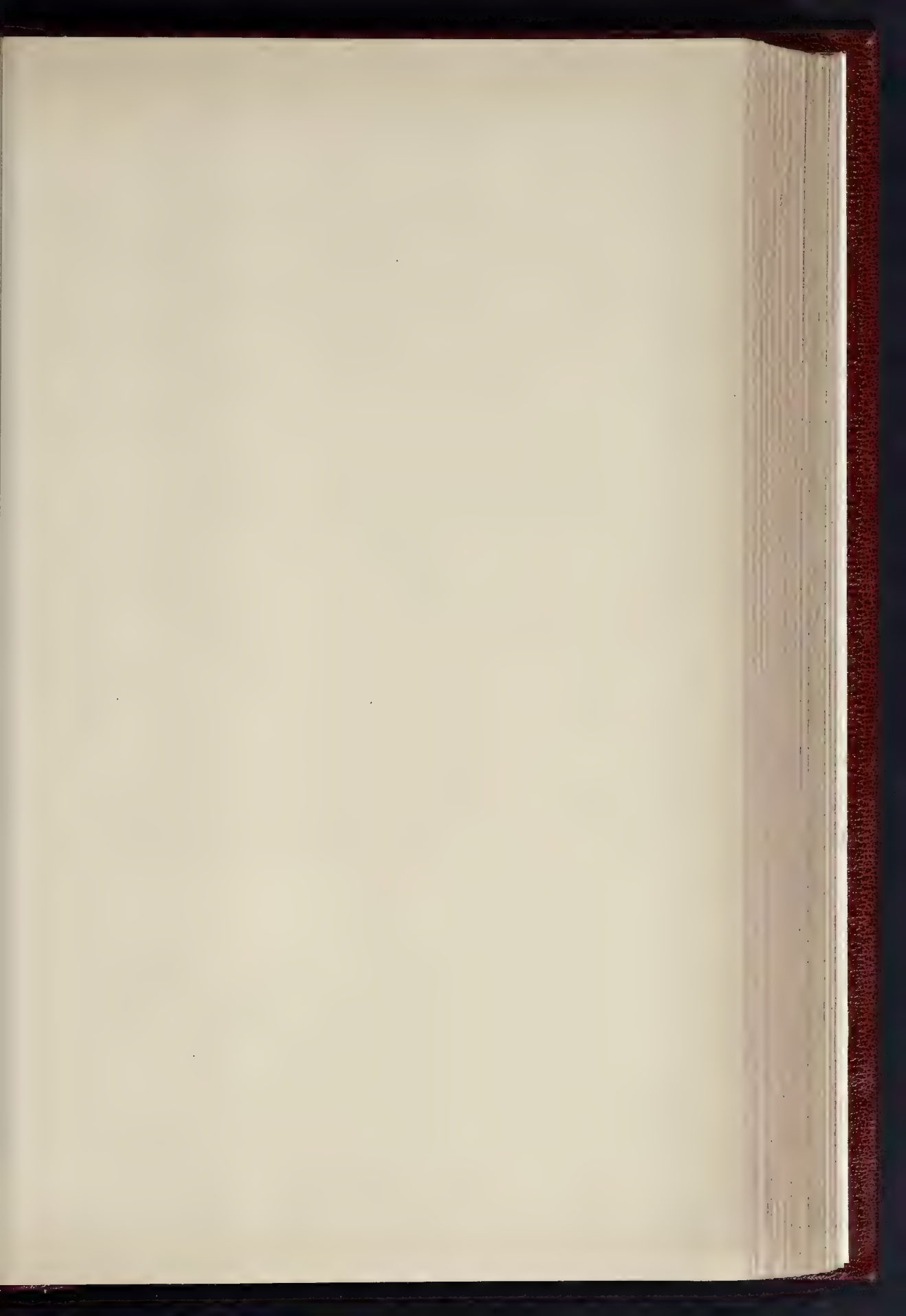


HOUSE, RUE DE LA FAISANDERIE, PARIS—M. DOUMOULIN, ARCHITECT



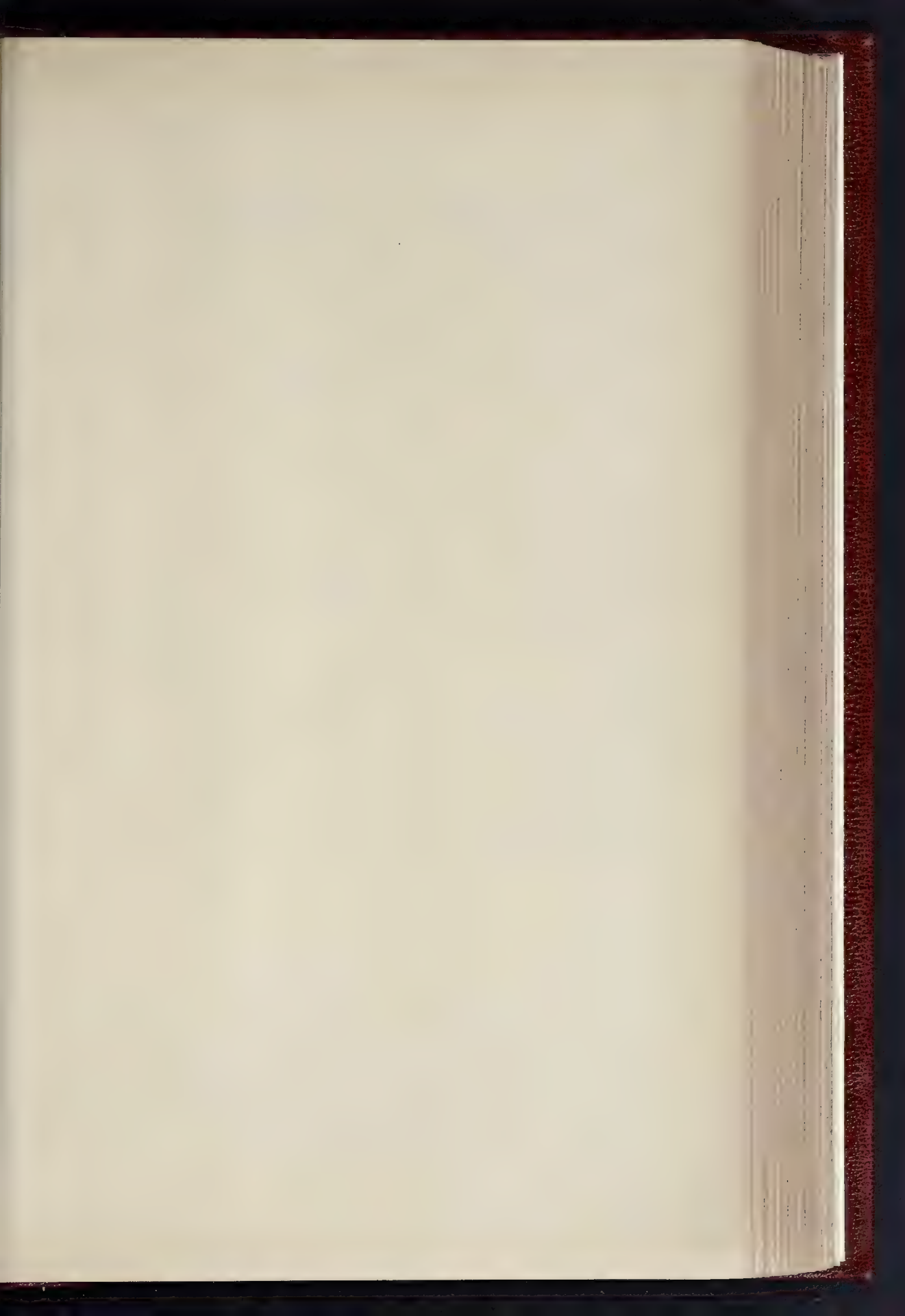
INK PHOTO SPRAGUE & CO. LTD. 4 & 5 EAST HARDING STREET FETTER LAKE E.C.

HOUSE, RUE LA BOËTIE, PARIS—M. LOBROT, ARCHITECT.

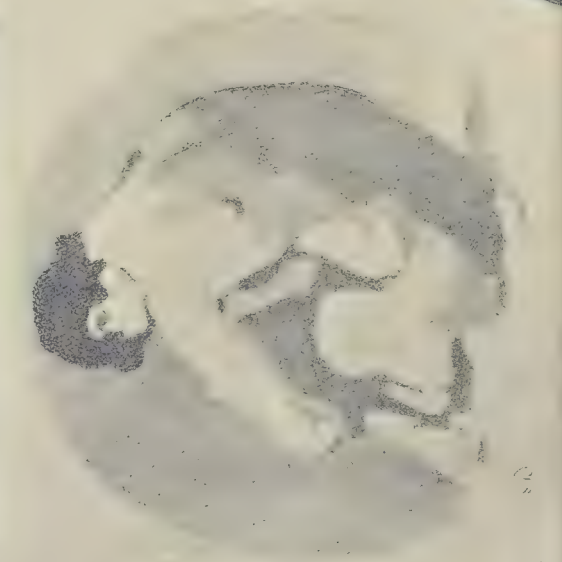
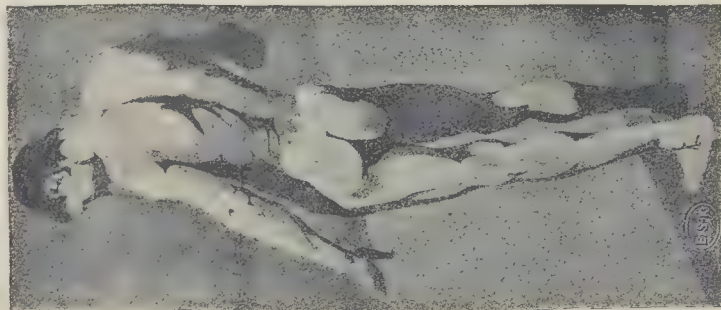


THE BUILDER OCTOBER 4, 1902

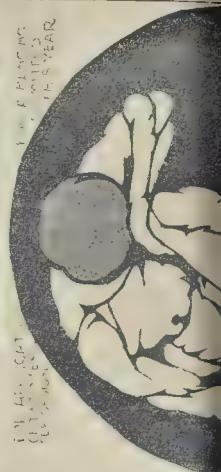


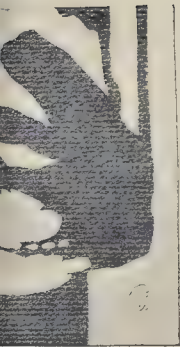


THE BUILDER OCTOBER 4, 1902

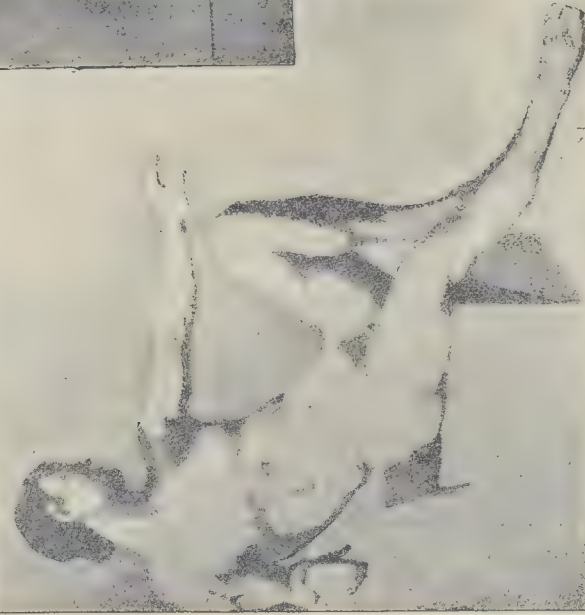
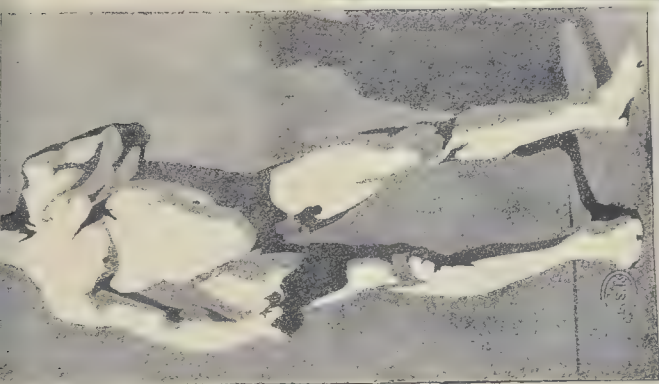


THE BUILDER
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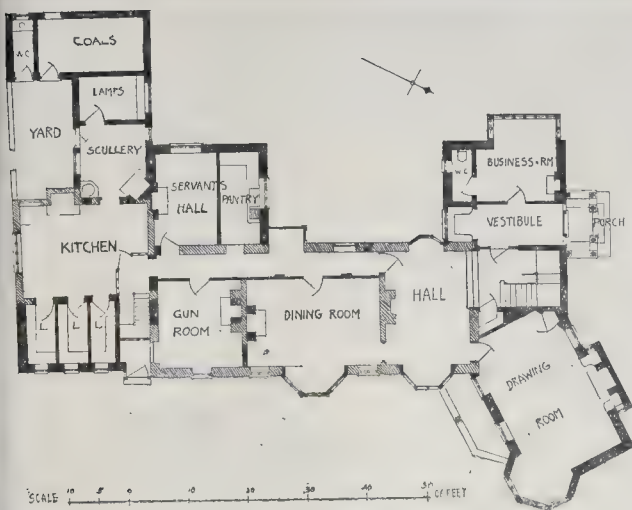
DECORATIVE STUDIES
IN ONE AND TWO
PLATE STANCES



CUT DIRECT FROM
THE LIFTO MODEL
BY GILBERT PIGERS



NEW PHOTO SERVICE & C. 5 EAST HARDY ST. CHICAGO, ILL. 60601



"The Retreat," Lakenheath. Plan.

mission to be carried out, but owing to circumstances the scheme had to be abandoned.

FRANK FOSTER.

"THE RETREAT," LAKENHEATH, SUFFOLK.

This building was formerly a Suffolk farmhouse built of flint with brick dressings and reed-thatched roof. The plan shows the extent of the alterations which have recently been carried out for the owner, who now uses the house as a shooting box.

The drawing-room was placed on the angle in order to obtain a southern aspect. The house has all been re-thatched, and local flints and bricks were used in the new portions. The hall and dining-room were panelled in Austrian oak.

Mr. Cowell, of Soham, was the builder.

A. N. PRENTICE.

FIGURE STUDIES IN STENCIL.

This is a reproduction of a series of figure studies produced in rather an unusual manner, by stencils cut from drawings made from the model. The artist, Mr. Gilbert Rogers, a student in the Mount-street School of Art at Liverpool, obtained for them a bronze medal in this year's national competition under the Science and Art Department.

The following is Mr. Rogers's note on his method of procedure:—

"There is not much to explain; everybody is familiar with the process of stenciling. I may say that in each case I used two plates, one for the masses of light and the other for the darks, the coloured paper on which the prints were made forming the half-tones. Sometimes I made a variation by using the colour of the paper for the lights, and the two stencil plates for the half and dark tones respectively. The same result was effected as in the case of the first method.

I believe the principal element of novelty in my stencils is that they were cut in the presence of the model, so that they may be described as stencils from life. My method was to make a sketch from the model before me and immediately cut it into a stencil and take a proof, using transparent water colour, or in some cases a faint body colour. The second plate was then cut in the same way and the proof at once finished."

WAUCHOPE MEMORIAL MONUMENT, YETHOLM.—A monument to the memory of the late Major-General Wauchope, which has been erected on the village green at Town Yetholm (situated on the northern base of the Cheviot Hills), was unveiled on the 23rd ult. The monument is in the form of an obelisk of Aberdeen granite, standing about 10 ft. high, and has been erected by Messrs. Waidie & Sons, Edinburgh, from the design of Mr. T. P. Marwick, architect, of that city.

BOOKS.

The Apartments of the House: Their Arrangement, Furnishing, and Decoration. By JOSEPH CROUCH and EDMUND BUTLER, Architects. London: At the Sign of the Unicorn. MDCCCXC.

IT is difficult to imagine for whose benefit (other than the authors') this remarkable book was prepared. It is hard to suppose any one particularly moved by the sentimentally uttered sentiments with which the work abounds—e.g., "a house . . . is the temple of the home-spirit"; it is incumbent upon us to make "the shrine ever more and more adequately expressive," "the stones and beams become precious to us as the silent witnesses of our most sacred joys and sorrows," &c., &c. Each chapter, be it observed, is prefaced with a few sentiments culled from the works of the late Mr. Ruskin and others, as if to give a species of Biblical sanction to the theories—and, may we add, the designs—of Messrs. Crouch and Butler; and, by the way, it argues a want of clemency in the nature of the latter gentlemen to have dug up a phrase of Ruskin's which his best friends would surely wish to be forgotten. "Portable we read, 'independent of all place, is art,' we read, 'independent of all place, is art,' for the most part ignoble art." Now, in view of the fact that for the work of Turner and other painters of easel pictures Ruskin for many years of his life blew his second-best trumpet, the reappearance in print of this dictum would seem particularly unfortunate.

A few interior views of what the authors call "old work," such, for instance, as the kitchen at St. Mary's, Coventry (from which few conclusions apposite to theories of modern comfort can be drawn), are to be found scattered up and down the book, but the substance of it consists in a series of designs for modern apartments of all kinds, and at the outset it cannot but be regarded as an extraordinary circumstance that no authorship is assigned to the designs in question. It is, perhaps, superfluous to attempt any criticism of the merits of these designs, but in passing it may be observed that the remarkable drawing described as "a suggestion for a den or a smoking-room," follows but ill upon remarks as to "Simplicity and Appropriateness" being the "watchwords of the new artistic movement." We read on page 26 that this same new school is "the enemy of all meaningless ornament and fussy effects of mere applied decoration." Fig. 27, however, in spite of this very inspiring announcement, exhibits a somewhat prodigal use of the Ace of Hearts, not merely as the basis, but as the substance of the design. This charming form, this tender emblem, appears not only on the wall, on the panes of glass filling up the slits which serve for windows, but on every article of furniture

in the room. Who, we ask again, is the artist responsible for these, and we may add, for the other delicate efforts revealed to us in this work, so neatly printed and bound?

Of the total number of illustrations, excluding a few small wash drawings of furniture, &c., twenty-five interior views of rooms in various houses are reproduced. No clue is afforded as to whence these charming pictures are obtained. Some few are from photographs, but by far the larger number are perspective drawings, by no means well executed. Each picture is accompanied by an attractively-worded description. In one place a suggestive plan for "a cosy dining-room" is inserted, and we naturally feel that if all these drawings are the work of living genius, it is cruel to withhold names from a clamorous and enthusiastic public.

But when we reach the appendices and note that the authors considered it "desirable to append one set of plans and elevations;" when we read that "the house illustrated is within the means of the man in the hansom;" that "the building contract should not exceed 1,500l., while another 500l. or 2,000l. in all would furnish the place on the lines suggested in the book," it only remains for us to draw comparisons between this work and the literary productions accompanying patent medicines of American manufacture.

Speaking seriously, this work can bring little credit to the authors, either in the profession or out of it.

Progressive Design for Students. By JAMES WARD. London: Chapman & Hall, 1902.

FOR teachers, Mr. Ward's new book will be found very valuable. There exists no little difference of opinion as to the method of instilling the principles of design into the mind of the young student. Many begin by calling attention to simple geometric devices, whereby given spaces may be pleasingly filled. Mr. Ward chooses to leave the study of strictly geometrical forms to the end of his course, and to put before his students simple leaves and flowers as the "elements" of design. This appears to us to be by far the better method.

Mr. Ward is a man of great experience in this field of study, and all that he has to say is worth reading. Here is a passage in his introduction which might indeed be taken to heart by architectural students and teachers:—

"The study of classical ornament should have attention concurrently with the drawing and designing from examples of plants and natural forms, not so much as a means of learning to draw, but for the purpose of enabling the student to learn the principles and construction on which the composition of good ornament is based. Too much copying of the acanthus foliage in art is dry food for the young student, and is apt to create in him a distaste for his work and to dull his imaginative powers. Generally speaking, the study of historic ornament might safely be left until the student has learnt to draw from objects and natural forms."

Altogether a well-written book, admirably illustrated and carefully printed.

Pattern Drawing and Design. By JOHN CARROLL. London: Burns & Oates, Ltd. 1902.

MR. CARROLL is well known as a teacher and writer on matters of art education. The little book before us (one of a series) is a good example of his careful and systematic efforts to create reliable text-books for class use.

Report of the Proceedings and Abstracts of the Papers read: International Engineering Congress (Glasgow), 1901. Glasgow: William Asher. 1902.

ALTHOUGH appearing somewhat late in the day, the volume recording the proceedings of the Glasgow Engineering Congress will be welcomed, for it presents the views of eminent men upon many great engineering problems of the time. As about one hundred papers were read and discussed at the meetings, it is clear that we cannot attempt, in this brief notice, to do more than to refer to a few of the subjects raised. In Section I, a question of extreme interest: "The Economy of Electricity as a Motive Power," was discussed by Professor Carus-Wilson, and from the particulars furnished it appears that the adoption of electricity would be particularly advantageous on branch or cross-country railways which at present rarely do

more than cover working expenses. We are pleased to call attention to a paper on "The Proposed Tunnel between Scotland and Ireland," by the veteran James Barton, whose membership of the Institution of Civil Engineers dates from the year 1853, and who is still on the Council of that body. Section II., dealing with waterways and maritime works, is distinguished by the contribution of papers from American, Continental, and British engineers, the works considered being of the highest importance to the world at large. In the mechanical engineering section, the steam turbine, the most notable invention of its class since the age of Watt and Stephenson, was considered in a paper by the Hon. C. A. Parsons; but it should be remarked that the results recorded have since been considerably improved upon. "The use of highly-superheated steam" is another subject raised in the same section, and it is one that is of considerable interest to all steam-users. Among other contributions to which we direct the special attention of our readers are the following, the titles of which we have abbreviated:—"Power from Blast-Furnace Gases," describing a system of power production that will certainly add to the industrial strength of the country; "Internal Strains of Iron and Steel," a subject of much scientific and practical interest; "Brick-Making," including references to the most modern methods and machinery; and "Mine Ventilation," a paper which may be commended to the engineers of low-level electric railways. Finally, we may say that unabridged proceedings of the various sections are to be obtained from different publishers, this being a facility that will doubtless be appreciated by many desiring more information than is given in the abstracts now issued.

Designing Ironwork, Second Series: Part III. Cisterns and Tanks. By HENRY ADAMS, M.Inst.C.E., M.I.Mech.E., &c. Published by the Author, London, 1902.

In the present instalment of the series now being written by Professor Adams on the design of ironwork, we have an extremely useful and practical pamphlet, which every architect ought to possess. There is no particular difficulty in designing a water tank, for the mechanical principles involved are of the most familiar and ordinary kind, but acquaintance with various practical details of construction is very desirable. So far as we are aware, no details of the kind are presented in any of the numerous text-books published in this country. We do not think it is too much to say that most architects, and perhaps engineers, are apt to leave the design of cast iron tanks very much in the hands of firms who are known as reliable makers of such structures. This cannot be looked upon as an altogether satisfactory position, and the pamphlet now issued by Professor Adams gives, in a handy form, just those particulars that have long been wanted. After some notes on water-pressure, the sizes of supply-pipes, and matters relating to cisterns and tanks in general, some simple rules are stated for calculating the distribution of pressure in a tank and the thickness of plates. All necessary details, such as the stiffening of plates, the form of joints, the dimensions of bolts, ties, and flanges, are discussed. Tank supports, and other auxiliaries, also receive attention, and the book concludes with calculations for a tank designed to hold 15,000 gallons. Two plates, including seventy-eight detail drawings illustrating the letter-press, add very much to the value of this issue.

Modern Iron Foundry Practice, Part I. By GEO. R. BALE, A.M.Inst.C.E. London: The Technical Publishing Co. 1902.

In the volume before us we find an excellent description of the equipment and materials used and ordinary processes followed in the foundry. While very few of our readers may find it necessary to become experts in foundry practice, it is very desirable that all should have adequate general knowledge on the subject, and those who are not already so equipped will find Mr. Bale's treatise of considerable use. Of the first eight chapters, dealing with the customary requisites of an ordinary foundry, that on "the cupola and its charge," is one of the most useful, as it contains serviceable data as to the effect of various constituents on the quality of the metal, and consequently

on its suitability for different purposes. The remainder of the book is chiefly occupied with details relative to the three kinds of moulding in general use, "green sand," "dry sand," and "loam" moulding. The distinguishing features of these methods are clearly explained, and a perusal of the chapters in question will certainly repay the reader whose profession or business necessitates the design and use of castings. The references made to the manufacture of pipes and the chapters on loam moulding are particularly worthy of notice, the latter for the reason that acquaintance with the method followed in the production of loam castings will often save the delay and expense involved in the making of patterns for odd castings. The concluding chapter on "malleable castings" should be of assistance to the designer, as it gives data as to the physical qualities of the material and some observations as to the preparation of patterns and moulds for malleable iron. Finally, we may say that the work is lucidly written and admirably illustrated, although some of the blocks, reproduced from the catalogues of various makers, are decidedly inappropriate in a purely scientific book.

Electrical Installations, Vol. 2. Rankin Kennedy, C.E. The Caxton Publishing Co. London, 1902.

In this volume the author first describes standard instruments for electrical testing, then numerous transforming and converting devices are illustrated and explained, and finally he gives a fairly full description of electrical installation accessories. The book is a running commentary on current electrical practice, and the author in many places gives his own opinion in such a way that the student will probably be misled into thinking that it is the generally accepted opinion of engineers. There are too many illustrations; it would be a great improvement to omit half of them and fill the space saved with further description of the remainder.

On page 1 an Ayrlon & Mather's galvanometer is described. We are told that the "fine-wire coil" is suspended by a *silk fibre*. The student will naturally wonder how the current can get into the coil of this form of d'Arsonval (not d'Arsonville) instrument. As a matter of fact, the coil is suspended by a phosphor bronze strip.

The reader gets the impression from Chapter I. that volts and amperes can be measured with ordinary care to 0.1 per cent., and that ohms can be measured by the best instruments to 0.01 per cent. Now we know of no standard voltmeter or ammeter that can be trusted to read correctly to an accuracy of one in a thousand. A Kelvin electrostatic voltmeter, for example, for use on a 100-volt circuit will give readings differing by 0.2 or 0.3 of a volt, depending on which terminal is made positively calibrated by comparison with a Clark cell, but even when calibrated for direct pressures, how are we to know the correction to be made for alternating pressures?

Mr. Kennedy has a very high opinion of the value of watt-hour meters for testing batteries. The results obtained by them are "of far more value than the results of tests and reports made by any testing institutions." The assumption is made somewhat hastily that testing institutions do not use watt-hour meters for testing batteries. We can assure him that this method is often used both by institutions and consulting engineers. In the latter case, however, the mistake is often made of neglecting to standardise the "accurate" watt-hour meter, and so the errors in the maker's calibration are superposed on the experimental errors and on the errors introduced by neglecting the effect of temperature, variation of load, &c., and so the final result is only a rough indication, and not a measurement at all.

The chapter on transformers and converters is uninteresting, and the attempt made to teach the student the principles underlying their design is not successful.

On page 99 a sketch is shown of the connexion between the consumer's wiring and the supply company's mains. A double-pole switch is shown next the mains, then a double-pole fuse, and finally the meter. With this arrangement it will be obvious to those with a little electrical knowledge that it would easily be possible for a dishonest consumer to get unlimited energy for nothing. The author says some hard things about municipal control, and the "harassing rules and regulations" to

which the electrical industry is subjected, but if electricians want to place meters as shown in figs. 110 and 120 we do not wonder that municipalities in self-defence have to make "harassing" rules.

In the last chapter there is a considerable amount of information useful to wiremen and those interested in electric wiring. There are, however, many illustrations of resistances, &c., which are crude and old-fashioned, and we think that they must have been included merely to fill space.

The book is, in fact, of very unequal merit throughout. The author often makes spirited attacks on ordinarily accepted methods, and although the expert occasionally learns something from them, yet sometimes the strongly worded conclusions are in glaring contrast to the slender premises on which they are based.

Handbook of the London Master Builders' Association. Edited by J. WILLIAM RUTLAND. Published by the London Master Builders' Association, 31-32, Bedford-street, Strand, 1902.

This handbook represents a new departure on the part of the officials of the London Master Builders' Association. The Editor generally we think, can be congratulated upon having compiled a very useful work for those engaged in the building trade, and although it appeals more particularly to those engaged in the practical part of this trade, at the same time it will also be found useful by those taking up the professional side. In fact, the catholicity of the selection of the Editor is a very striking feature. A perusal of the "General Contents," on pp. 19-21, will give one an idea of the quaint variety of the subjects touched upon—almost too great one would think—as the work would suffer little if almost the whole of Part IV. were eliminated, while it is difficult to see the connexion of "Marriage with a Deceased Wife's Sister" with the building trade in general or with the other items of Part III. in particular. A few reports of cases bearing upon the reading of the Building Act would be far more to the point.

A very useful feature is Part V., being the by-laws, rules, and regulations of the London Water Companies, with a map showing the areas dealt with by the various companies. This "part" has, however, some curious introductions, viz.:—"Notes on 'Leasehold Encroachment,'" "Arbitration—The Hague Court," and "Admiralty Works Department." The latter, while being in keeping with the intention of the book, has no connexion with this particular "part." The other items are quite foreign to the work.

The summary of working rules (pp. 59-65) are useful, but we think the rate of wages might be given in addition to the note of advances on p. 60.

There are various notes and tables throughout the work that add to the value. It would, however, be advisable to arrange these in some order.

Taking the work as a whole there is much to be commended, and we note with pleasure the absence of debateable opinions upon such questions as may affect the trade, e.g., in the chapter on "Municipal Trading." With the elimination of some of the items and a careful rearrangement, this book will doubtless take its place in years to come as a most useful work of reference for all those engaged in the building trade in London.

TRADE CATALOGUES.

MESSRS. J. H. SANKEY & SON send us an illustration sheet of "Sankey's Sink Trap," which is made of glazed stoneware, and requires no plumbing in fixing. It has an efficient water seal, and seems altogether a good article.

The Permanent Decorative Glass Co., whose glass wall-tiling we noticed two or three months ago (under the heading "Florite Opal Tiling"), send us a book of designs for decorative wall-linings in this material. We had before remarked that the process would lend itself to decorative design as well as to merely imitative work. Some of the designs are very good, and, as far as can be judged from their appearance on paper, would be effective in execution in the material proposed.

We have received from W. Glylich, of St. Olave's House, Lloyds-avenue, E.C., an illustrated pamphlet describing a new automatic lift manufactured by the Titan Co., of Copen-

en. The motive power is electricity, and immaterial whether the supply is direct or alternating. To call the lift, all that is necessary is to press a button outside the landing; this starts the motor, and the lift moves stops opposite the door, which can only be opened. On entering we press a button inside corresponding to the floor to which we want to go; the door then shuts automatically and the lift moves up or down, the case may be. All the doors in the lifts and in the cage are fitted with electrical and mechanical safety locks, and in addition there is a very complete list of safety devices and appliances. It is claimed that this can be operated with the greatest ease and safety even by a child, and as the power consumed is in direct proportion to the work it does to do it is economical. Several have been in operation for years. The Titan Co. also make smaller lifts on the same principle for shops, and these ought to prove very useful in warehouses.

Messrs. John Wright & Co. (Birmingham) send us a small illustrated catalogue of their "Aureka" gas fires and gas-heating stoves, of which there are a great many thoroughly illustrated engravings, differing apparently rather in appearance than in principle. It is claimed that every hindrance to perfect combustion has been avoided, and the fire is therapeutically heated bright red to the top. If some of the ornamental designs of these grates were done in iron, and some simpler patterns by good designers procured, they might be made much more attractive in outward appearance, without losing any of their practical qualities.

The Sun Fan Co. (Bradford) send us an illustrated catalogue of their ventilating fans, which are made entirely of wrought iron to prevent breakage. The designs of the blades are modified for the work to be done; and where there is a high resistance to be overcome, the Company recommend the use of their "double-effect" fan, which is equally efficient in either direction, and is used where it is needed to blow or exhaust alternately through ducts, as in refrigeration work, or to force or exhaust air for drying purposes through heat-treaters, and large masses of grain, wool, rags, &c. The efficiency at moderate speeds, especially at low speeds, is said to be very high indeed. For working in steam, acids, &c., fans with copper blades can be supplied. Some tables of speeds, volumes and powers are added. A second catalogue, in the same form, gives particulars of electrically driven fans.

Messrs. William Morris & Co. (of Fulham, Chelsea) send us two catalogues illustrating the work they are doing in designs for shaded lights. This is the system which has become rather a favourite one of late, of making the leading design, but we have not seen it done in so artistic and picturesque a manner as is shown in this catalogue. One or two of the designs are perhaps a little "twisty" and eccentric; but in the main they are sufficiently architectural in character, and show a great deal of fancy and play of line. We should prefer that the firm would give the name of the actual designer, who certainly merits recognition.

Messrs. F. W. Reynolds & Co. send us their catalogue of hand-power wood-working machinery and lifting and hoisting appliances, in which many types of useful machines are illustrated and described. The "Queen" hand-power circular and band-sawing machine ought to be appreciated in small workshops where the amount of work done is not sufficient to justify the purchase of separate machines. A still more inexpensive appliance is the "Princess" band-saw apparatus, which can be readily attached to any ordinary bench. Band-saw machines are shown in various sizes suitable for different classes of work, and amongst mortising machines we may mention the "Samson" as one of the most powerful appliances of its type, capable of mortising from $\frac{1}{2}$ in. to $1\frac{1}{2}$ in. wide. The stroke of the machine is 6 in., and it will take in timber up to 12 in. by 6 in. Attention may also be directed to the "Southwark" mortising, boring, and core-driving machine, which is fitted with a revolving tool-holder arranged so that the chisel, core-driver, and augur, may be alternately used without the necessity for shifting timber held in the machine until the required work has been finished. Amongst appliances for dealing with paints, we observe an ingenious self-acting painting machine suitable for Venetian blind laths, hoop iron, and similar objects. Hoisting appliances of

various familiar types are illustrated, as also are guards for sawing and other wood-working machinery.

Messrs. Jonas Smith & Co. send us their catalogue of sawn timber in stock, with information as to brands, sizes, port of export, and place of stowage in London.

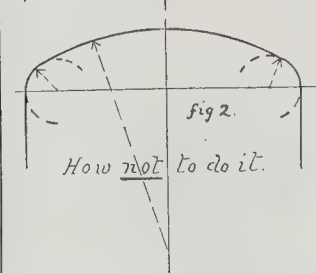
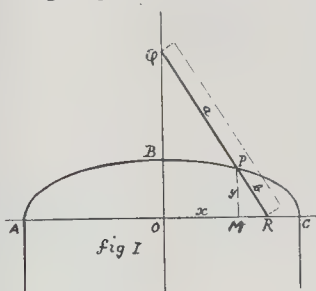
Messrs. Jacobs Bros. (London and Antwerp) send us their monthly list of iron and steel bars, rods, joists, steel wire, nails, &c., now in stock.

Correspondence.

HOW TO SET OUT AN ELLIPTIC ARCH.

The following is a practical way of setting out an ellipse, and it would be well if architects insisted upon having the proper curve when they ask for it. Carpenters and masons fondly imagine that they can make an ellipse by means of a collection of circles (fig. 2), and the writer has heard it whispered that there was once an architect who thought so too, but that was long ago.

The usual method, with two centres and a piece of string is not practical for obvious reasons, but the following method will be found perfectly simple and perfectly accurate (see fig. 1). Set out AC the width of the arch, OB the height. Now take a straight edge QR, the length of half the opening AC, plus the height of the proposed arch, and divide QR at P so that $QP=AO$, and $PR=OB$. Make a small nick at P to receive pencil or point. Nail a straight edged lath along AC and another



along OBQ, so that the straight edge QR will be able to slide freely between them. Now lay QPR along the line OB, so that P coincides with B. Place a pencil in nick at P and slide R along the lath towards C. The point P will describe the ellipse required (there is only one ellipse which will pass through the three points ABC). Of course the lath along OBQ must be shifted to the other side of the centre line in order to describe the other side of the ellipse.

For those who can receive it, the following is a proof that the curve thus described is a true ellipse:—

Let $PO=a$, $PR=b$, x and y the co-ordinates of P. Then by similar triangles

$$\begin{aligned} \frac{a^2}{a^2} &= \frac{OM^2}{QO^2} = \frac{OR^2}{QO^2} \\ \frac{b^2}{b^2} &= \frac{PM^2}{QO^2} = \frac{QO^2}{QO^2} \\ \frac{a^2}{a^2} + \frac{b^2}{b^2} &= \frac{QO^2}{QO^2} + \frac{QO^2}{QO^2} = 1. \end{aligned}$$

i.e. Locus of P is an ellipse. KNOX & WELLS.

** Our correspondents' communication is of interest but we do not know that their

initial gibes are quite called for. We have met with carpenters and masons who were quite clear as to what an ellipse is; and possibly the architect referred to was intending to draw a three-centred arch, according to the (occasional) practice of his Tudor predecessors. Of course, we quite agree in preferring the true ellipse, as a form.—ED.

RE WANDSWORTH TECHNICAL INSTITUTE.

SIR,—Allow me to draw attention to the unfair criticism on the students' work at the above Institute. One has only to state the conditions under which the competition was held, and the whole of the remarks, so far as the drawings are concerned, fall to the ground.

The drawings exhibited were the work of the students in the Building Construction class, executed at home during the summer vacation, the primary condition of the competition being that the work submitted should be entirely designed and drawn by the competitor, the designs to be worked to a specification, and the cost not to exceed 500l. for advanced students, and 1,000l. for honours.

Several drawings I had not seen until they hung on the walls of the Institute, and I consider an apology is due not only to the instructor, but also to the students, as to speak of their work as "rubbish," after they have spent many an hour in endeavouring to overcome the difficulties of the first principles of house planning, is most disheartening.

I may add that the student who obtained the first prize is but eighteen years of age and is an apprentice to the carpentry in one of our leading firms, and further, I have taken expert opinion with regard to the designs submitted, and for trade students they consider the drawings do them great credit.

This is my seventh session at the Wandsworth Technical Institute, and if necessary I could produce many old students who would testify to their appreciation, the few elementary principles I have been able to give them on house planning and designing; and personally, after an experience of lecturing to trade students for over twelve years, I consider the reading of plans to be one of the utmost importance to the trade student, and to be able to draw out plans and sections of even a six-roomed house must assist him greatly in following and appreciating designs of some of our best masters.

ERNEST CANNELL,
Lecturer on Building Construction to the Institute.

** Our critic was under the impression that the drawings were from examples set before the students. As efforts of young students in the building trades they are not so bad, but they do not represent what would pass muster among architectural students, and our correspondent is mistaken if he thinks so.—ED.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

14.—COPPER, ZINC, AND BRASS.—THE PROPERTIES OF ALLOYS.

PROPERTIES OF COPPER.—Copper is very malleable and ductile, and is a much better conductor of heat and electricity than any other abundant metal. Silver surpasses it as a conductor either of heat or electricity. The melting point of copper is about 1,100 deg. C., and its specific gravity is about 8.94. Copper is not corroded by dry air, but the joint attack of atmospheric carbon dioxide and moisture converts it into basic copper carbonate, the green compound which is often seen upon the surface of the exposed metal, and which is sometimes called verdigris. The term "verdigris" is, however, more correctly applied to basic acetate of copper.

All soluble salts of copper are poisonous, and copper culinary vessels should therefore be kept scrupulously clean. Copper is almost insoluble in hydrochloric acid, but it dissolves readily in nitric acid, or hot concentrated sulphuric acid. When exposed to salt water and air copper becomes more or less coated with copper oxychloride.

Sources of Copper.—Copper is found in the metallic state in many parts of the world, the metal being particularly abundant upon the shores of Lake Superior. The metal is, however, most largely obtained from copper ores, of which the most abundant are the sulphides known as copper pyrites (CuFeS₂) and copper glance (Cu₂S), and some complex sulphides of copper, arsenic, and antimony. Less abundant ores are the green hydrated carbonate known as malachite, the blue hydrated carbonate called azurite, a red sub-

oxide termed cuprite, and the black oxide. In the United Kingdom copper ores are found in greatest abundance in Cornwall, from whence they are mostly sent to Swansea to be smelted.

Copper ores usually contain so many impurities that the metallic copper extracted therefrom commonly contains small proportions of several foreign metals, in addition to traces of oxygen, arsenic, and sulphur. The metals most frequently present in commercial copper are antimony, tin, lead, bismuth, nickel, iron, and zinc.

Smelting Copper Ores.—The manufacture of copper from its ores is a complex process, and the methods employed have to be varied to suit the composition of the ores treated. Briefly, the method of obtaining copper from copper pyrites, the most abundant ore, is as follows:—

The ore is first roasted to expel some of the sulphur and to convert a portion of the sulphides of copper and iron into oxides. The roasted ore is then smelted with silica or siliceous matter. The silica combines with the oxide of iron to form fusible ferrous silicate, which is removed as slag, and copper sulphide containing less iron sulphide than was present in the original ore is obtained. This partially-purified copper sulphide is known as "coarse metal," and is subsequently ground and roasted to convert the remainder of the iron sulphide into oxide. The roasted coarse metal is again smelted with silica to enable the iron oxide to be removed as slag (ferrous silicate), and a comparatively pure copper sulphide, known as "white metal," or "fine metal," is obtained. The fine metal is then converted into a mixture of oxide and sulphide of copper by being roasted in presence of a current of air. Air is then excluded from the furnace, and the oxide and sulphide of copper react upon one another, and metallic copper and gaseous sulphur dioxide are produced.

In America, the coarse metal is usually run into a Bessemer converter having a siliceous lining, and metallic copper is produced by blowing air through the molten sulphide.

The copper obtained by the foregoing process is very impure, and has to be refined. The bars of copper are remelted in contact with a current of air to expel as far as possible the remaining traces of sulphur and arsenic in the form of gases or vapours, and to oxidise metallic impurities. As some of the copper is also oxidised into cuprous oxide, the presence of which renders the metal brittle, the molten copper is covered with finely-powdered carbon and well stirred with a pole of green wood. The gases escaping from the green wood when plunged into the molten metal reduce the cuprous oxide to metallic copper.

Impurities in Copper.—Lead is frequently added to copper in quantity not exceeding 0.5 per cent. to render it more suitable for rolling. Arsenic is always present in copper, and tends to make it brittle. The proportion of arsenic should not exceed 0.5 per cent. in B.S. (best selected) copper, which is the purest commercial form of the metal, and it should not exceed 0.5 per cent. in copper plates. Bismuth should not exceed 0.05 per cent., for a larger proportion makes the copper excessively brittle. Sulphur is also an objectionable impurity, sometimes present in small proportion in commercial copper. Nickel, cobalt, silver, tin, zinc, and iron are often present, but in such minute proportions that they have little or no effect on the physical properties of the metal.

For electrical purposes the purest commercial copper has to be employed, for even minute proportions of such impurities as arsenic, phosphorus, or iron greatly reduce the conductivity of the metal.

Zinc.—Most of the zinc used in this country comes from Belgium, Silesia, and Poland in the form of flat cakes, and in this form is known in commerce as "spelter."

Properties of Zinc.—Commercial zinc is a brittle, crystalline metal of bluish-white colour. Although brittle when cold, it is malleable while maintained at temperatures between 100 degs. C. and 200 degs. C. At temperatures above 200 degs. C. it again becomes brittle. Zinc is therefore usually rolled at a temperature of about 120 deg. C. The melting point of zinc is 412 degs. C., and at 1,040 degs. C. it boils. Zinc can to a large extent be purified by distillation from metals which do not volatilise at so low a temperature. When strongly heated in the atmosphere zinc burns with a bright greenish flame, and dense white fumes of zinc oxide are formed. Zinc is readily acted upon by most acids and alkalis,

even soap having an appreciable effect upon it. It does not alloy with lead to any considerable extent, but readily forms alloys with most other metals. Zinc makes excellent castings, and "French bronzes" consist of zinc casts coloured to represent bronze.

Zinc Ores.—The most abundant ores of zinc are zinc sulphide, also known as zinc blende or "Black Jack," zinc carbonate or calamine, the red oxide, and the silicate ($Zn_2SiO_4 \cdot H_2O$), known as "Smithsonite." The ore is roasted, then mixed with charcoal and heated in a retort. Zinc distils over and is condensed by being led into water or into any suitable condenser. The metal cadmium, which is sometimes present in combined form in zinc ore, is more volatile than zinc, and is, therefore, sometimes found as an impurity in the zinc obtained by distillation. A certain proportion of lead present in the original zinc ore also distils over and condenses as an impurity in the zinc. The greater portion of the other impurities in the ore remain in the retort.

Impurities in Zinc.—Commercial zinc usually contains about 0.5 per cent. of zinc and small proportions of lead, iron, arsenic, and tin, while traces of copper and cadmium are also frequently present.

Brass.—Brass is an alloy of copper and zinc. These two metals can be alloyed in any proportion. The following are some of the proportions of the two metals commonly used for the manufacture of different descriptions of brass:—

Variety of Brass.	Percentage Composition.		Remarks.
	Copper.	Zinc.	
White brass....	45	55	Almost silver-white in colour. Sometimes used for small castings.
Yellow casting brass.....	50	50	Used for castings. Cannot be forged.
Muntz metal ..	60	40	Can be rolled and forged. Used for sheathing ships.
Ordinary yellow brass.....	70	30	The most largely used brass. Is malleable, and is used for drawn tubes, for sheets to be used for brazed tubes, for making brass wire, and for many other purposes.
Boiler-tube brass	80	20	Is drawn into tubes for marine boilers, and when hammered into very thin sheets is used as "gilding metal."
Red brass	90	10	Sometimes used for rolling into leaf.

Manufacture of Brass.—The price of copper being much higher than that of zinc there is a natural tendency to use the largest permissible proportions of zinc in brass. Small pieces of zinc are added to molten copper, and the mixture is carefully stirred. A small proportion of zinc is lost by volatilisation, and a rather larger proportion than that required in the finished brass is therefore added.

Impurities in Brass.—Brass frequently contains traces of arsenic, antimony, and bismuth, all of which tend to harden the metal and increase its brittleness. These impurities are therefore objectionable in brass which is to be rolled. About 2 per cent. of lead is often added to brass which is to be used for castings, as the lead renders the alloy more easy to work with tools.

Iron in Brass.—The strength and density of brass is considerably increased by the addition of from 1 to 2 per cent. of iron. Delta metal is a yellow brass which owes its abnormal strength mainly to iron. The composition of Delta metal is varied to suit the purposes for which it is required, but the following may be regarded as a typical analysis.—Copper, 56; zinc, 40; iron, 1; phosphorus, 0.1; manganese, 0.9; and lead, 2 per cent. Many other bronzes containing iron in small proportion are manufactured for special purposes.

Tin in Brass.—Tin in very small proportions also strengthens brass in which it is present and is sometimes added to brass manufactured for special purposes.

Aluminium in Brass.—Aluminium may in some cases be added with advantage to brass in proportion not exceeding 3 per cent. The aluminium increases the fluidity of the molten alloy, and brass in which it is present is

therefore especially suitable for castings. The aluminium does not render the alloy unsuitable for rolling, stamping, or forging.

The Properties of Alloys.—The properties of alloys are frequently entirely different from those which mixtures of the metals of which they are composed might be expected to possess.

The colour of the alloy is often quite different from that of any of its constituents. Thus, when the white metal aluminium is alloyed with the yellow metal gold, an alloy of a ruby-red colour is obtained.

The melting point of an alloy is usually lower than the mean melting point of its constituents, and is sometimes lower than that of any of its constituents. Rose's metal, for example, which is an alloy of lead, tin, and bismuth, melts at 92 deg. C., which is lower than the boiling point of water, yet the melting points of lead, tin, and bismuth are 330, 235, and 270 deg. C. respectively.

An alloy frequently resists corrosion better than any of its constituents.

Alloys are commonly regarded as consisting of one or more metallic compounds held in solid solution in an excess of the predominating metal. It is believed that the metals unite with one another in certain definite proportions, and that these combined metals dissolve in that portion of the predominating metal which remains uncombined.

Alloys are not usually perfectly homogeneous after solidification. As the temperature of a molten alloy falls, that portion of the predominating metal which remains uncombined first solidifies, but holds disseminated throughout its mass a certain quantity of a liquid alloy of the predominating metal and another metal. As the mass continues to fall in temperature the liquid combination of metals also solidifies, and a temperature is finally reached at which the whole mass becomes solid. The solidification of an alloy may occur in several stages, for the number of metallic combinations, each having a different solidifying point, may be many.

The melting point of a combination of metals varies with the proportions in which the metals are combined, but it is impossible to reduce the melting point of any mixture of metals below a certain temperature. Thus, by mixing tin and lead in the proportion of 4 atoms to 1, an alloy which melts at 187 deg. C. may be obtained, and by altering the proportion to 3.3 of tin to 1 of lead, the melting point may be reduced to 180 deg. C. No other alloy of the same metals has a lower melting point. An alloy having its constituents proportioned to yield a combination having the lowest possible melting point is called a *eutectic alloy* (Greek: *eue*, well, and *tekein*, to melt). The alloys of commerce are in most cases mixtures containing several eutectic alloys.

The phenomenon of "eutectia" is not restricted to mixtures of metals, but is also common to certain mixtures of salts and to certain mixtures of fatty and other acids. Mixtures in which the components have the property of acting together to form a mass having a definite melting point lower than that of the mean of its constituents, and incapable of being further reduced, are called eutectic mixtures.

NATIONAL ASSOCIATION OF MASTER HOUSE PAINTERS.

THE annual convention of the National Association of Master House Painters and Decorators of England and Wales was continued last week at the Grand Assembly Rooms, Barras Bridge, the President, Mr. J. G. Cole, presiding.

The proceedings opened with a paper by Mr. R. G. Hatton, the head art master at the Durham College of Science, on "The Training of the Apprentice in Drawing, Designing, and Colouring." He was, he thought, two ways in which the apprentice might be trained. They could either train their shop from the top downwards, or from the bottom upwards. By the first method, the master-men and the foremen were themselves the authority, and advised and instructed the apprentices under them. But if they were to carry out some other system, of training the shop from below upwards, they must recognize that they could not carry out these older conditions. They must recognise that they would have to educate the shop through the apprentices, and they must consequently make arrangements by which the apprentices should receive the kind of instruction which the master-men thought they should need, and grow thus into better and more efficient workmen than the men they were displacing. This system

d in the present day probably be found working simultaneously in good shops. Continuing, Hatton said that there seemed to be arising an epidemic of embossed papers. He was not very useful and very handy, but, in his opinion, they were tending to drive out the need of certain skill on the part of the decorator which formerly had. It was only natural to think that there would be a tendency for using these appliances which would gradually eliminate the craft of the decorator, and the man who was jealous of his mechanical means which would tend to reduce skill of hand and eye. On the subject of drawing, Mr. Hatton pleaded for vigour and spirit of rather than for mere mechanical precision. Mr. Geo. G. Laidler (Newcastle) moved a vote of thanks to Mr. Hatton, and, in doing so, alluded to Hatton's comments on the subject of embossed materials. They were employing embossed materials largely, and he thought the material had come to stay. That was because it was taking the place of plaster work. It was bad plaster work which introduced embossed canvas and other materials, which had got to use it, and they would continue to use it in preference to putting good plaster on bad work. He was not at all of the existing state of affairs, he believed, that in time they would become their own plasterers. The good plasterer should always have a good plasterer in his shop to carry out plastering work worthy of his establishment. Mr. Green seconded, and the vote of thanks was carried.

Mr. Lewis F. Day next read a paper on "The Art and Trade of the House Painter." Mr. Day said that there was a time when all art was decorative, but that had changed altogether, for now decoration was only a division of art, and house painting only a division of that. Art and decoration were inseparable. It was difficult to draw a hard-and-fast line between them. The moment of consideration of beauty, apart from utility, entered into the calculation of the workman, he checked upon the domain of art. It was all but possible for a man to carry workmanship to its highest point without concerning himself about its utility, and that was art. It was possible, nevertheless, for a man to carry on his trade without art, and that was the modern change was due largely to the fact that, whereas house decoration used to be the hands of the workman or under the direction of a man who had been a workman, the tendency was more and more for the trade to get under the control of the enterprising man of business. The chief was not that the decorator had to make it his business to make it pay so well as it used to, but that the workman and his best qualities were being swamped by the necessity for making an enterprise he was engaged in pay the largest possible profit to the men who were running the enterprise. Things were tending nowadays to be on a large scale that the presence of the man of business was necessary, and that the man of business was not to be—or left the control to a man who was an artist, which he did not generally do, how was to be expected that the work done under such circumstances should be artistic? Art of any kind, he admitted, did not sell best, but it paid. It was the advertisement, it made people talk, it spread the word of the decorator, and perhaps brought customers for trade work. Was there ever a better advertisement for drain pipes than art pottery? That applied to pottery applied to house decoration. The good artist with practical qualifications did no desire to undertake more than he could personally supervise could always make a living, and anybody was to be envied, perhaps he was the man. But the point to which he wished to call attention was that the house decorator need not be a great artist, need not, in fact, have much more than a workmanlike appreciation of good work well done, to raise his trade to something of an art, if he only had the ideal and the courage of it. Mr. Gaskell moved a vote of thanks, which was carried, and after some discussion, to which Mr. V. replied, the vote was carried. The conference adjourned.

GENERAL BUILDING NEWS.

CHURCH, WEST DERBY, LIVERPOOL.—On the old site, the foundation-stone of a new church was laid at West Derby. It will form a chapel-of-ease to the parish church. The site is situated at the inlet known as the Dog and Gun, about a mile and a half from West Derby village, at the junction of four cross roads, Carr-lane, Lowerhouse-lane, and Dovershouse-lane. Designed by Mr. J. J. Scott, the church will be of stone, in the Early English style, and will be of cruciform shape, with nave, apse, two transepts for the organ and vestries, and surmounted by a small central tower. The edifice is to accommodate some 300 worshippers. The contractors for the new building are Messrs. J. J. Scott and Son, Liverpool.

CHURCH, PLASTOW.—A new church is to be erected at Harold-road, Upton Manor (London North Circuit). The estimated cost of the new

church and school is 5,300l. The new buildings (designed by Mr. W. H. Dinsley, of Chichester) will occupy a corner site, having frontages to Harold-road and Claude-road. The complete scheme consists of church, orchestra, minister's vestry, choir vestry, schoolroom, five classrooms, cloakroom, &c., the whole of which is at present being erected except the schoolroom and two of the classrooms, in place of which an iron structure has been put up temporarily to serve for school purposes. The principal approach to the church will be from Claude-road, with two secondary entrances from Harold-road. The rostrum will be placed at the end of the church opposite to the front entrance. The orchestra will be situated immediately behind the rostrum, and connected with the church by an arched opening. Galleries will be provided on one end and two sides of the church, and approached by four separate staircases. At the junction of Harold-road and Claude-road elevations a tower will be placed, finished with a copper-covered dome. The schools will have their main frontage to Claude-road, and behind the school rostrum will be placed a classroom, divided from the school by revolving shutters. The church will provide accommodation for about 600 adults or a mixed congregation of 700 persons, and the school for about 350 scholars. The main elevations will be faced with red brick, relieved with Bath-stone dressings. Messrs. Battley, Sons, & Holness, of Old Kent-road, S.E., are the builders. Mr. W. R. Ridington is acting as clerk of the works.

CHURCH RESTORATION, HARTSHORNE, DERBYSHIRE.—The parish church of St. Peter, Hartshorne, South Derbyshire, is being restored. Consisting of square embattled tower, chancel, nave, and north aisle, the edifice externally bears heraldic carvings, while the benches of the interior date as far back as 1590. The earliest parchments dated from 1594 are in good condition. Mr. G. F. Bodley, R.A., has submitted plans which have been accepted. The alterations comprise a new aisle and vestries, the restoration of the chancel, the opening out of the walled arches, with the addition of a baptistry, and when complete will provide additional seating accommodation for 100.—*Sheffield Telegraph*.

WESLEYAN CHURCH, BIRMINGHAM.—A new Wesleyan church has been erected in City-road, Birmingham. The plans, prepared by Mr. A. McKewan, provide for a church to seat 800, a Sunday-school, a lecture-room, classrooms, and a church parlour at a total cost of 3,700l. Messrs. J. Smith & Sons are carrying out the building scheme.

TOWER, ST. MICHAEL'S CHURCH, BRISTOL.—The tower of St. Michael's Church, Bristol, has just been restored at a cost of 1,200l. The tower is an example of the usual Somerset type, erected about the end of the fifteenth century. Originally an ancient church of the same date was erected on the site of the present building, which is of debased style, and quite out of harmony with the design of the tower. Some remains of the old church still exist, and they were preserved in the new church buildings near the church, and were incorporated in their design. Evidence exists that at the time of building the present nave and aisles the tower was extensively repaired and altered in the style of the period. These alterations have been, as far as possible, removed, and the old work restored to its original appearance. Everywhere has been taken out to destroy any of the old stonework that it was found possible to retain, so that the tower should preserve its ancient appearance. Much of the stonework was, however, so badly decayed that nothing but entire removal of certain portions was possible. The work has been carried out by Mr. A. J. Beaven, of Bedminster (the contractor), the architect being Mr. W. V. Gough.—*Bristol Times and Mirror*.

CHURCH, CORNHOLME, YORKSHIRE.—A new church was opened at Cornholme, near Todmorden, on the 27th ult. It stands close to the main thoroughfare leading from Todmorden to Burnley. Mr. C. Hodgson Fowler, F.S.A., of Durham, is the architect of the building. It consists of a nave 72 ft. by 24 ft., north and south aisles each 72 ft. by 11 ft., a chancel 37 ft. by 21 ft., with a north chapel and organ chamber, a sacristy, and a choir vestry on its south side, a western tower and spire, and a north porch.

CHAPEL, NORTH END, PORTSMOUTH.—A new Baptist chapel in London-road, North End, has just been opened. The new building is of brick, with stone dressings. In the centre gable above the arched porches is a traceried window, flanked on the left by a square tower, 64 ft. high, with traceried windows, and finished with lofty pinnacles. The pitch-pine roof is partially open work, and the building is also seated with lavatories, cloakrooms, and cellars. The building has been designed by Mr. J. W. Perkins, from plans and designs by Mr. John Wills, of Derby and London.

ALTERATIONS TO WOODHOUSE CHURCH, YORKSHIRE.—The second part of the scheme of alterations to and alterations of Christ Church, Woodhouse, having been completed, the chancel was consecrated recently. The second portion of the scheme includes the lengthening of the building eastward and the replacing of the old shallow chancel by one of larger proportions, by which there has been obtained a sacristy and the requisite space for a choir of thirty members, separate

vestries for the clergy and choir, with proper approach thereto, and the resetting of the transept in oak. The chancel has been erected in the Early English style of the rest of the structure. The outer walls are faced with ashlar, and the internal jambs and finishings of windows are deeply splayed and of the same material. In the gable at the east end is a large five-light window filled with coloured glass illustrative of the "Ts Deum," and on the south side are two lancet windows representing the baptism and transfiguration of our Lord. The flooring is of polished oak blocks. The various fittings are all in solid oak. The pulpit is of octagonal shape, and is erected on a stone shaft. The electric light standards and brackets are of brass. The plans of the church alterations and designs for the fittings were drawn by Mr. W. Cooper, architect, Huddersfield, who has superintended the carrying of them out. The following is a list of the contractors and others who have been engaged in the various works: Mr. Mark Brook, mason; Mr. Henry Holland, joiner; Messrs. G. Garton & Son, plumbers; Mr. T. H. Tunnicliffe, plasterer; Mr. T. W. Broadbent, electrician; Mr. S. Kendall, decorator; Messrs. Calvert & Co., heating engineers. The carving is by Mr. Edward Armitage, Springwood; and the stained-glass windows were designed and executed by Messrs. J. Powell & Sons, London.

CHURCH, AWSWORTH.—A new church has been erected at Awsworth, Nottinghamshire, from the designs of Messrs. Naylor & Sale, of Derby. The nave is 50 ft. long and 30 ft. broad, giving seating capacity for 200 persons. A tower, a side aisle, and other extensions are to be added at a future date. Part of the old schoolroom has been left for a vestry, and an organ chamber has been built on the north side. The reconstructed nave is composed of red brick, with stone dressings. The roof is an open boarded one.

PROPOSED RESTORATION OF THE CHURCH OF ST. THOMAS OF CANTERBURY, SALISBURY.—The fine fifteenth-century church of St. Thomas of Canterbury, Salisbury, is in great need of external repair, and a committee has been formed to raise 3,000l. for the purpose. The committee have placed the work in the hands of Mr. T. G. Jackson, R.A., who has reported that the nave arches have settled westward, and that all the columns have a slight inclination in the same direction. He proposes to remedy this by adding substantial buttresses to the west end. The tower, he finds, inclines so much to the south that the point of the spire, which is 95 ft. from the ground, has moved about 2 ft. 3 in. from the perpendicular axis. The roof of the south chancel aisle is in a bad state, and will require reconstruction. It will also be necessary to take off and recast much of the lead on the roof. The total cost of the work, he mentions, would be 5,000l., and the committee have decided to proceed with the absolutely essential parts of it at a cost of 3,000l.—*Times*.

CHURCH, NEW ROSS, IRELAND.—The new parish church of St. Mary and St. Michael, New Ross, was dedicated recently. The church is designed in the Early English style, but with the somewhat foreign semi-decagonal apsidal termination to the chancel. On plan it comprises nave and aisles, double transepts, a deep chancel, two side chapels, and large sacristy and boys' vestry, so arranged as to be capable of being thrown into one. The materials used for the external walls were the stones of the district, the deep blue limestone for the walling and the fine white Newtownbarr granite for the dressings affording pleasant contrast. Inside the stone work is of Bath and Portland, relieved with a considerable quantity of red, green, and black Irish marbles. The principal entrance to the church is through the great western doors, deeply recessed, with marble nook shafts giving access to the narthex, over which is the organ gallery, carried on a carved Gothic arch of three bays supported by solid quatrefoil shafts of black Kilkenny marble and bases of green Galway marble. The church affords accommodation for nearly 1,500 people. The floors are of wood block on Ebnar's system, the passages, &c., being tiled with red tiles. The chancel and the chapels are tiled with a pattern of encaustic medieval tiles made by Messrs. Craven, Donmill, & Co. The high altar and side altars are of white Carrara and various coloured marbles. The green and white marble Communion rails, made by Mr. Edmund Sharp, of Dublin, have wrought solid brass gates, while black marble is freely used in the steps, &c. The door of the high altar tabernacle is interesting as the replica of a very curious old Dutch plaque, representing the Last Supper. It was copied from the original by Messrs. John Smyth & Son, of Dublin. The tower and spire reaches a total height of nearly 200 ft., and is surmounted by a wrought-iron cross, 12 ft., by Fagan, of Dublin. The organ has been made by Messrs. Telford & Telford, of Dublin. The wrought-iron ornamental work has been done by Mr. J. Fagan, of Dublin. The carved capitals and foliage work is by Mr. J. A. O'Connor, of Cork, and the fittings and other interior work have been carried out from the designs of Messrs. Walter Doolin, Butler, & Donnelly, the architects, Dublin, while the general contractor was Mr. Andrew Cullen, of New Ross, who also made the confessionals and the organ gallery and screen. The total cost has been about 22,000l.—*Freeman's Journal*.

SCHOOL, ST. DAVID'S.—The new county school at St. David's was opened recently by Prince of Wales. It is situated in the Haverfordwest-road, just outside the city, and it has cost about 1,800. Mr. D. E. Thomas, Haverfordwest, was the architect, Messrs. T. Evans & Son the builders, and Mr. V. Morgan, St. David's, clerk of the works.

BOARD SCHOOL, NORTHAMPTON.—Barrack-road Board School, Northampton, is being erected by the Chairman of the Northampton School Board. The school has been erected from designs by Messrs. Law & Harris, and has, under the superintendence of Mr. Sidney Harris, been built by Councillor A. P. Hawtin. The total area of the site is 76,914 square feet, and in addition to the school buildings proper and the playgrounds, a swimming bath and laundry have been built, and a caretaker's house erected. The total cost, including the site, has been 24,396. Accommodation has been provided for 420 boys, 420 girls, and 530 infants. In the boys' and girls' schools the classrooms are arranged on either side of the corridor, which is 10 ft. wide, and the schoolrooms are at one end. The infants' department contains a central hall, 57 ft. long and 31 ft. wide, with classrooms arranged around. The floors of the classrooms, central hall, and schoolrooms are of maple wood blocks laid on concrete, while the floors of the corridors, entrances, and cloakrooms are paved with Venetian mosaic. The internal walls are faced with glazed bricks to the height of 4 ft. from the floor, and above the glazed brickwork the wall is plastered and coloured. The swimming bath is a pool 50 ft. long and 20 ft. wide, and its depth varies from 3 ft. to 5 ft. Shower arms are also provided.

SUNDAY SCHOOL, ERDINGTON, BIRMINGHAM.—On the 29th ult. the Lady Mayoress of Birmingham and the Rev. E. A. Anthony laid the foundation stones of the new Sunday school which is to be erected in connexion with the Congregational Church at Erdington. The main feature of the scheme is the erection of a lecture hall to accommodate 300 people, which will also be utilised as a Sunday school, and take the place of the present school underneath the church. Alterations are also contemplated in connexion with the kitchen and vestry accommodation to the church, and provision has been made near the front entrance for ladies' and gentlemen's retiring rooms. The buildings will be heated on the low-pressure water system. The work, which will involve a cost of nearly 1,800, is being carried out from the designs and under the superintendence of Messrs. Ingall & Son, architects, Birmingham, by Mr. J. E. Harper, building contractor, Handsworth.

INFIRMARY, BRISTOL.—A new infirmary is to be erected at Bristol for the sick poor. The architect is Mr. H. Percy Adams, of London. The revised estimate of the architect for the erection of the building is given as 141,093.

WORKSHOPS, FECHNEY, PERTH.—About a year ago the workshops in connexion with the Fechny Industrial School were destroyed by fire. A new workshop has now been erected. It is one story in height, and forms one whole shop roofed in three divisions. In it the turning and other operations connected with woodwork are conducted. The building is 66 ft. long by 52 ft. wide. Adjoining the main workshop and at the west end, separately enclosed, are the shoemakers' and tailors' departments. The principal elevation is in keeping with the other buildings, and the old clock and bellry have been replaced. The roof is of iron principals, and the door openings between the workshops are all fitted with double iron doors. The cost is estimated at 2,000. The plans were by Mr. David Smart, architect, Perth. The contractors are—Mason work, Alexander Beveridge; joiner work, Thos. Forgan & Son; slater work, James Buchan & Son; plasterer, John Peebles & Son; plumber, James MacLeish; ironwork, Messrs. Robertson & Robertson, Perth Foundry.

THE FOREIGN CATTLE MARKET, DEPTFORD.—On September 17 was laid the foundation-stone of the new chill-rooms which will be added to the existing market buildings, at an estimated cost of about 40,000, under the superintendence of Mr. Andrew Murray, City Surveyor, the contractors being Messrs. George Munday & Sons. The new extension will supply further space for 2,000 sides of beef; the present accommodation in that respect, upon which 37,000, has been expended, affords room for 3,000 sides. Since they first acquired the market site, thirty years ago, at an outlay of 95,000, the Corporation of the City of London have expended 600,000, upon structural additions and other improvements. In 1888 they erected, experimentally, four chill-rooms, with plant for freezing 400 sides; two years afterwards they increased that accommodation for the chilling of 800 sides at one time. In 1896 eight by Messrs. Munday & Sons, four blocks of cottages home at Catta, between York County Inebriates' Home at Catta, between York and Harrogate, were submitted, and considered at length. The four blocks of the cottage homes, three of which are to be reserved for women and one for men, each holding twenty inmates, will be situated on opposite sides of the administrative block. After discussion the plans are provisionally approved, and the General Purpose Sub-committee was authorised to get out and approve of detailed plans and specifications, and also to obtain tenders for submission to the full committee.

and Messrs. Rudd & Son, after plans prepared in the City Surveyor's office. In 1898 the Corporation had obtained an Act of Parliament for carrying out a scheme based upon a report made by Sir J. Wolfe Barry, whom they retained as engineer for the works. The scheme, involving an estimated expenditure of some 90,000, embraced the acquisition of house property at Grove-street-gate, in Grove-street, Barnes Terrace, Priest-street, and Watergate-street, a tramway railway lines to communicate with the London, Brighton, and South Coast Railway Company's branch line to Deptford Wharf, lairages, a junction of the three jetties, and other works.

BARNSEY HOSPITAL EXTENSIONS.—On the 25th ult. the new convalescent ward, which has been erected at the Barnsey Beckett Hospital, was opened. The work has been carried out under the supervision of Messrs. R. & W. Dixon, architects, the contractors having been Messrs. W. G. & L. England, and the sub-contractors Mr. S. Walker, mason; Mr. S. Rushforth, plumber and heating apparatus; Messrs. T. L. Stephenson, painters, &c.

CONVENT CHAPEL, CALLAN, KILKENNY, IRELAND.—The foundation stone of the new Chapel of the Mercy Convent at Callan has just been laid by Cardinal Moran. The architects are Messrs. Wm. H. Byrne & Son, and the contractor is Mr. Kerwick, of Callan. The new church will be of Romanesque style and in keeping with the Convent, which stands close by. It will be oblong in form, with side chapels and a transept, and will be of native limestone and externally finished to correspond with the house of the Community.

ADDITIONS TO A LIVERPOOL RESTAURANT.—An addition has just been made to the Crocodile, in Cable-street, Liverpool. The addition consists of a new dining-room, which has just been opened. The style of decoration and furniture has been carried out under the direction of the architect, Mr. T. Price, by Messrs. G. H. Morton & Son, Ltd., is Baronial; the walls are panelled 8 ft. high with solid carved Dantzic oak. Repoussé copper panels are introduced in the framing, and there is a frieze 4 ft. deep, hand-painted in colours on a gold ground. The chairs and tables have been specially made in the same character. The room will seat nearly 100 people.

SYNAGOGUE, HULL.—The foundation-stone has just been laid of the Hull Western Synagogue and schools. The site, which is in Linneus-street, has a frontage of 52 ft. to Linneus-street and to Convent-lane. It is 100 ft. deep, and contains a little over 1,700 sq. yards. Linden House, which is a substantial and good building, has been considerably enlarged and altered, and converted into school premises for the Hull Hebrew girls' school, the plans for which have been approved of by the Board of Education, and certified by that Board for the accommodation of 217 girls and infants. The infants' school and classrooms, lavatories, cloakroom, &c., are on the ground-floor, and those for the girls, including teachers' rooms and stores, are on the first floor. There is a concrete playground in the rear of the building, with covered play-shed and seats. At the present time over 180 children are at the school. The synagogue is situated between the end of the playground and Convent-lane, and can be approached from Convent-lane as well as from Linneus-street. The seating accommodation is for 400–250 on the ground floor and 150 in the ladies' galleries. The main entrances are at the west end of the building. They open on to the outer vestibule, which communicates with the inner hall, and so to the main building. On either side of the inner hall are stone staircases leading to the ladies' galleries, their vestry, and cloakroom. The minister's vestry and men's cloakroom are placed adjoining the vestibule. The whole of the building will be heated by low-pressure steam radiators, and electric lighted. The contractors are Messrs. Morrell & Sons, with the following sub-contractors:—M. Garton, joiner; C. Noble, stonemason; W. G. Padgett, plumber; W. Folkhard & Son, slaters. Mr. B. S. Jacobs is the honorary architect.

PROPOSED NEW CHURCH, ACTON.—In furtherance of a project for the building of a new Wesleyan church at Acton, the resident members of that community have entered into negotiations for the purchase of The Oaks as a site for the church, at a cost of 2,500, towards which amount subscriptions to make up a balance of about 1,000, are still required.

PROPOSED INEBRIATES' HOME, YORKSHIRE.—A meeting of the Yorkshire Inebriates' Act Joint Committee was held on the 29th ult. at the Town Hall, Leeds. Plans, which had been prepared by Mr. Vickers Edwards, the West Riding surveyor, for the erection of the administrative block and four blocks of cottage homes at the proposed County Inebriates' Home at Catta, between York and Harrogate, were submitted, and considered at length. The four blocks of the cottage homes, three of which are to be reserved for women and one for men, each holding twenty inmates, will be situated on opposite sides of the administrative block. After discussion the plans are provisionally approved, and the General Purpose Sub-committee was authorised to get out and approve of detailed plans and specifications, and also to obtain tenders for submission to the full committee.

SANITARY AND ENGINEERING NEWS.

WATERWORKS, KINTORE, ABERDEEN.—An inspection by the members of the Kintore Town Council of the new waterworks, just completed took place on the 23rd ult. The new water supply commences on the boundary between the parishes of Kintore and Kintore. The spring, which is known as Blackland Well, has a yielding capacity of 6,000 gallons a day. The next spring is situated about 250 yards below Blackland Well, and has a yielding capacity of 27,000 gallons a day. From this point the water is carried in a 4-in. pipe through the railway culvert to Clovenstone Spring, which has a yielding capacity estimated at 10,000 gallons a day. The new supply then passes the farm of Rathill, along the public road past the town head to the Town Hall, from which point 24-in. pipes distribute the water throughout the burgh. The reservoir is situated on Ramsay Croft, and has a holding capacity of 60,000 gallons. The contracts for the fitting of the pipes and all the other works were carried out by Mr. John Leask. The engineer of the works was Mr. William Bremner.

BATH WATERWORKS.—A special meeting of the Water Works Committee was held on the 25th ult. to consider the report of Mr. Fox, C.E., recommending a scheme prepared by Mr. G. G. G. Engineer, to augment the supply by a reservoir, and acquiring fresh springs in the Ayrford Valley. The estimated cost being 90,000. Mr. Fox was present, and the outcome of the meeting was a request to Mr. Fox to prepare a supplementary report as to the possibility of a modified scheme being adopted.

WIDENING LONDON BRIDGE.—Satisfactory progress is being made with the work of widening London Bridge, which was begun about six months ago. The last span of the first of the two temporary foot-bridges, which have to be erected before the present footways can be pulled up, has been placed in position. Approximately the total cost of the alterations will be 100,000, and the work is expected to take about another eighteen months. When completed, the new footways will measure 14 ft. from parapet to kerb, as against the 9 ft. 6 in. of the old, while the new roadway will average 37 ft., representing an increase in width of 2 ft. 7 in.

FOREIGN.

THE MEMORIAL GREEK CHURCH, SHIPKA PASS.—A large and fine church which has been erected by the Russian Government at the foot of the Shipka Pass was consecrated on Thursday, September 25. The church, planned and designed by Professor Voznesenski after the customary Greek type, is a gift to Bulgaria, and is intended to commemorate the engagement, extending over five days in August, 1877, between the Russian and Turkish armies at the Pass, in which as many as 80,000 men were killed or wounded.

FRANCE.—The competition for designs for a "Hôtel de Caisse d'Épargne" at Chambéry has been decided, and the first premium and the commission to carry out the building awarded to M. Martin, architect, Grenoble. The second premium of 400, was awarded to M. Revol, architect, of Tassin, and the third, of a value of 200, to MM. Morard & Bonnat, of Chambéry.

GREECE.—The works recently begun for the restoration of the famous colossal statue of a lion, which was erected on the battlefield of Chéronée in memory of the victory of the Greeks over the Macedonians, are being actively carried on under the superintendence of M. Sotiriades, the archaeologist. He has discovered near the battlefield a large tumulus, the contents of which tend to show that it is one of the tombs of the Macedonians slain in the battle.

AUSTRALASIA.—The Art Society of New South Wales has been amalgamated with the Society of Arts, and the government of the Colony has given a subsidy of 4000, to the Society to further its work. This action has been principally brought about through the agency of the Minister for Public Instruction.

QUEENSLAND.—A wireless telegraph plant has recently been landed in Brisbane to the order of the Queensland naval authorities. With this plant it is intended to communicate over thirty miles, between Cape Moreton and Brisbane. A bronze statue of the late Premier of Queensland, executed by Mr. B. Mackennal in London, has arrived in Brisbane, and is shortly to be erected in that city. The harbour accommodation of Melbourne is about to be considerably improved, and the matter has been taken up by the Railways Standing Committee. It is proposed that a straight cut shall be made from Port Melbourne to the river wharves, the channel to be 900 ft. in width. It is proposed in Sydney to appoint a Royal Commission to inquire into the question of the selection of suitable sites for the erection of hospitals for consumptives.

—The foundations of the new premises for the Sydney Harbour Trust Commissioners have been completed, and it is anticipated that the superstructure of this important building will be practically completed before the end of the year. The Queensland Cabinet has decided to grant the Brisbane Technical College authorities a site for a new college in the city. The site is said to be one of the finest in Brisbane, giving a grand view of the

ole of the district.—Large business premises, headquarters of the Citizens Life Assurance Co., will shortly be opened in Wellington, New Zealand. The same company is also erecting large branch offices in Collins-street, Melbourne.

BRICK AND TILE FACTORY IN RUSSIA.—At the port town of Theodosia, in South Russia, a brick and roofing tile factory has (an official report) been erected and opened by a Franco-Swiss company. It is capable of producing about 40,000 bricks and about 5,000 tiles per day. The roofing tiles manufactured are of the flat kind, and known locally by the name of "Marseilles tiles," from which place (Marseilles) large numbers are imported into the Black Sea ports. The machinery for making the bricks and tiles was imported from France, and the motive power—Laval's steam turbine—from Sweden. At present about 100 labourers are engaged regularly at the works.

SOUTH RUSSIAN TIMBER AND THE LONDON MARKET.—Mr. H. P. Smith, British Consul at Kiev, reports to the Foreign Office that the efforts to develop a direct trade in timber between the Kingdom and South Russia do not appear to have been so successful as those interested would desire. Large cargoes of pine were sent by two firms to London via Odessa, but the results were very unfavourable. The cargoes seem to have reached London at an unsuitable time, and the brokers did not seem to recognize the possibilities of the trade. The pine in question was considered equal to the No. 1 and III. White Sea qualities quoted on the London market at the time at 111. 10s. per standard 100 cubic ft., while the "Danipier" quality was selling in Kherson—the outward port—at 91. 13s., so that there was a sufficient margin to cover freight from Odessa to London. The opinion of those interested in this trade, Mr. Smith gathers, is that great benefit would result to both sides if a direct connexion with the British market could be arranged.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Messrs. Lamington & Co., marble merchants, have moved from 28, City-road, to Finsbury-pavement house, Finsbury-pavement, E.C.

THE PROPOSED EDINBURGH ART SCHOOL.—Edinburgh Town Council, at their meeting on the 27th ult., discussed the subject of a central School of Art in Edinburgh on a minute of a special meeting of the Lord Provost's Committee on the subject. The Town Clerk made a long statement on the report of the Lord Provost's Committee, which had considered the question, and ultimately the decision made by the committee was adopted, to the effect that when any definite scheme is submitted to them with the sanction of the Scotch Education Department, and especially with the approval of the Governors of Heriot's Trust and the other existing schools, they will be prepared to give it full consideration.

HONDURAS MAHOGANY.—The exports of mahogany from Honduras in 1901 amounted, according to the official statistics of the Colony, to 6,485,952 ft., value 359,250l., as compared with 7,994,378 ft., value 38,880l., in 1900, and 6,499,168 ft., value 178,625l., in 1899. In reporting these figures to Mr. Chamberlain, as Colonial Secretary, he explains that three large firms of mahogany and logwood merchants suspended operations during 1901, which doubtless accounts for the decreased exports, but the most serious aspect of the case is that those who have continued in the business cannot get the same prices for their shipments, and declare their intention to restrict their operations. If they devote their capital to other industries the Colony will soon recover its prosperity, but up to the end of the year no movement in that direction appears to have taken place. The exports of mahogany, which in 1895 and 1896 were only 2,868,346 ft. and 1,709,076 ft. respectively, increased at a bound in 1897 to 6,777,382 ft., and in 1898 to 7,639,252 ft., decreasing in 1899 to 6,499,168 ft., only to rise again in 1900 to 7,994,378 ft. In the meantime the mahogany trade was being pushed in West Africa, and it would appear that the supply has in consequence exceeded the demand. The Customs returns do not disclose any adequate reason for the fluctuations in the price of the great increase of exports in 1897 to 1900, as the price per foot is shown as highest in 1896 and 1898, and that for 1901 was somewhat higher than for 1900, although there are wide complaints that the trade has become unremunerative. "I am afraid," the Governor adds, "that the reductions to be drawn from this circumstance are not accurately ascertained by the Customs officers, and that the large quantity of wood cut in recent years has exhausted the supply in easily accessible areas, and the cost of baulage of what is now available is excessive; the cost of production is therefore higher than formerly. It is probable, moreover, that the losses on measurements in England have a material bearing on the profits of the trade. I have been afforded a perusal of a recent sale catalogue of mahogany from which I gather the following particulars:—The 'extreme contents' of the shipment amounted to 221,314 superficial feet, whereas the 'sale contents' are returned as 157,429 ft., a loss of 63,885 ft., or 28.86 per cent. of the shipment. A careful inquiry into the cause of this and similar

discrepancies might result in a means being discovered of minimising these losses, to the great advantage of the exporter. A general review of the export trade seems to show that for some reason not very clearly indicated, but doubtless owing to an increased demand for mahogany and better prices, almost all other industries began to be neglected in 1897, and the energies of the population were devoted to increasing the output of mahogany, and that this trade proved remunerative for three or four years, but is now undergoing the inevitable period of depression following inflation."

REDEMOS, ST. MARTIN'S CHURCH, CAERPHILLY.—A new reredos, erected to the memory of the Rev. Thomas Jenkins, has just been dedicated at this church. It was built by Mr. Clarke, sculptor, Llandovery, from designs prepared by Mr. George E. Halliday, the diocesan architect.

IMPROVEMENTS IN THE ROYAL COURTS OF JUSTICE.—During the Long Vacation the opportunity was taken to effect an improvement of the ventilation with an installation of fans for the withdrawal of vitiated air from the vicinity of the several courts and corridors; and a jury box has been constructed in Court 1 of the King's Bench Division in order that the Court may, upon occasion, be available as an additional Court for the trial of cases by jury.

RICHMOND PARISH CHURCH, SURREY.—As a memorial to the late Canon Procter, who was vicar during thirty-three years, it is proposed to open a fund for the enlargement and improvement of the parish church of St. Mary Magdalene. The project comprises the erection of a new chancel, with roof and eaves, and of a nave and vestry. The late vicar had collected a sum of 3,000l. for the former purpose; the extended scheme will, it is estimated, cost about 4,000l. more. The present fabric retains the old tower with turret of Sheen church, constructed of stone and flint laid chequer-wise; the body of the church, built of brick, is more modern, and consists of a nave, aisles, and chancel, as enlarged in 1750. Eighty years ago a sum of 2,000l. was expended upon the repair of the fabric. The church contains a cenotaph, by Flaxman, in memory of the Rev. Robert Mark Delafosse, of Richmond Academy, with a medallion portrait and two figures. In high relief, of mourning scholars; the grave, near the altar rails, of Mrs. Yates, the actress (1787); another, and a brass tablet set up by Lord Buchan in memory of James Thomson, the poet. The marble monument, with medallion portrait, of the Hon. Mrs. Barbara Lowther (1805) is also by Flaxman. In the churchyard is the vault, with monument, of the Viscounts Fitzwilliam, in which was buried (1816) Richard, seventh Viscount, who founded the Fitzwilliam Museum at Cambridge. A tablet at the west end, near the tower, was set up by Charles Kean in memory of his father. In the churchyard was buried Heidiger, many years director of the Italian opera. The registers record the burial (1703) of William Gibson, the miniature and portrait painter, and the baptism, on March 20, 1680-1, of "Heater, daughter of Edward Johnson"—the Stella of Swift.

THE BROTHERS COMPANY'S EXHIBITION.—In the course of next spring the Brothers Company will open an exhibition of embroidery. The exhibited work will be divided into three classes, and the Company offer seven prizes, to range from 21l. to 51. 5s. for award in each class. The three divisions consist of figures, embroidery, sacred or secular; embroidery, either sacred or secular, executed in a frame shaded in silks, or in silks and gold; and embroidery as applied to ornamental or useful articles, and applique work or handwork (in silks or crewels) shaded or for the adaptation of the greatest number of stitches. Competitors can create their own designs, materials, and colours.

THE PETROLEUM TREATMENT OF ROADS.—Advantage was taken of the fine weather which prevailed at the end of last week to carry out the proposed experiment with oil upon a portion of the London and Southampton road between Farnborough and Aldershot. This is a thoroughfare much frequented by motorists and cyclists, and is near the great camp of the First Army Corps. Two thousand five hundred gallons of Texaco heavy oil were supplied for the purpose by the proprietors of the County Gentleman, and the oil was placed upon the road under the immediate supervision of the County Surveyor of Hampshire. The oil was laid upon three-quarters of a mile of road commencing at the thirty-second milestone from London. Several dressings were given, the oil being first distributed by means of a watering-cart, and subsequently, in order to secure an even distribution, the men went over the length with large watering-cans. The oil soaked quickly into the road and left the surface well knit and firm. The treatment was immediately successful in preventing dust. On the Sunday a large number of motor-cars passed along the road; the oil-dusted portion they raised not a speck, but immediately that was passed they disappeared in a whirlwind of dust. It was feared that the smell from the oil would be found objectionable, but the odour was much less than was anticipated, and while objected to by some people was considered by others to be not unpleasant. It is rapidly passing away. A large number of questions have to be decided in connexion with this experiment, such as

the relative cost compared with watering, the effect of the oil in consolidating and preserving the road, the extent to which it will prevent the formation of mud, &c. In due course a report dealing with these and other points will be issued by Mr. W. J. Taylor, the County Surveyor of Hampshire, and Mr. W. Rees Jeffreys, the Hon. Secretary of the Roads Improvement Association, under whose joint direction the experiments have been made. It is hoped, however, that the one treatment with oil will for many months render watering or a further application of the oil quite unnecessary.

THE LABOUR MARKET ABROAD.—The October circular of the Emigrants' Information Office states that in New South Wales the building trade at Sydney continues busy, and there has been a demand for skilled plumbers, but all other trades are depressed. In Victoria there is no general demand for more labour, and many men are out of work. No large public works are being proposed by Government which might provide employment. In South Australia there is no demand for more labour at the present time. The last report from the Government Labour Bureau in Queensland shows that in the north there was no demand for any one except female servants and some general labourers; in the central districts there was practically no demand; and in the south there was a good demand for agricultural labourers and general labourers only. The last report of the Government Labour Bureau in Western Australia shows that there is an ample supply of men in the building and other trades at Fremantle, Coolgardie, Albany, and other towns, and on the goldfields many are out of work, but there is a demand for them in one or two small places, such as Menzies and Northam. In New Zealand there is a good opening for a limited number of mechanics, but not for general labourers. In Natal no one is now allowed to land without a permit, which must be applied for personally at the Permit Office, 47, Victoria-street, S.W. The applicant must possess 100l. or prove that he is in a position to maintain himself in South Africa. There is now no special demand for more artisans, a large number of carpenters and others in the building trades having lately arrived, but skilled men can find work. The following persons are wanted for the Government railways; engagements are for three years; candidates must apply to the Agent-General for Natal, 26, Victoria-street, S.W., enclosing particulars as to age, height, whether married or single, with medical certificates and testimonials; free passages are provided, and half pay during the voyage.—Good platelayers between twenty-five and forty years of age, with five years' experience, wages 11l. to 15l. a month; mechanics in the building trades at an average wage of 12l. a week; and wagon examiners having five years' experience, wages 3s. a day. Permits (see above) are required by those going to the Transvaal and the Orange River Colony. These will not be valid unless endorsed by the representatives of those colonies at the port of disembarkation. There is a fair demand on the Rand for really first-class mechanics in the building trades at an average wage of a little more than 11l. a day, but the market is limited, and emigrants must remember that the cost of living is at least double that in England, rent being especially high. There is no demand for ordinary labourers, of whom there is a large local supply, the discharge of the irregular forces after the war having thrown large numbers of labourers on the market.

ARCHITECTURAL DISCOVERY, LITTLE MARLOW.—Three interesting discoveries have been made at the ancient parish church of Little Marlow, Bucks, which is now being thoroughly restored. In the chancel wall was found an old "priest's door," which had been so completely blocked up that only a careful inspection could trace any indication of it in the rough rubble surface that the wall presented. Careful cleaning and clearing out has given back the complete stone arch, with some of its mouldings. The second "find" is the original opening to the roof-loft, though no indication remains of the position or character of the steps by which it was approached. The third discovery was made within a cavity in the wall which constituted once the opening to the loft, and consisted of a Norman piscina, which retains its old dog-tooth mouldings. This was simply deposited in the hollow space left when the surface of the entrance was plastered up, it is supposed, at the Reformation. It is to be replaced in the corner from which it was torn.—Times.

ELECTRIC LIGHTING, LEEDS.—On the 30th ult. the members of the Leeds City Council inspected the new buildings and plant in Whitehall-road, at the invitation of the Chairman of the Lighting Committee, Ald. R. Wigram. The extension of the works has been purposely made very large in order to meet the requirements of the future. The site which the Corporation had available for the new works covered an area of 200 ft. by 181 ft., and the whole of this land has now been built on. The buildings consist of engine-house, switch-room, cable cellar, boiler-house, stores, and workshops. The engine-house is 220 ft. in length and 65 ft. wide. Its total height is 44 ft., and 33 ft. to the 30-ton overhead travelling crane, which has been erected by Messrs. J. Booth & Bros., of Rodley. The switch-room, alongside, is 170 ft. long and 28 ft. wide. The boiler-house is 231 ft. long and 82 ft. wide, and in the middle of it is placed the chimney, which is 210 ft. high. Over the boiler-house is the coal-

September 22.—By GARVEY & GORE.
14 and 146, New Church-rd., f.,
g. 72, 154.

By HARRIS & JACKSON (at Abington).
y. Berks.—Various enclosures, 45 a. r.

By B. R. HARRIS & JACKSON (at Abington).
Berks.—Various enclosures, 71 a. r.

By B. R. HARRIS & JACKSON (at Abington).
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By ROBINS, GORE, & MARSH.
Brixton—147, 149, and 151, Acre-lane, u.t. 321
yrs., g. 134, y. 124.

By F. J. STAINES.
Mile End—y. King-st., f., y. 304.

By STIMSON & SONS.
Hackney-rd.—70 and 72, Goldsmith-stow (S), u.t.
95 yrs., g. 124, y. 251, 65.

Camberwell—17 to 25 (odd), Selbourne-rd., u.t.
50 yrs., g. 304, y. 160.

Holloway—27 and 29, Victor-rd., with workshop
in rear, u.t. 71 yrs., g. 154, y. 153.

Camberwell—20 and 22, Jardin-rd., u.t. 28 yrs.,
g. 61, 88, w. 67, 128.

Brixton—29, 31, 37, and 41, Dalberg-rd., u.t. 74
yrs., g. 214, 108, y. 130.

7, Mostyn-rd., u.t. 61 yrs., g. 124, 108, y. 704.

By J. A. & W. THARP.
East Ham—20 to 26 (even), Grosvenor-rd., f.,
w. 912.

Rattersea—4 and 6, Cairns-rd., f., y. 561.

Old Ford—65 to 71 (odd), Ford-rd. (S), u.t. 37
yrs., g. 44, y. 105, 82.

Hackney—3, Gore-rd., u.t. 52 yrs., g. 80, 34
58, y. 404.

Islington—1, Stanley-rd., u.t. 49 yrs., g. 34
154, y. 404, 108.

Holloway—10, Poole's-pl., u.t. 63 yrs., g. 61,
y. 304.

By Wm. WESTON.
Paddington—304, Harrow-rd. (S), u.t. 43 yrs.,
g. 104, y. 854.

By DOUGLAS YOUNG & CO. (on the estate).
Croydon—Mitcham-rd., &c., 50 plots of freehold
building land (in lots).

September 26 By DOLMAN & PEARCE.
Haverstock Hill—No. 26, u.t. 36 yrs., g. 104,
108, e. 604.

By MAY & PHILPOT.
Clapham Park—Southard, The Chestnuts, and
8, f. p.

Brixton—109, Loughborough-pk., u.t. 20 yrs.,
g. 134, 136, p.

By NOTT, CARTWRIGHT, & ETCHESS.
Pimlico—28, St. George's-sq., u.t. 36 yrs.,
g. 174, p.

46, Grosvenor-rd., u.t. 274 yrs., g. 82, e. 654.

Chelsea—87, Walton-st. (S), f., y. 484.

Croydon—151, 153, 173, 175, 177, and 179, Byres-
rd., w. 101, 88.

Ramsgate, Kent—Lyndhurst-rd., Lyndhurst, f.,
y. 404.

Contractions used in these lists.—F.g. for freehold
ground-rent; l.g. for leasehold ground-rent; l.g. for
improved ground-rent; g. for ground-rent; r. for rent;
f. for freehold; c. for copyhold; l. for leasehold; e. for
estimated rental; w. for weekly rental; y. for yearly
rent; u.t. for unexpired term; p. a. for per annum; yrs.
for years; st. for street; rd. for road; sq. for square; pl.
for place; ter. for terrace; cres. for crescent; av. for
avenue; gdns. for gardens; yd. for yard; gr. for grove.

PRICES CURRENT OF MATERIALS.

*. Our aim in this list is to give, as far as possible, the
average prices of materials, not necessarily the lowest.
Quality and quantity obviously affect prices—a fact which
should be remembered by those who make use of this
information.

BRICKS, &c.

Hard Stocks . . . 1 13 o per 1,000 alongside, in river

Rough Stocks and
Grizles . . . 1 10 o " " " "

Facing Stocks . . . 2 18 o " " " "

Shippers . . . 2 5 o " " " "

Flettons . . . 1 8 o " " " "

Red Wire Cuts . . . 1 10 o " " " "

Best Firebricks . . . 3 12 o " " " "

Best Red Pressed
Kiln Bricks . . . 5 5 o " " " "

Best Blue Pressed
Kiln Bricks . . . 4 5 o " " " "

Do, Bullnose . . . 4 11 o " " " "

Best Stroubridge
Fire Bricks . . . 4 8 o " " " "

GLAZED BRICKS
Best White and
Ivory Glazed
Stretchers . . . 3 10 o " " " "

Stretchers . . . 12 0 o " " " "

Quoins, Bullnose,
and Flats . . . 17 0 o " " " "

Double Stretchers . . . 19 0 o " " " "

Double Headers . . . 16 0 o " " " "

One Side and two
Ends . . . 19 0 o " " " "

Two Sides and one
End . . . 20 0 o " " " "

Splays, Chamfered,
Squints . . . 20 0 o " " " "

Best Dipped
Glazed Stretchers
and Headers . . . 22 0 o " " " "

Quoins, Bullnose,
and Flats . . . 14 0 o " " " "

Double Stretchers . . . 15 0 o " " " "

Double Headers . . . 14 0 o " " " "

One Side and two
Ends . . . 15 0 o " " " "

Two Sides and one
End . . . 15 0 o " " " "

Splays, Chamfered,
Squints . . . 14 0 o " " " "

Best Dipped
Glazed Stretchers
and Headers . . . 22 0 o " " " "

Quoins, Bullnose,
and Flats . . . 14 0 o " " " "

Double Stretchers . . . 15 0 o " " " "

Double Headers . . . 14 0 o " " " "

One Side and two
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Two Sides and one
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Glazed Stretchers
and Headers . . . 22 0 o " " " "

Quoins, Bullnose,
and Flats . . . 14 0 o " " " "

Double Stretchers . . . 15 0 o " " " "

Double Headers . . . 14 0 o " " " "

One Side and two
Ends . . . 15 0 o " " " "

Two Sides and one
End . . . 15 0 o " " " "

Splays, Chamfered,
Squints . . . 14 0 o " " " "

Best Dipped
Glazed Stretchers
and Headers . . . 22 0 o " " " "

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and Flats . . . 14 0 o " " " "

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COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
* Designs & Estimates for Laying-out 44 acres of Land	Borough of Arundel.....	50l. and 20l.	Dec. 1
* Designs for Town Hall, Library, &c.	Durban (Natal) Corporation	500l., 200l., and 200l.	Dec. 18
* Designs for Extension of Town Hall	Hull Corporation	500l., 200l., 100l.	Jan. 31
* Designs for University Buildings, Cape of Good Hope	Agnt.-Gen. for Cape of Good Hope	400l., 200l., 100l.	do.

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Sewer, Asylum, Bridgend, Glam.....	W. E. B. Allen, County Offices, Cardiff	Oct. 7
School, Sunny-brow, Co. Durham	R. Dixon, West-road House, Crook, Durham	do.
Thirty-five Houses, Ystrad Mynach, Wales	T. W. Miller, Architect, Mountain Ash	do.
Boiler House, Gasworks	W. Ewing, Engineer, Gasworks, Greenock	do.
Additions to Workhouse	Young & Co., Engineers, Scottish Provident Buildings, Belfast	do.
Railway (10½ miles), Honeybourne	G. K. Mills, Paddington Station, W.	do.
Road Materials (4,500 tons)	Heaton & Co., Architects, Wigan	do.
Road Works, Heathfield-avenue	G. S. Morgan, Surveyor, School-street, Pontypridd	do.
Additions to Schools, Portlough, N.B.	G. E. Shore, Borough Surveyor, Earle-street, Crews	do.
* Tar Macadam, Alma-place, Harrow-road	Sutherland & Jamieson, Architects, Elgin	Oct. 8
Wrought Iron Fencing, Hampden Park	Borough Surveyor, Town Hall, Hammersmith, W.	do.
Mortuary, &c., Patricroft	J. V. Gove, Surveyor, Town Hall, Eastbourne	do.
Additions to Tramway Depot	T. S. Picton, Civil Engineer, Town Hall, Epsom	do.
Sewer, Church-road, Malahide	J. Young, 88, Renfield-street, Glasgow	do.
Surveyor's Materials	H. Milning, Civil Engineer, Rosemount, Malahide	do.
Gasworks	Mr. Brown, Surveyor, Beilington	do.
Street Works	Adrossan (N.B.) Town Council	do.
Additions to Schools, Park	Halifax Corporation	Oct. 9
Steel Rails (4,000 tons)	Andover R.D.C.	do.
Additions to Police Station	G. S. & W. Railway Co. (Ireland)	do.
Sewer, Hill-road, Garlinge	Eastbourne Corporation	do.
Culvert, Ampoft	Thames R.D.C.	do.
Bridge Works, Gelly Brook	J. Wormald, Surveyor, Andover	do.
Four Houses, Hawick-street, Carlisle	W. J. Jones, Engineer, Council Offices, Pentre, Rhondda	do.
* Reaction, New Bath, Artisans' Dwellings, Stonely-lane	H. H. Hodgkinson, Architect, 9, Lowther-street, Carlisle	Oct. 10
* New Sanitary Fittings, Artisans' Dwellings, Stonely-lane	Office of Engineer to the Corporation, Guildhall, E.C.	do.
Pipe Laying, Alexandra Parade	Oct. 11
Paving Works, College road	G. M. Gale, Engineer, 45, John-street, Glasgow	do.
Cast Iron Pipes, Pine-grove	J. F. Burns, Borough Surveyor, Ker-street, Devonport	do.
Schools	Borough Engineer, Town Hall, Epsom	do.
Fifty Houses, Aber, Glam	Barrowcliff & Alcock, Architects, Mill-street, Loughborough	do.
Additions to Chapel, Sherburn Hill, Durham	G. Kenhole, Architect, Station-road, Bargoed	do.
Vestry Hall, Sherwood, Wyrnola	J. W. Taylor, Architect, Newcastle-on-Tyne	do.
Additions to Premises, Lowmore, near Bradford	Lewis & Morgan, Architects, Pontypridd	do.
Schools	Milnes & Francis, Architects, 39, Swan-arcade, Bradford	do.
House at Asylum, Castlebar	W. C. Jackson, Architect, Chesterfield	do.
Kilo, Stables, &c., Seaview-road, Liscard	E. K. Dixon, Civil Engineer, District Lunatic Asylum, Castlebar	do.
School, The Camp, St. Albans	R. W. Rogers, Engineer, Great Road, near Birkenhead	do.
Road Materials	F. W. K. Tarte, Architect, St. Albans	do.
Sewer	T. F. Berry, Surveyor, Council Offices, Sheerness	do.
Club Buildings, Dowla, Glam	Surveyor, Council Offices, Buxton	Oct. 13
Limestone, &c. (1,000 tons)	James & Morgan, Architects, Cardiff	do.
Cement (2,000 tons)	T. Hughes, Council Offices, Ebbw Vale	do.
Subway near Victoria Bridge	Borough Surveyor, Town Hall, Manchester	do.
Bridge Works, Buxley	S. Hart, Civil Engineer, City Hall, Manchester	do.
Road Materials	W. J. Taylor, Surveyor, Castle, Winchester	do.
Mortuary	W. J. Crowther, Engineer, Municipal Offices, Southampton	do.
* Alterations at Baths	Borough Surveyor, Sun-street, Tewkesbury	do.
* School on Loxford Hall Estate, &c.	City Engineer, Town Hall, Leeds	do.
* Road Widening and Paving Works	G. G. Hawley, Surveyor, Castle, Nottingham	do.
* Making-up Inniskilling, Jedburgh, &c., Roads	J. A. Angell, Surveyor, Council Offices, Beckenham	do.
* Road-making & Paving Works, Back-lane, Orickwood	Borough Engineer, Town Hall, Hackney	do.
Church, North Featherstone, Yorks	Borough Architect, 7, Bank-buildings, Ilford, Essex	do.
Sewers, High-street	Council's Surveyor, Beckenham	do.
* Ambulance and Hearse Shed	Borough Engineer, Town Hall, West Ham, E.	Oct. 14
* Wood Floors & Fireplaces, &c., at Isolation Wards	Council's Engineer, Public Offices, Dyne-road, Kilburn, N.W.	do.
* Porter's Room at Infirmary	W. G. Smithson, Architect, 13, Bond-street, Leeds	do.
* Engineer's House and Sewage Works	W. Fiddian, Surveyor, Old Bank Offices, Stourbridge	do.
* Extension, &c., of Action Cemetery, Willenden-lane	J. Haslam, Corporation Offices, Bury	do.
* New Coast Guard Buildings, near Dover	Borough Surveyor, Town Hall, Felixstowe	do.
Additions to School, Greatford, near Stamford	Borough Surveyor, Town Hall, Fulham, S.W.	Oct. 15
* Supply & Delivery of 192 Stacks Air & Bellows Valves &c.	Borough Engineer, Lambeth Town Hall, Kennington Green, S.E.	do.
* Supply & Delivery of Pipes & Specials at Waterworks	W. Smith, Architect, 65, Chancery-lane, W.C.	do.
* Service Reservoir to hold 500,000 gallons, &c.	J. H. B. Roberts, 10, Castle-street, Carnarvon	do.
* Delivery &c. 2 Comp. Inverted Tandem Pump Engines	Union Offices, Coombe-lane, Kingston-on-Thames	Oct. 20
* Steel Bridge at Point of View, Victoria, B. C.	do.	do.
* Farm Buildings, &c., Chickensley, Yorks	do.	do.
Sixteen Houses, Holbeck, Leeds	do.	do.
House, Freudenfurt, Haverford West	do.	do.
Store Premises, Baginall	do.	do.
	Acton U.D.C.	Council's Surveyor, 242, High-street, Acton	Oct. 21
	Admiralty	Director of Works Department, Admiralty, W.C.	Oct. 24
	U.D.C. of Conville	Head Master, Greatford School, near Stamford, Lincs.	Oct. 27
	do.	Council's Engineer, 4, Milston-lane, Leicester	Nov. 4
	do.	do.	do.
	do.	do.	do.
	Victoria, Brit. Columb., City Cpn.	Agent-General for B. C. 219, Salisbury House, London Wall, E.C.	do.
	do.	F. W. Kidgway, Architect, Dew-bury	No date
	Co-operative Society, Ltd.	F. W. Rhodes, Architect, Upper Wortley, Leeds	do.
	do.	J. Thomas, 15, Upper Lawa-street, Pembroke Dock	do.
	do.	W. V. Betts, Architect, Old Basford	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Applications to be in
* Surveyor	Amerham R.D.C.	120l. &c.	Oct. 6
* Clerk of Works	Borough of Camberwell	4l. per week	do.
* Surveyor	East Grinstead R.D.C.	100l.	Oct. 12
* Sanitary Inspector	Metropolitan Borough Woolwich	115l. per annum	do.
* Local Main Road Surveyor, Cirencester	Gloucester County Council	165l.	Oct. 13
* Local Main Road Surveyor, Thornby and Bristol	do.	180l.	do.

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv. vii. & x. Public Appointments, xix.

PRICES CURRENT (Continued).

WOOD. At per standard. £ s. d. £ s. d. £ s. d.

... Pine-Planks, per ft. cube. 0 2 6 0 3 6 0 4 6

... Large, per ft. cube 0 2 6 0 3 6 0 4 6

... Small 0 2 6 0 3 6 0 4 6

... Wainscot Oak, per ft. sup. as 0 0 7 0 0 8

... in do. do. 0 0 6 0 0 7

... Honduras, Tabasco, per ft. sup. 0 0 9 0 0 11

... Selected, Figury, per ft. sup. as 0 1 6 0 2 0

... Walnut, American, per ft. sup. 0 0 10 0 10

... Oak, per load 16 10 0 20 0 0

... American Whitewood Planks— Per square. 0 4 0 0 0 0

... Prepared Flooring— 0 13 6 0 17 6

... 1 in. by 7 in. yellow, planed and 0 14 0 0 18 0

... matched 0 16 0 0 21 6

... 1 in. by 7 in. white, planed and 0 11 6 0 13 6

... shot 0 12 0 0 14 0

... matched 0 14 6 0 16 6

... 1 in. by 7 in. white, planed and 0 11 0 0 13 6

... beaded or V-jointed boards 0 14 0 0 18 0

... 1 in. by 7 in. do. do. 0 10 0 0 11 6

... 1 in. by 7 in. white do. do. 0 10 0 0 11 6

... 6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c. In London, or delivered Railway Vans, per ton. £ s. d. £ s. d. £ s. d.

... Compound Girders 7 17 6 8 17 6

... Angles, Tees and Channels, ordinary sections 8 5 0 8 15 0

... Flat Plates 7 2 6 8 5 0

... Cast Iron Columns and Stanchions including ordinary patterns 7 2 6 8 5 0

METALS. Per ton, in London. £ s. d. £ s. d. £ s. d.

... Common Bars 7 15 0 8 5 0

... Staffordshire Crown Bars, good merchant quality 8 5 0 8 15 0

... Staffordshire "Marked Bars" 10 10 0 10 10 0

... Mild Steel Bars 9 0 0 9 10 0

... Hoop Iron, Galvanised 16 0 0 16 10 0

... (* And upwards, according to size and gauge.)

Sheet Iron, Back— Ordinary sizes to 30 g. 10 0 0 11 0 0 12 10 0

... 30 g. to 36 g. 12 10 0 13 0 0 14 0 0

... Sheet Iron, Galvanised, flat, ordinary quality— 12 15 0 13 5 0 14 5 0

... Ordinary sizes, 6 ft. by 2 ft. to 3 ft. by 20 g. 12 15 0 13 5 0 14 5 0

... 22 g. and 24 g. 13 5 0 14 5 0 15 5 0

... 26 g. 14 5 0 15 5 0 16 5 0

... Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. 12 10 0 13 0 0 14 0 0

... 22 g. and 24 g. 13 0 0 14 0 0 15 0 0

... 26 g. 14 0 0 15 0 0 16 0 0

... Cut nails, 3 in. to 5 in. (Under 3 in. usual trade extras.) 9 5 0 9 15 0 10 0 0

LEAD, &c. Per ton in London. £ s. d. £ s. d. £ s. d.

... LEAD—Sheet, English, 3 lb. & up. 13 10 0 14 0 0 15 0 0

... Pipe in coils 14 0 0 15 0 0 16 0 0

... Soil Pipe 16 10 0 17 0 0 18 0 0

... Copper Pipe 16 10 0 17 0 0 18 0 0

... ZINC—Sheet— Vieille Montagne— ton 25 0 0 26 0 0 27 0 0

... Silesian 24 10 0 25 0 0 26 0 0

... COPPER— Strong Sheet— per lb 0 0 10 0 0 11 0 0

... Thin 0 0 11 0 0 12 0 0

... Copper nails 0 0 11 0 0 12 0 0

... BRASS— Strong Sheet— 0 0 0 0 0 0 0 0 0

... Thin 0 0 10 0 0 11 0 0

... TIN—English Ingots 0 0 2 0 0 3 0 0

... SOLDERS—Plumbers— 0 0 6 0 0 7 0 0

... Timmer's 0 0 8 0 0 9 0 0

... Blowpipe 0 0 9 0 0 10 0 0

ENGLISH SHEET GLASS IN CRATES. 12 oz. thirds 24d. per ft. delivered. 13d. 14d. 15d.

... 24 oz. thirds 24d. 25d. 26d.

... 26 oz. thirds 24d. 25d. 26d.

... 30 oz. thirds 24d. 25d. 26d.

... 36 oz. thirds 24d. 25d. 26d.

... Fluted sheet, 15 oz. 24d. 25d. 26d.

... Hartley's Rolled Plate 24d. 25d. 26d.

... 24d. 25d. 26d.

... 24d. 25d. 26d.

PRICES CURRENT (Continued).

OILS, &c. £ s. d.

... Raw Linseed Oil in pipes or barrels per gallon 0 9 6 0 9 6 0 9 6

... Boiled " " in drums " 0 2 8 0 2 8 0 2 8

... Turpentine, in barrels " 0 2 11 0 2 11 0 2 11

... " in drums " 0 3 1 0 3 1 0 3 1

... Genuine Ground English White Lead per ton 22 0 0 22 0 0 22 0

... Red Lead, Dry " 20 0 0 20 0 0 20 0

... Best Lined Oil Putty per cwt. 0 8 6 0 8 6 0 8 6

... Stockholm Tar per barrel 12 0 0 12 0 0 12 0

VARNISHES, &c.

Per gallon. £ s. d.

... Fine Pale Oak Varnish 0 8 0 0 8 0 0 8 0

... Pale Copal Oak 0 10 6 0 10 6 0 10 6

... Superfine Pale Elastic Oak 0 12 6 0 12 6 0 12 6

... Fine Extra Hard Church Oak 0 10 6 0 10 6 0 10 6

... Superfine Hard-drying Oak, for Seats of Churches 0 14 0 0 14 0 0 14 0

... Fine Elastic Carriage 0 12 0 0 12 0 0 12 0

... Superfine Pale Elastic Carriage 0 16 0 0 16 0 0 16 0

... Fine Pale Maple 0 18 0 0 18 0 0 18 0

... Finest Pale Durable Copal 0 18 0 0 18 0 0 18 0

... Superfine Pale Copal Body 0 18 0 0 18 0 0 18 0

... Extra Pale French Oil 0 18 0 0 18 0 0 18 0

... Eggshell Flattening Varnish 0 18 0 0 18 0 0 18 0

... White Copal Enamel 0 18 0 0 18 0 0 18 0

... Extra Pale Paper 0 18 0 0 18 0 0 18 0

... Best Black Japan 0 16 0 0 16 0 0 16 0

... Oak and Mahogany Stain 0 9 0 0 9 0 0 9 0

... Brunswick Black 0 10 0 0 10 0 0 10 0

... Berlin Black 0 10 0 0 10 0 0 10 0

... Knotting 0 10 0 0 10 0 0 10 0

... French and Brush Polish 0 10 0 0 10 0 0 10 0

TO CORRESPONDENTS.

J. S. (Amounts should be stated.)

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100, unless in some exceptional cases and for special reasons.]

* Denotes accepted. † Denotes provisionally accepted.

BEXLEY.—For the erection of four cottages on the Foresters' Asylum Estate, May Place-road, Bexley Heath, Kent. Mr. W. F. Potter, architect.—

J. Shelley £1,950 0 0 | W. F. Small £1,275 0 0

Robson & Arnold & Co. £1,269 0 0

Moon & G. A. Bown 1,250 0 0

W. F. Blay, 1,510 0 0 | J. Dawson 1,500 0 0

J. Lonsdale 1,774 0 0 | Enness Bros. 1,178 0 0

W. Coates 1,642 0 0 | Poulton & Sons, Thornthorpe Heath 1,120 0 0

Cousell Bros. 1,600 0 0 | Crabb & Son 1,540 0 0

H. J. Arklin 1,457 12 6 | W. Mayhew 1,095 0 0

BROMLEY.—For alterations and new marble and other fittings to fishmonger's shop, Widmore-road, for Mr. S. C. Connell. Mr. W. James Pamphilon, architect. St. Kilda, Bromley, Kent.—

Hill & Son £560 | Crossley & Son £650

Sealy 738 | Payne 648

Duchart 660 | Arnold & Son 563

[All of Bromley.]

COWLEY (Middlesex).—For alterations and repairs to the Rectory, for the Rev. W. R. C. Hamilton. Mr. G. St. Pierre Harris, architect, 8, Ironmonger-lane, E.C.4.—

C. F. Kearley £663 | Fassindge & Son £639

H. Barton & Sons 652

DOVER.—For the erection of Turkish baths, for the Town Council. Mr. H. E. Stilgoe, C.E., Masonic House, Buggin-street, Dover. Quantities by the Borough Engineer.—

H. Richardson £3,100 0 0 | R. W. Paramor £2,494 0 0

G. Dennerston 2,938 0 0 | Gann & Co. 2,451 18 7

T. T. Denne 2,852 0 0 | E. Stokes 2,448 0 0

Austen & Lewis 2,778 0 0 | R. & G. Brisley

G. Munro 2,597 18 4 | Dover 2,399 0 0

G. Keeler 2,586 0 5

FARNBOROUGH (Kent).—For erection of four shops and houses for Mr. T. Hubbard. Mr. Money Marsland, architect, 68, Great Tower-street, E.C.4.—

W. Owen £1,580

FLEET (Hants).—For the erection of a new shop and residence. Mr. Hy. A. Whitburn, architect, 22, Surrey-street, W.C.2, and Woking.—

Poole & Sons £699

HALLIFORD.—For the erection of an annex to hospital for Mr. J. Parker-Ayers. Mr. H. Fuller Clark, architect, 36, John-street, Bedford-row, W.C.1.—

Slapson & Co. £112

LONDON.—For repairs and sanitary work to be done at the Licensed Victuallers' Asylum, Asylum-road, Old Kent-road, S.E. Mr. W. F. Potter, architect.—

Repairs. Sanitary Work.

King & Son £435 0 0 | £58

H. Cooke 295 10 0 | 105

J. J. Bridger 75 | 75

F. Dawes, Peckham Rye 210 0 0 | 52

LONDON.—For pulling down and re-erecting 64-67, Tottenham Court-road, W., being the second portion of new premises for Messrs. E. Catesby & Sons. Mr. Hy. A. Whitburn, architect, 22, Surrey-street, W.C.2, and Woking. Quantities by Mr. J. T. Carew, 22, Surrey-street.—

J. Marsland £12,252 | Richards & Co. £11,839

Burman & Sons 12,145 | Smith & Sons 11,550

Mattock Bros. 11,997 | Patman & Fotheringham 11,093

H. M. Dove 11,920

J. Carmichael 11,848

LONDON.—For dynamo and engine room floor, for Metropolitan Borough of Stepney. Mr. M. W. Jameson, Borough Engineer.—

W. Johnson £304 | John Bros. 168

Calnan & Son 169 | Whitechapel-road £112

W. G. Brown 167

[Borough Engineer's estimate, £105.]

LONDON.—For stores, cart and van sheds, offices, lodge, and public urinal, Wentworth-street depot, for the Metropolitan Borough of Stepney. Mr. M. W. Jameson, Borough Engineer.—

F. & F. J. Wood £7,145 | Watts, Johnson, & Co. 7,000

Balham Bros. 7,000 | Johnson & Son 5,916

Martin Wells & Co. 6,700 | Chessum & Sons 5,788

Patman & Fotheringham 6,391 | J. O. Richardson 5,773

J. T. Robey 6,378 | A. E. Symes 5,787

Calnan & Sons 6,405 | H. Lovatt 5,700

R. & E. Evans 6,336 | S. E. Moss 5,663

Dove Bros. 6,335 | Saley & Son 5,571

Smith & Sons, Ltd. 6,237 | Thomas & Edges

Cousell Bros. 6,181 | Anglessea avenue

Deering & Son 5,997 | Woolwich, S.E. 5,463

L. T. Lamplough 5,969

[Borough Engineer's estimate, £6,722.]

MIDDLETON.—For alterations, additions, &c., a Middleton Hall, Norfolk. Mr. H. J. Green, architect, Castle Meadow, Norwich.—

J. Kinnimont & Sons, London £2,390

MITCHAM.—For the erection of a school, with caretaker's house, at Lonsome, for the Mitcham School Board. Mr. H. Carter Pegg, architect, Thornton Heath.—

J. Burnand £5,940 | Smith & Sons £4,768

General Builders Co., Burgess & Sons 4,700

Ltd. 4,997 | Loney & Son 361

R. A. Lowe 4,995 | Hawthorne-grove

Jenkin & Co. 4,893 | Penge 4,580

OXTEAD (Surrey).—For drainage to ten cottages, Station-road. Mr. Money Marsland, architect, 68, Great Tower-street, E.C.4.—

G. Morgan £132 | Sales & Son £123

PARKSTONE (Dorset).—For the erection of new offices, Upper Parkstone, for the Wilts and Dorset Banking Co., Ltd. Mr. Walter Andrew, architect, Parkstone.—

J. Wright £3,568 5 6 | A. & F. Wilson £2,900 0 0

W. J. Cross 3,816 17 6 | Baker & Peary

Miller & Sons 3,090 0 0 | Parkstone 2,366 16 4

J. H. Wilson 2,940 0 0

ST. MARY CRAY (Kent).—For the erection of additions to two shops. Mr. G. St. Pierre Harris, architect, 8, Ironmonger-lane, E.C.4.—

T. Knight £1,228 0 0 | J. Smith £1,129 0 0

Stebbing 1 | Somerford 974 10 0

Son 1,132 0 0 | Fannett 974 10 0

SEACROFT (near Leeds).—For foundations of the Willingham Hospital for Smallpox, for the city of Leeds. Mr. Edwin T. Hall, architect, 34, Bedford-square, London, W.C.1.—

M. Hall £9,064 7 6 | Turner, Heason, & Mitchell £5,812 0 0

J. Ellis 7,612 10 0 | J. Bentley 5,648 0 0

Irwin & Co. 5,693 0 0 | Graham & Sons 5,460 0 0

T. E. Sugden 6,500 0 0 | Wilson & Co. 5,146 11 0

B. Fifth 6,221 3 5 | Arnold & Son

Murgatroyd & Son 6,200 0 0 | Doncaster 5,005 0 0

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J. Cracknell £298 0

R. Dye 285 0

Tash, Langley, & Co. 279 11

Read & Wildbur, King's Lynn 274 0

Recommended for acceptance.

[See also next page.]

STRET福德.—For the erection of generating station, for Streiford Urban District Council. Mr. Ernest Woodhouse, architect, 38, Mosley-street, Manchester:—
 W. D. Scott £12,000
 William Healey 11,050
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J. Horrocks	11,576	S. Page	11,100
T. Cole	11,838	J. B. Potter, Sut-	
Cropley Bros.	11,829	ton	11,059

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Pumping.—McIlwraith, Cowan, & Co., Ayr* ..		251	14
Plastering.—D. & T. Bone, Ayr* ..		217	0
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The Builder.

VOL. LXXXIII.—No. 3774.

OCTOBER 11, 1902.

ILLUSTRATIONS.

Marine Hotel, Troon	Messrs. J. Salmon & Son, Architects.
Goodwyns Place, Dorking	Messrs. Balfour & Turner, Architects.
"Allangate," Rustington, Sussex	Mr. R. Heywood Haslam, Architect.
Painted Panel for Dining-room (Silver Medal, National Competition, 1902)	By Miss A. McLeish.

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Rhodes in 1902.



THACKERAY, in his quaint little book, "A Voyage from Cornhill to Grand Cairo," was probably one of the first Englishmen to describe the wonderful old city of Rhodes as it stood in all its marvellous preservation about the middle of the nineteenth century. He gives an enthusiastic account of the ancient fortifications, little altered from their condition when adopted by the Christians in the fifteenth century, and above all he pictures the old city upon their fronts still untouched after many years of Turkish occupation. In more recent times, Sir Charles Newton published a volume of travels in the Levant, which contains many very beautiful etchings of the mediæval remains of Rhodes. In one or two instances these are especially valuable, showing the consequence of the destruction now going on or imminent. At the present time the city still presents a marvellous picture of the middle ages. Curious moles or piers project into the triably calm waters of the Gulf of Asia, forming two great harbours or ports, the more or less piratical war-galleys of the knights once found a refuge. These, which are part of the original fortifications, are well preserved, and still adorned with curious rows of windmills in the same way as they are represented in the old maps of Rhodes of the fifteenth century. Even at the present day considerable defences remain of the famous siege of 1480. On the seaward walls one of the towers lies a mass of ruins as it was battered down by the Turkish cannon. Over the interesting port gate, between the king round towers, still stand in a niche a canopy of white marble the apituted statues of three saints. Everywhere, ruins naturally meet the eye,

but with the exception of a slight modification to the fortifications to accommodate a comparatively modern saluting battery, the city has been marvellously let alone until the present time. Now, however, that singular spirit of energy which seems developing all over the once dormant Turkish Empire, is also making itself felt in Rhodes. For the last two or three centuries the island has been only a sort of penal settlement, or, at least, a place of exile for political prisoners, in the way that many old fortresses have been used. Now the spirit of alteration is abroad, and, amongst other things, a new street is being ruthlessly driven through the ruins of the great church of St. John, and many new villas and houses are springing up in the suburbs.

On November 6, 1856, the church of St. John, which stood at the top of the Rue des Chevaliers, and formed a part of the interesting group of mediæval houses, was destroyed in the blowing-up of a powder-magazine by lightning which had been established in the crypt. This church is very fully described by M. de Vogüé ("Eglises de la Terre Sainte," 1854) as he saw it on his way back from the Levant. He describes it as of purely Italian design (dated 1320), with wide nave arches and wooden roofs and ceilings to nave and aisles. Many interesting knightly monuments which survived its conversion into a mosque (like in Cyprus where the churches converted into mosques are still filled with Christian memorials) perished in this explosion. A few of the gravestones were afterwards rescued and carried to Paris by French tourists. They are now in Cluny Museum. Of the other churches of the city mentioned by M. de Vogüé as existing about the middle of the nineteenth century, only one seems to have survived, to some extent, subsequent earthquakes. This is a building close to the port, in which the general outline of a Gothic church, but with the windows filled in with masonry and a much-plastered exterior, serves to represent the church architecture of Rhodes. It may possibly be the St. Catherine, originally built in 1330, mentioned by De Vogüé.

The citadel seems to have been surrounded by three *enceintes*—a general outside city wall around the whole town, with a deep and wide moat, where it is not built on the sea shore or as part of the harbours; an inner line of wall enclosing the residences of the knights; and a third wall which formed, with a portion of the outer *enceinte*, the castle precincts. After the siege of 1481, when the Turks inflicted great damage on the city, and after the terrible earthquake of the succeeding year, the rebuilding of Rhodes consisted chiefly in reducing the outer of these walls to a condition of defence in accordance with the principles of artillery fortification of the early sixteenth century. The main or curtain wall, still crowned with the loopholed battlements and *meurtrières* of an earlier age, was further protected with semicircular towers to contain cannon with a flanking fire upon the walls.

The chief architectural interest of the present day centres in the Rue des Chevaliers and its most interesting collection of small mediæval houses, the priories, auberges, or "commandaries" of the different national subdivisions of the Order. These subdivisions, instituted on the removal of the Order of St. John from Jerusalem to Rhodes at the beginning of the fourteenth century, were eight in number, representing the countries of Provence, Auvergne, France, Italy, Aragon, Castile, Germany, and England. They mark the later development of the Order into a military organisation, but the earlier ideal of the Hospitallers is also represented at Rhodes by the presence of the huge caravanserai or hospital which forms part of the knightly division of the town. Passing up the Rue des Chevaliers from the port gate, this hospital is on the left hand, forming part of one side of the street, the priories are chiefly on the right or north side. At the top of this street stood the church of St. John, backed up by the palace of the Grand Master or citadel. Few vestiges remain of these latter monuments. Many of the priories are still easily identified by the excellently-preserved coats of arms with which their fronts are encrusted. That of France is, perhaps, the most important,



Plan of the Fortress of Rhodes: from Coronelli (1688).

A. Citadel and Grand Master's House.
B. Rue des Chevaliers.
C. Church of St. John.

D. Church of St. Catherine.
E. Port Gate.
F. Priory of the Holy Spirit.

and on its front are two shields of arms which De Vogüé identifies as representing the architect of the building, Pierre Clouet.

The priory of England is particularly interesting. It stands at the top of the street, on the right hand side, and is easily distinguished by the coat of arms of England the three lions passant, the cross-keys of an Archbishop of York, and the arms of Cardinal d'Aubusson, who restored the building in 1483. Part of this priory seems to have been a chapel (now a deserted and inaccessible mosque), and the singular little doorway into this chapel at the top of the narrow flight of stone steps built against the side of the street is its chief external feature. Over this doorway is a very remarkable canopy (octagonal), projecting as a kind of hood over the door, with gables and miniature groining, the whole apparently cut out of one stone. It reminds one of the usual canopy over a figure or niche of the fifteenth century, and looks older than the other work in Rhodes.

By far the finest of these priory buildings is that of "St. Esprit," a French Order which seems to have had a branch establishment in Rhodes independent of the Order of St. John. This is a very picturesque building approached by a platform with a flight of steps. An elegantly designed entrance in the style of François I. leads into a court at one side. The marble lintel with a large angel holding coats of arms, and the door-jambs covered with the curious badge of the Order—a cluster of flames—are singularly well preserved. The square windows of this building, like those of most of the other priories, are formed by a square-cut mullion and transome, so characteristic of French architecture, surrounded by a richly moulded architrave and the usual drip-stone with returned ends. Exquisite scraps of mediæval sculpture in niches and panels enrich the walls of all these buildings.

The ancient "hospital" at Rhodes which seems to have been planned in imitation of

the original at Jerusalem is a vast rambling quadrangle, now used partly as barracks, partly as prison. It is, of course, inaccessible and can only be judged of from outside. The entrance is beneath a singular projecting bow window with traceried lights. This part may, however, have been modified in more recent years. In the Rue des Chevaliers is another entrance of an imposing character, now walled up.

The famous old city of Rhodes is still a wonderful survival of a mediæval fortress, although much has disappeared since the days of Thackeray, De Vogüé, and others who described it in the middle of the past century. As has been pointed out, new influences are at work in the old Ottoman Empire, and probably the days of such historical relics are numbered. Like Famagusta in Cyprus or the once numerous castles of crusading times dotted along the Syrian coast, it is doomed to disappear. Many of the coats of arms and inscriptions on the priories have recently been treated in a curious manner—they have been covered with a coat of whitewash which brings out their sculpture in a remarkable manner, although it does not add to their effectiveness as works of art. Such a treatment is, perhaps, supposed to render them more attractive in the eyes of the tourists who land from the passing steamers and leave a few francs behind them amongst the Jewish boatmen of the port. As is everywhere the case in the Turkish Empire of the present day, the priceless and unique antiquities which survive are being turned to a temporary profit by the ignorant, greedy natives, who have discovered that for some unaccountable reason such things attract the attention of the European visitor, who can also be made to pay the inevitable "backshish" for their inspection. Such conditions are often maintained until some change in ownership, or the prospect of better speculative profits, involves a total destruction.

THE LIVERPOOL CATHEDRAL SCHEME.



IT is not surprising that the result of the first competition for the proposed Liverpool Cathedral has excited widespread dissatisfaction which is now beginning to show itself; and not alone among architects, as is evident from the trenchant letter signed "A Layman" which appeared in Thursday's *Times*.

We were of opinion from the first that the system on which the preliminary competition was instituted was far too vague and indecisive. To allow competitors the option of either sending in special designs for the site, or merely sending illustrations of work already done, as a testimony of their capacity, was putting them on a very uneven basis for comparison. The competition should either have been limited to a sending-in of illustrations of executed work, or it should have been limited to the sending of small sketch designs for the existing site. The latter, as we said from the first, would have been by far the preferable system, and would have been likely to have resulted in a much more important and interesting competition. As it is, there were in the competition no less than three distinct classes of drawings—(1) those designed for the site; (2) those showing original ideas for a cathedral but not designed for the special

site; (3) photographs and drawings showing executed work. In addition to this confusion as to the basis of competition, the committee allowed it to be supposed that everything was to be sent in under the authors' names, a supposition which, to our knowledge, prevented some men from competing who might have produced good designs; for if an architect knew that he was not a *persona grata* in the church building world represented by the committee, it would be foolish of him to waste his time in sending in a design under his own name which would almost certainly be rejected on personal grounds. After it was too late to be of any use, the Committee apparently came to the conclusion that the names should be concealed—we presume from the assessors; at all events they were covered over and the representatives of the Press were asked not to divulge them; but the mischief was done by that time: people who might otherwise have competed had been, as it were, warned off.

The vague and varying conditions of the competition would necessarily add to the difficulty of forming a comparative judgment on them; but at all events the assessors ought to have been made aware of the advertised conditions, and taken them into account; and if these conditions were not put before them, the assessors should have asked for them. We presume they must have been unacquainted with the conditions, since they actually cast a slur, in their Report, on competitors who had in fact done exactly what they were invited to do, at their own choice. Competitors could either send in designs for the cathedral, or illustrations of their executed work; and yet those who chose the latter alternative are twitted in the Report with indolence and indifference, as persons who have "actually taken no trouble." This is well brought in the letter of "A Layman" already referred to; but there is a stronger point in the case which he does not seem to be aware of viz.: that the very first

me in the list of the five selected candidates is that of one of these firms who have "taken no trouble," Messrs. Austin & Key to wit. They have been in the habit of having fine and effective perspective drawings made of their various churches, and these they wisely exhibited; most of them we remembered quite well, and we do not think that any of them were specially prepared for the occasion. Why then this turn upon competitors who have done just the same?

The moral seems to be that to act as judge in a large competition it is not sufficient to be an eminent architect in the artistic sense of the word, but that a logical habit of mind is required, as well as a wide sympathy, and the faculty to recognise architectural ability and originality apart from any specially favoured style.

From this point of view the Cathedral competition appears to be, so far, a complete failure. The Committee, it must be admitted, laid the foundation of failure in the first instance, by not inviting a regular sketch competition *ad hoc*, with anonymous designs. But the selection from that were sent in is lamentably deficient and one-sided. Only compare some of the names kept out with some of those selected or honourably mentioned. Architects who have built some of our best recent churches, and who were among the competitors, are shut out even from the old comfort of "honourable mention." We do not say that all the five selected are not likely to produce good designs, but there are others from whom we should expect it will more confidently. One would like to know also what is the view of permissive originality, on the part of the assessors, which has led them to turn their back on such designs as those numbered 38 and 53 in the competition. If these are included in the condemnation of designs which "had little aim beyond being eccentric for the sake of originality," all one can conclude is that "eccentricity" meant anything at variance with orthodox Gothic. There was nothing "eccentric" in either of these designs; both of them showed a reasonable effort to suggest something specially suitable for the site and for a modern cathedral. No. 38, with its two towers over the nave, was obviously an attempt to produce a design specially suitable to a confined site, where a grouping on a central system could not be seen from any advantageous point of view. There were others worth attention of which we have a less definite recollection; but certainly these two designs merited special recognition, as attempts to evolve a treatment specially suitable to the occasion, and to give a modern version of the cathedral idea. This, however, appears to be exactly what is not wanted; there was a chance for the evolution of a modern cathedral, and both the Committee and their assessors seem to have done their best to prevent any such result.

The Committee may be assured that neither architects nor the public will be satisfied with the present result; and we should recommend them to call in a supplementary assessor or assessors to make such a further selection as will bring the number for the final competition up to twelve, and will give them opportunity to include some of the really original and thoughtful designs which have been passed over.

NOTES.

IN view of the Pennsylvania coal strike, and the placing of an order for 50,000 tons of the best English "domestic" coal by the ubiquitous Morgan Syndicate, the much-abused Government has, at least something to congratulate itself upon in its action in imposing coal duties on exported coal. The return issued last Saturday of the coal industry of the world in face of the above facts also comes at a very appropriate moment, and it shows that out of the 700,000,000 tons which the whole world produces annually, over the last three years the United Kingdom has produced an average of 221,441,000 tons per annum, and the United States 242,816,000 tons, together amounting to nearly five-sevenths of the whole world's production. In the year 1900 the average value per ton taken at the collieries was, in the United Kingdom, 10s. 9d., but in the United States 5s. 3d., or less than half that sum, yet the exports from the two countries in the same year were 58,405,000 tons from the United Kingdom, as against only 8,295,000 from the United States, the latter country also importing 1,903,000 tons, whilst the United Kingdom only imported 10,000. The increased export of a necessity of life owing to the natural resources of another country being, so to speak, artificially closed by reason of strikes, is undoubtedly a good thing for those interested in the particular article, but is not desirable for the country at large. Not only will householders here suffer from the strike in America whilst it is in progress, but after its close, owing to the subsequent fall in prices and wages, and the unreasonable attitude of labour, future strikes are almost certain to develop in this country, and the nation at large will suffer. The alleviation secured by the coal tax is a small thing compared to such loss as is caused by inflated prices in coal, but it is something, and possibly future Chancellors of the Exchequer will read the coal returns now made in connection with the above facts with considerable interest.

Rail-way Ventilation.

EXPERIMENTS at the Bond-street Station of the Central London Railway have sufficed to show that the fan placed there a few months ago is of little practical use in removing foul air from the subway. The idea was that by vigorous action for a certain space of time during cessation of traffic the tunnels might be thoroughly swept out and furnished with a supply of fresh air to serve passengers for the remainder of the day. Even to achieve so modest an object would certainly have necessitated a much larger fan than could possibly be installed in any station on the line. If all openings between the tunnels could be absolutely closed it might be possible to sweep out the heavy air by the aid of two blowing or exhausting fans, one at the end of each tube, each of diameter equal to that of the tunnel, but a smaller fan would almost certainly have the effect of drawing fresh air along the upper parts of the tunnels, leaving a large proportion of the denser gases at the bottom. In any case, the inadequacy of ventilation performed only once a day must be perfectly clear to all who regard the subject from a rational standpoint. The original proposition that trains moving in opposite directions

through two connected tunnels would cause a pump-like action, and would so effect satisfactory ventilation, is now proved to have been entirely fallacious, and the wonder is that it was ever seriously advanced. No engineer in his senses would ever dream of designing a water pump on such lines, and we cannot imagine why it should have been supposed that air could have been so dealt with when the working conditions absolutely precluded success. The only possible manner in which the moving trains could be caused to act like the units of a chain pump would be by permanently closing all openings between the up and down lines, and by providing separate lift wells for the two lines. Probably it would also be necessary to adapt air-tight doors at the ends of each station to ensure the complete expulsion of foul air by an approaching train, and the admission of fresh air by the suction caused by a receding train. Any arrangement of so complete a character could hardly be attempted at the present time owing to the heavy cost and limitation of the train services. We believe the Directors have now decided to adopt a system of ventilation involving the employment of fresh-air ducts, fitted with regulating valves, throughout the whole length of the railway, through which the outer air will be delivered under sufficient pressure to ensure adequate distribution. There is no reason why such a method of ventilation should not be effective, but everything must depend upon the manner in which it is applied, and upon the adequacy of the mechanical plant for the requisite delivery of air.

The Sonning Bridges.

A COPY of *Country Life* has been sent to us containing the proposed design by Mr. Lutyens for rebuilding the Sonning bridges, which was the occasion of a letter from Mr. Holman Hunt in the *Times* the other day, urging the Oxfordshire authorities to accept this design. We fear that *Country Life* and Mr. Lutyens, in their well-intended efforts, have done more harm than good to the cause. Mr. Lutyens's design, which consists of timber framing resting on brick piers 17 ft. 6 in. from centre to centre, rising just above water level, is undoubtedly picturesque, and for a bridge to take a side lane for light traffic would do very well. But the roadway concerned is the high road through Sonning, and to take all traffic which claims a right to come along the high road this design is inadequate, and would not be sufficiently permanent under heavy loads, and we should certainly not counsel a county engineer to accept it for the purpose. Mr. Holman Hunt, who writes to the *Times* in approval of it, is an eminent painter but not a constructor, and regards only the appearance of the thing. Moreover, there is rather an aesthetic defect in the design, in the fact that the main beams and the wooden balustrade on them are treated with a slight curved rise or camber from pier to pier, giving a wavy line to the whole. It is not, we presume, proposed that the surface of the road should follow this line, and in that case the design produces a wrong impression to the eye of the facts of the structure; nor do we think that it is agreeable in itself. We return to what we have before suggested; viz.: that in regard to the character and use of the two arms of the stream concerned the

brick or stone piers might be built closer together than is here proposed, and bridged by a series of strong oak beams, (if necessary sawn and reversed, with an iron flitch between). This would carry everything that would be required, and would leave no junction points where strains under moving loads would in time induce weakness and dislocation; and it would be a picturesque form, resembling in general lines those Welsh and Dartmoor bridges, consisting of straight beams laid across rough stone piers, which are the delight of artists. We are entirely in sympathy with the feeling about the Sonning bridges; we consider that the common form of iron girder would ruin the aspect of the place; but it is unfortunate that those architects and artists who come forward in these cases to propose a better way nearly always contrive to put themselves in the wrong with the engineers, by proposals which neglect practical requirements and conditions.

THE rebuilding now in progress of Kew Bridge has prompted a project, which the Richmond Bridge, Surrey, Town Council of Richmond are about to consider, for rebuilding the bridge at Richmond, which, it is represented, is no longer equal to the requirements of heavy and increasing traffic. In 1773 an Act, 13 Geo. III., c. 83, was obtained for enabling Commissioners to purchase the interest of the lessee in the ferry, which in former days had belonged to the Crown as an appendage of the manor, and to erect a bridge which, as the Act required, was to have a middle arch, with a span of 60 ft., and affording a headway of 25 ft. above low-water mark. The four other arches were to be of such height and breadth as would give a clear passage within the banks of not less than 250 ft. of water—the river at that spot being about 100 yards wide. The bridge, having five semi-circular arches of stone across the tide-way and towing-path, and a line of five brick arches on the Middlesex shore for the relief of flood-water, was begun in August, 1774, and completed in December, 1777, after the designs of James Paine, or Payne (who subsequently erected the bridge at Kew, for Robert Tunstall, proprietor), assisted by Kenton Couse, of the then Board of Works. The total expense of the works amounted to 26,000*l.*, of which sum 25,000*l.* was raised, under powers given by the Act, by a tontine in shares of 100*l.* apiece, at 4 per cent. interest. The Act of 1773 provided for the ultimate extinction of toll-charges; the "Annual Register" for that year records that the owner of the ferry offered to surrender all his rights for a capital payment of 6,000*l.* or an annuity of 200*l.*, and in the former case to subscribe the whole amount towards the building of the bridge. It is to be hoped that if Richmond Bridge is to be rebuilt, an effort will be made to secure that something is produced equal in architectural effect to the present bridge. Otherwise, at the rate things are going on, half the beauty of the Thames will presently be destroyed.

SCARCELY a month passes without some indication that Americans are beginning to realise in earnest the difficult problems that must present themselves in any fully-

organised country. A notable proof of this statement is to be found in a paper read at the Annual Convention of the Good Roads Convention in Albany, U.S.A. So much do the circumstances therein mentioned resemble those existing in many parts of Great Britain, and particularly in the home counties, that the paper would have been most suitable for any of our own engineering societies. Concern is expressed for the future of rural districts; in twenty-two counties of New York State a decrease in population of over 3½ per cent. has occurred during the past ten years, and the gain has been almost entirely made in cities, five-sixths being actually in New York city, and the author asks that a serious search should be made for the facts governing what he terms the "extremely unsatisfactory movement in our population." His suggestion is that lack of convenient and cheap transportation may be the governing factor, and we quite agree with him. Traffic facilities of the proper kind undoubtedly influence the position of large industries and centres of population, for the high cost of freight over bad roads or badly engineered railways must make manufacture unremunerative and discourage growth of population. Ordinary roads have almost ceased to be of importance to the manufacturer in the United States, and they are of merely local service to traders in this country. To farmers and private residents they are more valuable, and will become much more so when self-propelled vehicles come into general use in country districts, as agriculturists and others will be able to dispose of produce without the delays and excessive rates involved by transport over traffic-glutted railway lines. To suburban districts good roads and rapid means of communication with cities and towns are of the greatest importance, as the business man almost always chooses his place of residence where suitable traffic facilities are to be found. The writer of the paper says that New Jersey is able to show a 30 per cent. increase of population, because macadamised roads were adopted there some thirty years ago, while five counties east of the Hudson, without improved roads, show a net loss in population of rather more than 1 per cent. On the question of electric tramways the author remarks that "a trolley road, obviating the necessity of getting out either a horse or wheel"—the American term for a bicycle—"makes a locality especially attractive to residents and to business people." No doubt this is perfectly true concerning new residents, though a different opinion is entertained by old inhabitants of a district. The view that tramway lines running through country roads will cause population to concentrate along the highways is another commendable theory, and the establishment of such lines would certainly do much towards the more equal distribution of population in England—a consummation that is hoped for by all who have thought seriously on the question.

WE have received from Messrs. Effingham Wilson a little pamphlet entitled "How to Insure against Fire," by Mr. C. Spensley, insurance expert. We are not quite sure what the title of "insurance expert" may mean, but the remarks contained in this pamphlet are certainly worthy of notice. There is un-

questionably a considerable amount of dissatisfaction among insurers, both commercial and private, against the manner in which insurance companies settle claims, for few can be concluded without something like a conflict, which frequently ends in arbitration between the insurers and the insured. Mr. Spensley points out, the amount stated in the policy is merely a maximum, and loss under the policy has to be proved before it can be recovered against the company; consequently, it is to the interest of the company's official to run down the claim as much as possible, and there is no doubt that in many cases amounts are taken from the insurance companies less than are really due, simply because the insured is anxious to obtain his money with as little trouble as possible. Whether the "valued policies" could not become more general seems to be a serious question, so as to prevent the need of any contest when a loss takes place. The cost of depreciating claims is, perhaps, larger than insurance companies suppose. It means that they have to pay officials to reduce claims, whereas these salaries and commissions would be saved could the property which is insured be paid for without dispute. At present the public are much handicapped, because the insurance companies all work together, and the individual who has lost by a fire has practically to fight what is to all intents and purposes a insurance trust.

Offering Commissions to Architects.

Two architects have sent us this week the following extraordinary circular from a manufacturing firm:—

"DEAR SIR,—We beg to address you, although with some diffidence, fearing we may be misunderstood, but will explain our position briefly, hoping to enlist your attention.

We are manufacturers of varnishes, colours, and paints of all kinds, as well as oil refiners, and can offer at prices comparable with equal quality far below those current. The difficulty of getting representatives fully alive to the altered conditions of business, and first ascertaining buyers' requirements, compels us to conduct our business by correspondence, and we are willing to give that consideration which would otherwise be given in representatives' expenses in shape of a liberal commission for all business introduced to us.

We beg you will communicate with us on this subject."

The barefaced character of this proposal, coupled with the admitted "diffidence" in making it, is perhaps more calculated to excite amusement than indignation. It is really an invitation to architects to become, in a sense, "travellers" for the firm. One of our correspondents fears that the fact of these proposals continuing to be made to architects is an indication that there are quarters where they are accepted, but we hardly think this is likely in the present instance we should attribute the sending of such a circular to sheer ignorance rather than to any intention of acting improperly. To people in trade the offer of a commission seems a natural way of getting business, and they cannot understand that professional men are in a totally different position.

PUBLIC IMPROVEMENTS, REDCAR.—The Redcar Urban District Council have decided to carry out the scheme of their Engineer and Surveyor (Mr. James Howcroft) for improving the promenade, creating shelters and underground lavatories for ladies and gentlemen, at an estimated cost of 8,000*l.*

THE ARCHITECTURAL ASSOCIATION.

SESSION 1902-3 of the Architectural Association opened on Friday last week in the meeting-room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, when the President, Mr. H. T. Hare, took the chair.

The Annual Report.

The Committee report that during the fifty-third session of the Association, which terminated last May, steady progress has been made. The membership, which has progressively increased during the past eleven years, reached the total of 1,425 at the close of the session. One hundred and two new members were elected, six were reinstated, and the excesses by death, resignation, and other causes amounted to thirty-one. The Committee report that the day school has fully realised the anticipations of its founders, and has been attended by fourteen students; eight have completed one year's course and entered offices as articled pupils, and it is hoped that all or nearly all will be joining the second year's course. The holiday work of the students during the Christmas and Easter vacations was very satisfactory, and great credit is due to the master, Mr. Arthur T. Bolton, and to Mr. E. F. Reynolds, the assistant master, both of whom have spared no pains to make the school successful. Several visits have been paid to buildings and also to workshops. The day school has met with most gratifying support from the profession, and the idea of the second year's course has been favourably received. The question of obtaining suitable premises in order to fulfil the requirements of the day and evening schools, library, and offices has continued to engage the attention of the Committee, and, although not yet settled, the matter may be said to have advanced a great step forward by the creation of a special fund for building. The donations and promises for this purpose amounted at the close of the session to 4,285*l*. This amount might not justify the Committee in embarking on a building scheme at present, but it went one way in that direction. The Association owes a debt of gratitude to Mr. W. H. Sethsmith (past President) for his indefatigable efforts to obtain donations towards the new premises fund. The office, library, and common-room have been improved by the installation of electric light, but the work of both library and offices has been much hampered on account of the cramped accommodation. The Committee has taken over the management of the "A.A. Sketch Book," and it is hoped that the list of subscribers to this publication will increase considerably. Messrs. W. G. B. Lewis and W. A. Pite have continued to act as editors. The Council of the Royal Institute of British Architects has arranged that all drawings submitted in competition for the Institute prizes will be considered available for illustration in the "A.A. Sketch Book" or "Architectural Association Notes," unless the author lodges an objection with the Institute within fourteen days of the publication of the award. "Architectural Association Notes" has been ably edited by Mr. Herbert A. Satchell, with Mr. Francis Hooper as assistant editor. The cordial thanks of members are due to Mr. G. H. Fellowes Prynne, who had to relinquish the post of editor owing to pressure of professional work. The library has been largely used by members. A separate library has been provided for the day-school students, and this has proved very useful. One hundred and ninety-eight individual students attended the studio and evening-classes. Although the numbers showed a slight falling-off compared with previous sessions, the results attained were very satisfactory. The Classes of Design have again proved of great service to members, and the results of the session's work compares very favourably with previous years. The best thanks of the Association are due to the Visitors, who devoted much valuable time to the consideration of the designs submitted, and for their criticisms at the meetings of the classes.

The minutes of the last meeting having been read and confirmed,

The Chairman proposed a hearty vote of thanks to the Royal Institute of British Architects for its eleventh annual grant of 100*l*. towards the educational scheme of the Association.

The motion having been heartily agreed to, The Chairman proposed a vote of thanks to

Mr. H. Wilson for presenting to the library a portfolio of drawings, designs, and sketches by the late John Sedding. He was sure the gift would be very much appreciated by every member of the Association. Mr. Sedding's work was known and appreciated by all the members, and any work of his, and any sketches, must be of great interest and value, both as a record and as a reference.

The motion having been agreed to, the following gentlemen were elected members of the Association:—Messrs. A. Bough, C. J. Graham, and J. R. Sanders. Fifty-nine gentlemen were nominated for election at the next meeting.

Mr. R. S. Balfour, Hon. Secretary, announced the following donations to the library:—"Architecture and Ornament of the Renaissance and other Periods in Italy," presented by Mr. A. J. Meacher; "Picturesque Westminster," presented by Mr. Walter Emden; "Orders of Architecture" and "Architectural Drawing," presented by Mr. R. Phene Spiers; the Banister Fletcher Bursary Report, and "Drawings of Wren's Dormitories," presented by Mr. Arthur Stratton; "Designing Ironwork," presented by Professor H. Adams; "Shoring and Underpinning," by Mr. Stock, and "Elementary Building Construction," by Mr. C. F. Mitchell, presented by Mr. B. T. Batsford.

A vote of thanks having been accorded to the donors,

Mr. Balfour announced that certain classes of the Association would shortly commence.

He also announced that the first meeting of the Discussion Section would be held on October 15, when Mr. N. F. Barwell will read a paper entitled, "Some Recent Theories Concerning Saxon and Early Norman Work in England."

The Chairman then proposed a hearty vote of thanks to the Bath Stone Firms for the hospitality extended to the Association in conducting the members of the party over the Portland Quarries recently.* The party had a very pleasant day, and they felt indebted to the Bath Stone Firms collectively, and to Mr. Turner and Mr. Sansom individually.

The vote of thanks was heartily agreed to.

Prizes and Studentships.

The Chairman then delivered the prizes and studentships for Session 1901-02 as follows:—

*A.A. Travelling Studentship, value 25*l*. and Silver Medal.*—L. G. Detmar.

*Second Prize, value 5*l*.*—G. S. Nicol.

*A.A. Medal, value 10*l*. 10*s*.*—Not awarded.

Banister Fletcher Bursary, value 25 Guineas, and Medal.—A. E. Richardson.

*Andrew Oliver Prize, value 3*l*. 3*s*.*—W. J. M. Thomasson.

*Second Prize, value 2*l*. 2*s*.*—H. Kenchington.

*A.A. Scholarship, value 4*l*. 4*s*.*—W. A. Hodges.

Banister Bursary Medal gained in 1900.—A. Stratton.

Studio: Division I.—J. F. Schneider, drawings of old work, prize value 10*s*. 6*d*.; H. L. Samson, study of ornament, prize value 10*s*. 6*d*.; H. L. Samson, construction, prize value 10*s*. 6*d*.

Studio: Division II.—I. S. Davies, design, prize value 10*s*. 6*d*.; A. E. Bullock, time sketches, prize value 10*s*. 6*d*.; A. E. Bullock, study of ornament, prize value 10*s*. 6*d*.; A. E. Bullock, construction, prize value 10*s*. 6*d*.; H. L. Samson, perspective, prize value 10*s*. 6*d*.

Elementary Class of Design.—H. L. Samson, prize value 3*l*. 3*s*. and bronze medal; E. G. Stevenson, H. Hyams, certificates.

Advanced Class of Design.—E. Gunn, prize value 5*l*. 5*s*. and bronze medal, and pass for modelling class; E. G. Theakston, certificate and pass for modelling class; L. Lee, A. G. Scott, J. N. R. Vining, passes for modelling class.

ORDER OF MERIT: Lectures. Division I.

Greek and Roman Orders.—E. G. Stevenson, book prize.

Elementary Construction.—W. A. Hodges, book prize.

English Architecture.—C. J. Goodwin, book prize.

Medieval and Renaissance.—W. A. Hodges, book prize.

Elementary Physics, Formulae and Calculations.—R. E. Stewardson, book prize.

Plane and Solid Geometry.—S. T. Hennell, book prize.

ORDER OF MERIT: Lectures. Division II.

Materials, their Nature and Application.—R. J. Tyndall, book prize.

Construction.—G. Church, book prize.

Drainage and Water Supply.—D. Anderson, book prize.

Ventilation, Lighting, and Heating.—G. M. Page, book prize.

Mensuration, Land Surveying, and Levelling.—D. Anderson, book prize.

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President's Address.

The Chairman then delivered the following address:—

Fellow Members and Students of the

Architectural Association.

The first official duty your President is called upon to perform, that of addressing you at the opening of the session, is probably the most difficult and onerous of the many tasks which fall to his lot during his term of office. Time-honoured precedent, however, makes it impossible for him to avoid the duty, however much he might desire to do so, and it is a privilege not to be lightly set on one side. I therefore take up the burden, not so much in the hope that I may be able to say anything which has not been often and better said by my predecessors in the chair, but rather that I may give the necessary opening to what promises to be one of the most successful and important sessions which the Association has seen. What diffidence I may feel is dispelled by the testimony of your presence here to-night, which witnesses to the fact that this annual address is no mere formality. The responsibility, however, increases yearly, and expands as the work grows, and our interest in an engaging and delightful calling makes it well that we should thus annually meet to take stock, as it were, of our position; to review not only the past year, but the years which have gone beyond recall; to see how we stand, to look ahead into the future years, with whatever they may bring us; and, while taking counsel with each other, to encourage ourselves for the great and far-reaching object we have in hand, viz., the advancement of architecture, both as an art and a science.

About fifty-five years ago the Architectural Association, which was then in formation, met in a coffee-house; afterwards in Lyons Inn Hall. The same burning zeal which inspired the founders is, I truly believe, still with us—the flame has in no way become dim; some of the founders are even still with us to-day, among them the venerable and esteemed Professor Kerr. From then till now is over an average lifetime, and the Association is now a full-grown and vigorous body, meeting, by the courtesy of the Royal Institute of British Architects, in this their meeting room, our proceedings fully reported in an admirable professional Press, and possessing a representative journal of its own production, not devoid, I venture to think, of literary merit.

We cordially welcome here to-night many old friends, while a still vaster number continue on our rolls whose sympathy and support are essential to our well-being and progress. Their sons and successors are with us, working with a full and free hand, while, it may be, their grandsons are now in the Student Corps which our roll encloses. The Architectural Association is truly vernal. If you would renew your youth, I know of nothing likely to be so invigorating and stimulating as your attendance at one of our annual gatherings.

The labours of the Association have ever been of a self-denying character. In early days, and until within quite recent years, when the new educational move was inaugurated by my distinguished predecessor in the chair, Leonard Stokes, the work of the Association was carried on by mutual self-help of an entirely honorary character. The services thus rendered gratuitously were of a high and valuable order, and many of us here to-night gratefully acknowledge our deep indebtedness for the valuable instruction thus imparted. But what was suitable for that time is wholly inadequate for to-day. Not that the conditions have so changed that we can dispense with the information of the past; but modern requirements are so exacting, and technical facilities offered by public bodies so great, that it became essential, not only to bring our curriculum into line with those institutions, but to place the Association in such a position as to be able to be the head and fountain of architectural education in London.

The establishing of the studio and the renting of the present premises in Great Marl-

* See our last issue, p. 292.

borough-street was an enterprise viewed with fear and misgiving by many members. Those who pressed forward the scheme, fully believing it to be urgently necessary to meet the requirements of the time may now, however, congratulate themselves on the success which has resulted, and on the benefits which the profession generally has derived from the facilities for study which have been afforded. Those who have passed through this course of training are only too ready to testify to the practical nature of the instruction they have received, and there is every reason to believe that the success of the past will be more than maintained in the future.

The general principle of the old classes of design is still maintained, in that the instruction or criticism is of a voluntary nature, conducted by a body of visitors specially invited, whose instruction is of the greatest value and advantage to the students attending the School of Design. We are glad that this old and well-proved system still continues, and with such excellent results, in our Association work. We have not yet embarked upon the actual teaching of design in principle and practice, but that this must form a definite item in our programme of the future is not difficult to foresee.

I am happy in having the privilege of recording the most successful result of the first year's work of our newly established day school, which is now in a flourishing and vigorous infancy. The formation of this involved a vast amount of time and thought on the part of my immediate predecessor in the chair, and its successful inauguration must be very gratifying to him. We have been most fortunate in securing as a master Mr. Arthur Bolton, to commence and complete the first year's course. To inspire enthusiasm into the new students, and to fully satisfy the intentions of a Committee who were keeping their eyes upon the future of the school, must have taxed the best and most genial of men. Everything has dovetailed in a most admirable way, and the success of the first and somewhat experimental year augurs well for its long and growing influence.

The year's work has, however, demonstrated beyond all possibility of doubt the absolute necessity for other and more suitable premises. It needs no little skilful negotiation in our now very confined limits to make everything work with the smoothness so necessary in an educational institution. How difficult this is may be judged from the fact that the day school hours are from 9.45 to 5 and the evening school from 6.30 to 10. It is unnecessary for me to reiterate what has been stated so often from this chair, that the Committee are still on the look-out for premises. I ask, however, for patience, fully expecting to be shortly able to make an announcement which, while fully meeting all our needs, will be gratifying to a degree to our members.

The object of the Architectural Association is to teach—in a measure—architecture, while its lofty aim is the improvement of the art. I do not by this mean to infer that it is possible for us to outshine the brilliancy of the work of the ancients, or of the masters of the Gothic or Renaissance periods. Our object is not to revive this or that period, but rather by the study, contemplation, and comparison of that which has gone before us in all that is noble, beautiful, and pure, to acquire those principles of proportion, those refinements and elegances of form and detail which have been the constant admiration of mankind in all ages. By such reflective study we seek to originate an inspiration which will subserve itself to the utilitarian requirements which our day and generation demand from us as architects, form being subservient to purpose, and use put into effect may be so suitably and constructively dressed as to commend its result not only to those who employ us, but to all intelligent and thinking observers of the beautiful and suitable in the greatest of the constructive arts. We feel that the deeper, the wider, and the more analytical our study of the work of the past, the better shall we be equipped for the production of original work, and the less likely shall we be to fall into the dry and uninteresting groove of the mere copyist. We desire no "New Art," casting aside in a moment the traditions of the past, but a steady and rational development on a sure and solid foundation; the same process of development which has produced everything in art which has been lasting and worthy of admiration.

Our ideal is no doubt a very high one, and in order to achieve it so far as lies in our power,

we have collected for the guidance and instruction of our students (if I may quote from a recent address) "Brains, similar to the collecting of rare books or works of art." In our instructors we have a body of gentlemen of attainments which our predecessors in this Association would have envied. The requirements of the fully qualified architect cover so wide a range of knowledge, and true education is so lacking in most of us, that many are prevented from attaining the best results. We endeavour to bring the average man, who comes to us with his mental capacities trained at a good school, in contact with the best brain power the profession can offer him, and this before bad professional mental habits are formed, which eventually would lead him to wander illogically from pencil to paper, and thence into practical being in a building, which unlike a picture, cannot be painted out, or hidden away from the gaze of mankind.

I am not afraid to assert that architecture in this country is cursed by ignorant mental habits which a simple and well-defined system of education would have rendered impossible. Even the genius (there are such, and we are glad to have them, though their percentage is small to the generality of men) may profit in no small degree by the training and knowledge we have to offer him. But it is to the average, not the exceptional, man that I wish more especially to address myself. An employer seeks the services of an architect in his necessity; that man usually is the average man. Generally speaking, it is the all-round man of good average ability who, by dint of long, patient, and persistent study, is he who makes the most successful and valued practitioner. Speaking the other day of another profession, the President of the British Association said: "It was in the abundance of ordinary plodding ability, thoroughly trained and methodically directed, that Germany at present has so commanding an advantage." These weighty words abundantly express what it is the object of our Association to provide, and what, I sincerely trust, it is the whole-hearted aim of our students to acquire.

We have no new style to invent. It would be as sensible to invent a new language for the British nation. But as we read Shakespeare, Milton, and Addison, or study the elegancies in diction of Lamb, Burke, or Bright in writing and speaking in beautiful language, so our endeavours should be to graft upon the construction of our designs such sympathetic qualities as shall form a perfect marriage between the beauty and form of the architectural outlines and the practical necessities and objects of our buildings.

Our educational work is not to cram for an examination; far from it. The examinations of the Royal Institute of British Architects do indeed test our work, but are a means, not the end, we have in view. It is to be regretted that crammers do exist. I again quote Professor Dewar's brilliant address, which is singularly applicable to us as architects: "There are," said he, "plenty of chemists turned out now by our Universities, but they are of no use for practical purposes. They are chockful of formulae. They can recite theories and they know text-books by heart. But put them to solve a new problem freshly arisen in the laboratory, and it will be found that their learning is all dead. It has not become a vital part of their equipment, and they are 'floored' by the first emergence of the unexpected." Now, the end of all this is to show that our desire is to make our students learn to think "as a vital part of their mental equipment."

Much has been said, and much more no doubt will be said, on the much-vexed subject of architectural competitions, and I do not wish to enter upon a discussion of the question from its more controversial points of view. I am amongst those, however, who do not regard them as an evil to be fought against, and eventually, if possible, abolished. The fact that they provide the young and obscure architect with his opportunity seems to me to be sufficient to justify the principle without argument which has been urged against them. It has not been so much against the system as against the abuses which have occurred in their conduct; these are undoubtedly preventable, and the remedy lies entirely in the hands of the profession.

It is, however, of the educational aspect of competitions that I wish to speak. I know of no better means by which a young architect

can acquire knowledge and experience in design than by taking part in a competition for a definite building for an actual site; in no other way can he so well attack the practical, as well as the æsthetic problems, and in no other way can he have an opportunity of comparing his efforts with those of more experienced and practised architects. If, however, he is really to profit by such experience his design must be a serious effort, carefully studied and restudied until it appears to its author to be as perfect as he can make it, until he can conceive no possible objection or fault which is capable of remedy. The brilliant idea, the flash of genius, dashed off in half an hour, never did and never will succeed in a competition. And withal, the young competitor (and I might also add the old one) must always cultivate the habit of self-criticism, and must be always prepared and even anxious to admit his inferiority. He must always have in mind that his task is not merely to find a solution of the problem in hand, but the best possible solution. This, of course, should be the object in all design, competition or no competition, but I fear it is so in comparatively few cases, judging by the work we see around us every day. The principle of competition should give the necessary incentive for the effort required. It is, of course, essential that the conduct of competitions should be beyond all question, and that every possible means should be adopted in the selection to secure the choice of the best design submitted. Matters have greatly improved in this respect of late years, but much still remains to be done. The profession can, if they will, compel promoters to conduct competitions in a satisfactory manner, and all those who are working for this end should have the support of every architect in their endeavours.

Much as architects have to deplore the ignorance and apathy of the public towards their art, I believe there is slowly, but none the less surely, developing a movement towards a better appreciation of architecture. The building public are, I truly think, growing anxious to have real architecture, and are willing to pay for it if they can get it. It is our business to give it them, so far as lies in our power. Public bodies are becoming very keen to have buildings of which they can be proud, and which are not designed merely to serve their utilitarian purpose. One sees occasionally an architectural article in the daily press, evincing nearly always, it is true, an ignorance of the subject positively appalling, but still showing that there must be a desire on the part of the public for information. It is much to be regretted that these articles when they appear are so often incorrect and misleading. We, as architects, may I think, do much to educate the public in these matters.

Without apology to our seniors, I now wish to address myself more particularly to our younger colleagues, and especially to those members of our day school whom we are glad to cordially welcome within our ranks. You have entered one of the most fascinating and noble of professions it is possible to select, and with diligence and devotion to your studies you will find your work provide you with many recreations. Art is long, and life at the best short, and you will find much to interest and delight you throughout your career. It is not given to everyone to be a genius born; indeed, it is well that it is not so, inasmuch as many such are impractical and visionary dreamers in a matter-of-fact world. Your ultimate aim is to become a refined and capable practising architect, and with this in view you will do well to organise your studies into a system which for reference will stand you in good service in after years. Reflect upon what I have said as to the cultivation of the mental habit. Analyse the reason and basis of everything. It is not enough to sketch and draw. You must inquire and investigate as to why this is beautiful, and why that is unlovely. Above all, I would have you not regard your profession as merely a means of livelihood. That, of course, is a necessity, but if you are to excel, it must be your recreation, and, indeed, your life. The real and sweetest reward of your labour will always be the appreciation of your fellow-workers, who know so well the difficulties you have had to meet, and can estimate the measure of your success.

It is all important that you should be capable draughtsmen. I do not by this wish to convey the idea that draughtsmanship is architecture; far from it, it is often the reverse; but by

draughtsmanship an architect is able to record his conceptions and to dissect his ideas. A well-known professor of architecture at the Royal Academy, in urging precision, advised his hearers to throw away their indiarubber. I advise you to do the reverse. Do not be afraid of that invaluable means of erasure. Rub in and rub out until you have secured what you believe to be right. Above all things, do not work upon an empty head. You might as well work upon an empty stomach and expect to have physical energy and activity. But first feed your mind with examples, reflect upon and analyse these, whether from illustrations or your own recorded sketches. Then put these on one side and conceive what is suitable to the position and character of the object in hand. You may be only the average man, but by persistent study and patient endeavour, precept upon precept, line upon line, here a little and there a little, you will be able to build up a reservoir of information which will be of great and lasting value. Any way, there is no room in the profession for the lazy man—I hope he is not here to-night—as the rewards which diligence brings have to be sought with love and labour. Your profession calls for some self-denial; it would not be worth much if it did not do so, perhaps some expenditure of midnight oil may be necessary, but this will not be detrimental if exercised with wisdom and moderation.

The priceless collections in our museums wait your inspection and study, together with an appreciative knowledge of the best works of painting, sculpture, and the allied arts, both ancient and modern. The same may be said of the ancient buildings of London and the neighbourhood. The best works of modern architects seem to me to be a faithful and helpful study which is not fully taken advantage of by our students. Our spring and summer visits, so admirably organised, will afford you facilities for going further afield.

It has, I fear, become somewhat the custom to decry the particular value of sketching and measuring, while the standard of draughtsmanship has advanced by leaps and bounds. In recent years it would appear that the healthy habit of sketching is not so universal as it was twenty years ago. I commend it most earnestly to your careful attention. Nothing that I can say will be of so much advantage to you as the systematic and careful collection of figured sketches. I do not mean thereby the production of pretty pictures—a snapshot will effect that—but the thoughtful study of an ancient nature, with a discrimination which gives, as far as possible, the reason why, is a valuable record; and the fact of delineating impresses he study upon the mind for ever, and leaves a permanent influence for good.

The reflective habit should also be cultivated, whether in the contemplation of a noble building or the reading of a notable book. It is a good thing to sit before an old building and drink in its poetry; to cultivate the spirit of true criticism and inquiry. Beauty, like love, is divine and indefinable, but it must be pondered upon and pursued if it is to be secured.

In conclusion, I trust we shall return to our studies and duties after the recess with renewed energies, and that we shall be intent upon carving for ourselves a little niche, and leaving some executed work behind us which shall make the world more beautiful than it was before, and call forth the approval of those who will follow us.

Mr. Aston Webb, A.R.A., said it was with very great pleasure that he proposed a vote of thanks to the President for an address in which there was a great deal of thought, and which would be very useful to members of the Association. It was twenty years that night since he (the speaker) occupied the Presidential chair of the Association, and as he listened to the address he could not help thinking of that time, especially when the President spoke of the hope of having new premises. He spoke of a similar hope twenty years ago, and years before that other Presidents had breathed such hopes and had such aspirations. But in the address to which they had just listened there was a sentence that seemed to suggest that before very long the President would do more than express a hope; he would be able to tell them of a scheme which was arriving at fruition. He had been much struck by the changes which had taken place in the affairs of the Association since he was Presi-

dent. In those days the President was selected from the striving, now he is selected from the thriving; in those days the President of the Association dreamt of building town halls, now he was building them; in those days they looked with some awe upon the Royal Institute of British Architects; now, the President of the Association is an honoured member of its Council, and in those days the idea of the President of the Institute attending the opening meeting of the Association caused considerable flutter; but in these days, he was sure, it did not turn a hair! He remembered very well when he was preparing his address as President of the Association that the Secretary came to him looking very serious, and said that the President of the Institute was to be present on the occasion. He (the speaker) spent the next few days (they did not print the address in "A.A. Notes" then) in trying to bring the address up to a level equal to the occasion, but Mr. Street (the President of the Institute) did not come, and it was his sad duty a few weeks afterwards to voice the regret of the Association at the great loss experienced by Mr. Street's death, and to represent the Association at his funeral in Westminster Abbey. He (the speaker) was very glad that one of his first duties as President of the Institute was to be present to express, on behalf of the Institute, the very great interest they had always taken, and did especially now take, in the work the Association was carrying on. They recognised that the Association was almost unique amongst professional bodies—it was almost unique that the young men of a profession should undertake to educate themselves, and that they should be able to keep that education up to the advancing requirements was really a very remarkable instance of self-help. They might be quite sure that at any time the Institute could be of assistance to the Association, the Institute would be found willing and anxious friends. During his address the President had touched upon one or two points which he (the speaker) also proposed to deal with in his forthcoming address. One of those subjects was that of competitions—that, of course, appeared in every presidential address, both before the Association and the Institute. All he could say that evening was that he thoroughly agreed with everything the President had said as to competitions. The justification for them, as he said, was that they afforded an opportunity to the young and unknown architect. That was really at the bottom of the reason why this system prevailed. It gave to the young architect the opportunity of distinguishing himself which otherwise he might have to wait for. As to the day school, it certainly was a matter for congratulation that it had passed through a year of success. He had some little personal acquaintance with the working of it, and he believed it had been thoroughly efficient; and he thought they had been most fortunate in getting Mr. Bolton to manage the school. As the President had said, the young members of the Association were embarking upon what was a very noble profession—a profession in which they could engage without doing anything low or mean—in which they would serve their clients to the best advantage, and yet do nothing of which they need be themselves ashamed. That was a great point, and, as the President had also said, it was a profession which provides within its own bounds the recreation which all of them from time to time needed. But to succeed meant hard work, though success was open to all. There was no profession, he thought, which was more open. Only one man could never reach the top, and that was the lazy man. One of the most useful remarks ever made to him when he was a young man was made by an old friend, who said: "Fancy, if you arrive at thirty without knowing the general rudiments of your work!" He was about twenty-five at the time, and he began to fancy; and although when he arrived at the age of thirty he had not, of course, anything like the general rudiments of knowledge he ought to have had, he felt that he had learnt a great deal more than he might have done but for that remark; and now he handed it over to them to make use of. On behalf of the Institute he would conclude by expressing his interest in and appreciation of the work which the Association were carrying on.

Mr. W. H. Seth-Smith, in seconding the vote of thanks, said that the President had sketched

in an admirable manner the general drift of the work of the Association. He was quite sure they would agree with the President's remarks, the key-note of which was the key-note of the presidential addresses at the British Association meeting this year, *i.e.*, the defective system too often adopted in England of teaching a great deal of matter—a vast number of facts and formulae, without evoking that spirit of inquiry and thought which was at the bottom of all true education. Very earnest efforts were now being made in all directions to remedy the present defective system. No doubt many of them had noticed that Professor Sir Arthur Brooker, in his recent address at one of the polytechnics, took the same line, and gave them hope that that great idea would be paramount in the organisation of the London University, to which they were looking forward in the hope that it would reform London training, not only in the general arts and sciences and in literature, but also in the fine arts and the applied arts. At present the University could not recognise the training in architecture given in London as being up to the University standard. That was a misfortune, but it was a fact that the early training of architects, taking them all round, had not, to the present time, been up to University standard. That, it was to be hoped, would be remedied before long. The Royal Institute of British Architects and the Association would have to make it a condition that all their students and all their candidates for examination had been through a proper general education before they specialised in architecture. The aims of the Association, which the President had sketched and with which he was sure, they would all agree most heartily, were summed up in the President himself, who represented just that practice of architecture and those points which they felt were leading them in the right direction; and he always thought that the man who represented the Association for the time being should, as far as possible, focus, and be symbolical of, the ideas which were guiding the institution of which Mr. Hare was President. As to work, he noticed a few days ago that the great violinist Kubelik had studied one piece twelve days and twelve nights in order to make himself proficient. He did not advise working like that, and there was no doubt that the Association students did work steadily, and that had been a great factor in their success.

Mr. John Slater, in supporting the vote of thanks, said he was very glad that the President had mentioned the work which one of the former Presidents had done for the Association, *i.e.*, Mr. Leonard Stokes. The success of the educational scheme of the Association was very largely due to him. No one could have sat on the Committee which Mr. Stokes presided over—before and after his Presidency—without feeling that to his tact and energy in the face of great difficulties the success of the scheme was due. With regard to the question of new premises for the Association, the President had been very reticent. It must be patent to any one that the provision of premises suitable for the Association—the finding of a suitable locality and site, and the finding of the money necessary—was by no means an easy task. He was rather amused by the President's statements of the objects of the Association, *i.e.*, "to teach, in a measure, architecture." He liked that reserve very much; but he was very glad to hear the advice the President gave to students of architecture as to their general education. It was more and more necessary for an architect who was to be successful to be an educated gentleman, and to bring that about it was necessary to get at the parents and guardians rather than the students. If those in that meeting saw some of the papers sent in in the Preliminary Examination of the Institute (which had nothing to do with architecture, but only the common, ordinary, grounding of education) they would be positively appalled, and would wonder how persons who had such a small education as those papers showed could possibly hope to succeed as architects. The more the students of that Association—or, in fact, any students—took to heart the fact that they must learn to think, the better it would be for them. In regard to what the President had said as to the interest which the public took in architecture and the way they were helped or otherwise by the public press, the point was one which ought to be made more of. The articles which appeared in the non-professional papers on pro-

essional subjects seemed to be intended for people who knew little about the subject, and were written by people who knew less. He wished the public press, too, had not such a high opinion of the modesty of architects as it would seem they had from the accounts they gave of the opening of any building. In such accounts the name of the architect responsible for the work was generally omitted. He looked forward with interest to the work of the session which had been so auspiciously opened that evening. He noticed from the syllabus that some of the papers went very far afield: from the paper on the archaic twilight of Homer (if they were likely to hear anything luminous on that period they would be thankful) to the modern and ever fresh and new subject of competitions. With such a syllabus, he felt sure the meetings would be very interesting. When the elders of the profession thought of the means of education existing when they were students and compared them with the present, they could only wonder that they had met with any success at all.

Mr. C. Harrison Townsend, who also supported the vote of thanks, said he was very glad the President had urged upon them the necessity of study, study, study. No doubt the President would agree that besides study, besides education, there was something else which went to the making of an architect. A successful architect was not all education; he was not all learning; there had to be in him a certain aspiration which the poverty of the English language compelled him to call the gift for invention. A man might study; he might know; he might be acquainted from beginning to end with all the text books; but without the quality of invention they were of little use, and "invention" did not mean a gift for adaptation; it did not mean the ability to dig in the past, to disinter the past and to bring it forward and make it subservient in our own day; but it did mean the general impression of the past made on our mind, and the result—not of the things of the past, but of the sense of the past—showing itself in our work. He cordially agreed with the President's positive prohibition of the young architect's wish to create a new style, or even to think of a new style. They could not invent a new style; all they could do was to work with the materials gathered from the past, and translate them into their work through themselves. Though we talked the language of Milton, Shakespeare, or Addison, we did not chop sentences out of their essays or poems, string them together, and call them our own work. We educated ourselves to speak the English of the great masters of the past by studying those masters. We must educate ourselves to be architects of beauty by speaking the language of to-day, and speaking it just as, in great measure, we are acquainted with the best in the past.

Mr. E. W. Mountford, in congratulating the Association in having Mr. Hare as their President, said he did not think there was any man living whose work had shown such consistent improvement as had that of their President. He was glad to observe that the President referred to architecture as a "calling." There had been many discussions as to whether it was a profession or an art, but the difficulty seemed to be got over well by referring to architecture as a calling. It was really not worth while to spend time, as some gentlemen did a few years ago, in considering whether it was a profession or an art. So long as an architect did his level best to design well in his own way and produced more or less good work, it did not matter what that work was called; the work would be there to speak for itself. He would emphasise one remark the President had made, i.e., as to the necessity of studying modern work as well as old. He had a very strong impression that some of the old buildings we admired so much now would not have called forth that admiration if we could have seen them when they were new. He was quite sure that if some of the old churches we see and admire so much were being erected now we should have articles in the professional Press showing how entirely bad they were; it was owing to the kind hand of Time that many of them were so beautiful. Consequently, there was hope for their work to-day. No one knew what it would be like three or four hundred years hence—if it should be standing. The study of modern work was very desirable; they saw such a lot that they could improve upon or avoid with advantage, and really they saw a

great deal that they could genuinely admire. He believed that buildings were being erected now which were quite equal to anything which was ever put up in England, and that in future days the work of the early twentieth century would be much studied by A.A. students, and he believed the study would be to their advantage.

Mr. Webb then put the vote of thanks to the meeting. The motion having been agreed to very heartily.

The Chairman, in reply, said he regarded it as a great honour to be their President, especially having regard to the number of distinguished men who had already occupied that chair. The position was a responsible one, but he should spare no effort to render the session as successful and useful as any which had passed. Many very important subjects of the greatest consequence to the Association were looming in the immediate future, and he was fully conscious that the dealing with them would require careful consideration on the part of those who had the direction of the Association in their hands. No thought would be spared by himself or the Committee in dealing with those questions. As to what had been said about the importance of the general education of architects, he thought they could congratulate themselves on the improved type of students who were now entering the Day School—scholars from public schools—and it looked as though the general education of the coming generation of architects would be very much better than it had been in the past.

The Chairman then announced that the next meeting would be held on the 17th inst., when Mr. T. R. Spence is to read a paper on "Homer and Architecture." Mr. Slater, he said, seemed to be in doubt as to what sort of information Mr. Spence could give them. He might say that Mr. Spence was an enthusiastic student of Homer, and his knowledge of the subject, and of the subject in connexion with architecture, was really second to none. Mr. Spence would have many things that were new and interesting to tell them, presented from the point of view rather of the painter than of the architect—a point of view from which matters were not often looked at in that room. He looked forward to a most instructive paper and he hoped there would be a good attendance.

The meeting then terminated.

MAGAZINES AND REVIEWS.

The *Art Journal* devotes an article to the work of Mr. Hugh Cameron, and Mr. Claude Phillips continues his learned critical analysis of the Wallace collection, dealing in this issue with the Netherlandish pictures, especially the examples of Rembrandt. In regard to the "Ideal Landscape" by this painter, the illustration of which is placed at the head of the article, we quite agree that Rembrandt in this instance appears as a romanticist in landscape instead of a realist; it is curious how the landscape seems to tell its own story in this sense; it is so obviously a "composition," in which elements not generally found united in an actual landscape, are brought together and arranged for pictorial effect. Among the illustrations to Mr. Hugh Macmillan's serial article on "Rothiemurcus" is an exceedingly fine study of Highland scenery, "Rocks above Loch Eunach," from a drawing by Mr. Scott Rankin. Mr. Wallace Rimington's water colours form the subject of an article by Miss Ellen Browning; the subjects illustrated, mostly architectural, show better, to our thinking, in black and white than they do in colour. Mr. Day contributes an article on "Tooled Bookbindings," in which he gives good advice as to the advisability of leaving a certain proportion of the leather surface untouched, several of Mr. de Sauty's designs (which are the best among those illustrated) giving examples of the effect resulting from this judicious reserve on part of the tooler. There is an imaginary (?) discussion between Mr. Brewtnall and Mr. Day on "Book Illustration," the question being whether illustrations are really a desirable addition to a well-written story. The argument seems to be "drawn," each disputant retaining his own opinion—Mr. Brewtnall for, Mr. Day against the illustration. We are decidedly with Mr. Brewtnall, on one condition—that the illustrations are of such ability as really to assist in throwing light on the characters and scenes, and not merely for the sake of making pictures. "What

is the use of a book without pictures?" said Alice in Wonderland; and that is the attitude of the general public mind. We have just heard this week of a book-club in a small country town where a resolution has been passed that "no magazines should be subscribed for except illustrated ones." There is the "reading public" at one stroke. Unquestionably Lewis Carroll's books owe an immense debt to Tenniel's illustrations; but these are exceptionally good; there is real genius in them. Thackeray injured "Vanity Fair" and "Pendennis" by his own illustrations, which are only a vexation to the reader; Dickens, whose literary weakness was a tendency to caricature, suffered still more by the vulgarity of Hablot Browne's illustrations; and in spite of a few happy hits in Mr. Hugh Thompson's illustrations to Jane Austen, on the whole the possession of them is no advantage to the reader. And in magazine literature there can be no doubt that the admirable character of the illustrations in the *Century*, *Harpur*, and *Scribner* has too often availed to pass off very inferior literary matter; a poor or flippant story is made tolerable by clever illustrations; and in so far, in periodical literature, the book-illustrator's art has been a bad influence.

The *Magazine of Art* announces an important change and enlargement in its contents and illustrations, which will be accompanied by a reduction in price. It is intended to give more examples of colour reproduction by the more refined and complete methods now obtainable; and there is to be a new fount of type and improved paper. The present issue includes "Fragments of My Autobiography" by Rosa Bonheur, with a number of reproductions from various studies of animals. The slight autobiographical sketch gives some interesting details of the artist's early life and studies, including spending whole days in the slaughter-house at Roule to study the animals. As she observes, "one must be greatly devoted to art to stand the sight of such horrors, in the midst of the coarsest people," who seem to have received her in anything but a friendly spirit. "The Leek School of Embroidery and its Work" is the subject of an article by Mr. W. Shaw Sparrow, and there is one on "A Modern Illuminator," Miss Jessie Bayes, of whose work, however, we get only the design, not the colour. "Studies in English Costume" by Mr. Richard Heath, deals with the ladies costume of the George III. period. The article goes to show that it was in this period that a reaction took place against stiffness and conventionality in dress forms, and that this reaction was very closely connected with the love of flowers which was a characteristic of the period. We hope the subject will be continued; it is one of considerable artistic interest.

The *Berliner Architekturwelt* is largely occupied with illustrations of villa architecture, partly executed works, partly designs in the Berlin Art Exhibition of 1902. Among these are studies for a garden house by Herr Schwager, and an interior of a sitting-room by Herr Biberfeld (both of Berlin), which are of considerable interest and originality, the more so as they are free from the "glimcrack" taste which is the besetting sin of German villa architecture. Some other interiors from the same exhibition, on other pages, are of good quality; these appear to be photographs of built-up interiors and actual furniture. Among the various illustrations of sculpture and painting from the Art Exhibition, is an admirably characteristic painting, "Kirchgang," by Herr Eckhardt, of Berlin (four old women on their way to church through the fields), a capital example of genre painting.

The *Architektonische Rundschau* numbers among the illustrations of its last issue a view of the front of the *Allgemeinen Zeitung's* offices at Munich, the ground story of which has the merit of showing a frank and unaffected treatment of iron construction, unfortunately treated by the terrible detail of the gable which forms the central feature. Professor Dülfer, of Munich, is the architect. No building of great importance is illustrated. The front of the Public Library at Stuttgart, by MM. Eisenlohr and Weigl, of that city, shows an interesting attempt to make a roof-garden an architectural as well as a recreative feature, the presence of the garden being symbolised by a light colonnade rising from the parapet, with a wooden architrave, around which, and around the columns, climbing plants are twining. A rough-cast and half-timber villa at Fauenbach

Herr Leinweber, of Munich, shows a new corative treatment of the inner faces of the terior window shutters, as they appear when ened back against the wall, by a system of ernating light and dark bands painted (or herwise produced) in undulating lines drawn atwise up the shutter; the effect is rather od.

The *Antiquary* contains an interesting article by Mr. J. Russell Larkly on the Church of the essed Virgin at Burham, Kent; a deserted urch on the banks of the Medway. The ticle is illustrated by some sketches of detail. ne of the characteristics of the structure is e use of tufa blocks in portions which are of rman date. Mr. W. E. A. Axon contributes tes on Millenberg (Bavaria), an interesting id little-known locality. Mr. Sheppard condes his article on "Hull Merchants' Marks." *Blackwood* has an important article on "The ecessary and Art in Scotland," giving an ount of the state of official encouragement art study at present existing in Scotland, nd e history of its development, so far as it as veloped. It appears that an institution called The Board of Manufactures' is the custodian f the Scottish National Gallery, and it concts a school of design, now, it is averred, f the use to the linen manufacture (for the good f which we gather that it was originally arted), and, according to the painters, of still ss use to them:—

"Founded, as has been said, for the purpose of aining designers for the linen manufactories, this hool did good work for many generations of udents. It appears that in later years its chief urpose was to capture medals at South Kensington: it became a prey to the deadly system of payents by results. That phase passed when the ience and Art Department changed its methods, nd at the tradition remained in Edinburgh; and ough the school is now in a state of semi-pupile f the Scotch Education Department, it appears o be gradually verging towards petrification. The use of its decay is not far to seek. No teacher, ewever skilful, can do good work without constant mulus from without. . . . The School of Design is no rival: it has no visitors; it appears to arse a serene course on definite lines without gard to the bent of its pupils or the advancement f public taste. Such, at any rate, are the asserons of many competent to judge, who desire new ethods, who aim at different ways. . . . The oard is also the patron of a School of Applied rt, which is reported to have been of great advantage to architects. Further, it possesses a collection f casts of antique sculpture, badly arranged, no bunt, but still capable of being of use to the udent of the history of ancient art. For practical urposes these casts, however, are of no value. he cast-marks are, in most cases, obliterated; excessive coats of paint have obscured the anatomy f the figures, and to the student who desires to come either a painter or a sculptor they are not uly useless, but actually harmful, objects of tudy."

The list of pictures which are in the Scottish National Gallery, and of those which are not there, is depressing, but entirely tallies with our own recollection. Here the Board 'has acted according to its lights—and its purse." The Imperial Treasury has done little or the establishment. The general suggestion f the writer of the article is that Scotland has been starved in respect of art; that consequently the official art institutions of the country are in a moribund state, and that something should be done by the Imperial Government to give them the means of new life.

The *Monthly Review* follows other examples with the inevitable article on Rodin, by Mr. T. Sturge Moore, who is not quite so far gone as some of the Rodinists, and even admits that the excellence of the idol may be a subject of discussion and difference of opinion; but he discusses the Balzac monstrosity as if it were a serious work of art—"The question is, does marble lend itself to such a treatment of form, and to that colossal scale?" Treatment of form! Why, the very point is that there is no form at all. As with so much of the present-day literary writing on art, the article is exceedingly vague in its expressions, and one doubts whether the writer distinctly knows what he means himself. "The Laocoon fails where the Metopes of the Parthenon succeed; for, with all its ability, it does not convince us of its propriety, but is at once perceived to possess what beauty it has on a lower plane." Now, what is the real meaning of that in plain and definite English?

The *National Review* contains an article on "The Serious Problem of the Motor-car," by Mr. Alfred Harmsworth; an advocate's article, but not a prejudiced or unreasonable one. He

points out that the real element of danger lies not in the motor-car itself but in the driver, and that he is not at present required to have any legally recognised qualification. No more, it might be replied, has the driver of an express train; but the cases are not quite similar, since the train driver is in the employ of a company which exists for the special purpose of conducting railway travelling, and the driver is either brought up under their own eye or comes to them with a character from another railway company; whereas the amateur owner of the motor-car may have no capacity for judging of the competency of his driver, and has no certificate but that perhaps of another amateur owner. The argument in favour of a legalised certificate for the motor-car driver is therefore, we think, reasonable. Mr. Harmsworth is in favour of registration and the large identifying number on the car; he admits that it is disagreeable and contrary to the habits of Englishmen in regard to private vehicles, but the road between San Remo and Cannes convinced him of its necessity.

The *Fortnightly Review* contains an article by Mr. Claude Phillips on the Bruges Exhibition. The main point of the article is the endeavour to distinguish, on sound critical grounds, the work of the two Van Eycks; the writer's position being that Hubert is by far the greater artist, in conception, at all events; that Jan Van Eyck has been credited with work which should rightly be attributed to Hubert; at all events, that the two are more distinct in style and genius than has hitherto been supposed.

The *Pall Mall Magazine* contains an article by Mr. Chauncey Depew on "Impressions of London and Londoners in Coronation Year." It is more concerned with impressions of the London people and their ways than with the architectural and decorative aspect of the capital, though the general aspect of the decorations is touched upon, in a rather more indulgent spirit than we fear we could have accorded to it. "An Iron Golconda," by Mr. Harwood, is a description of work in the iron-ming region on Lake Superior.

Scribner contains an article by Mr. Russell Sturgis on the work of the American sculptor, Mr. Ward, who is now undertaking a very important piece of public work, the sculpture for the tympanum of the new Stock Exchange, New York, a building to which we have before referred, and which is now approaching completion. We do not gather what is to be the precise nature and subject of the tympanum group; the object of the article seems to be to show, by illustration of Mr. Ward's other works, that he was the right man to do it.

The illustrations, we fear, go to confirm the impression that American sculptors have not achieved style in sculpture yet. Those shown in this article strike one as well-meaning, but nothing more. Under "The Field of Art," Mr. Sandier's interesting article on the Louvre, to which we referred last month, is concluded. In the same number Mr. P. G. Hubert writes an article on the American Fire Department's work, under the title "Fire-Fighting To-day and To-morrow." We gather from it, at all events, that the Americans are thoroughly satisfied with their own system, and convinced that they have nothing to learn from any other country. The description of the American system and apparatus ought, however, to be of general interest. We gather that in the street fire-alarms it is not necessary to break a glass, but you have to "turn a handle to the right" to open the box, and when there is real danger a nervous person can hardly even follow this simple direction. If this is the usual arrangement, however, it shows a faith in the good sense of the public not to sound the alarm needlessly which will hardly be felt here, where even the glass has been frequently broken to send sham messages. The writer of the article makes a wise practical remark as to the duty incumbent on citizens to acquaint themselves with the whereabouts of the nearest fire-alarm, so as to be able to go straight to it in an emergency without losing time. He mentions a case where two children were suffocated in a house while a citizen who did not know where the nearest fire-alarm was ran "two blocks out of the way" to find one (we presume there is one in every block). "Those two minutes cost two lives." This is a lesson which London residents might take to heart. How many London householders know exactly where their nearest fire-alarm is if they were suddenly called upon to find it?

Harper contains an article by Mr. C. Mulford Robinson on "Art Effort in British Cities," a subject which the writer says is of peculiar interest to Americans because the conditions under which such effort is carried on in England are more similar than in any Continental country to the conditions existing in American cities. The article is rather descriptive than critical, and is written in a very fair and impartial spirit. Mr. Robinson seems much struck with the prevalence of the Art School everywhere in English provincial cities. Nevertheless he thinks (and we can hardly differ from him) that "municipal art is not advanced in English provincial centres. From that standpoint they are in a transition stage. They have grown rapidly, and, as a rule, content to expend their energy in laying foundations for future civic glory, the ugly and gross has been suffered to show upon the surface. Below are the efforts that will tell: firm, intelligent, honest grasp of municipal monopolies, and a thorough and far-reaching art instruction." One criticism, however, is worth quoting, on a matter which, owing to habit, would not perhaps occur to an English critic:—

"To an American, nothing is as striking, in the half-suburban residence quarters of an English city, as the high walls that enclose the gardens. Edgbaston, which is the fashionable west-end suburb of Birmingham, may be taken as a type of it. The broad streets, overhung by noble trees, curve and wind in a most fascinating manner, presenting topographical advantages of rare loveliness; but the houses on either side of the road are enclosed by high walls of brick and stone. Now and again the luxuriant ivy gives to these walls a beauty of their own, and trees spreading their branches over them suggest coolness, seclusion, and beauty within. But such amenity to the public way has come not because of the walls, but in spite of them, and the observer who takes the æsthetic standpoint sees, when he goes to a newer suburb where the walls are of glaring brick, and the highway, that really runs between pleasant gardens, has become a prison walk, what sacrifice of city beauty is made by this custom to unconscious selfishness—or, in plainer phrase, to that individualism that is peculiar of the nation."

"Peculiar to," we suppose he means; but the point is worth consideration. The origin of the walls is really, of course, the pardonable desire for privacy which is "peculiar of" the English household. The *Revue Générale* includes an article by M. Van der Smissen on "Accidents du Travail," in which the writer reviews and compares the working of the law in regard to workmen's compensation for accidents as it exists in Germany, Belgium, and France. The English law on the subject is not taken into consideration.

In the *Gentleman's Magazine* Mr. Crawley Boevey writes an article, under the title of "Strong as Iron," which is a historical sketch of some of the old English iron mines and forges; and Mr. Gerald P. Gordon contributes one on "Some Early Art Sales," the adjective "early" not denoting anything before the seventeenth century, towards the close of which the interest in art sales seems to have arisen. The article contains some interesting gossip in regard to old collectors and auctioneers.

THE LONDON COUNTY COUNCIL.

THE first meeting of the London County Council after the summer recess was held on Tuesday in the County Hall, Spring-gardens, Sir J. McDougall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Southwark Borough Council 12,900*l.* for sewerage works; Battersea Borough Council, 5,000*l.* for electric lighting purposes; Hackney Borough Council, 800*l.* for a street improvement; Lewisham Borough Council, 2,250*l.* for a bridge improvement; Fulham Borough Council, 25,000*l.* for electric light installation; Lewisham Borough Council, 4,250*l.* for underground sanitary conveniences; Stepney Union, 6,100*l.* for the erection of schools and cottage homes; Southwark Union, 3,200*l.* for drainage works at the workhouse; Bethnal Green Guardians, 3,785*l.* for completion of the infirmary; Hackney Union, 18,000*l.* for the erection of casual wards, and for other work; Holborn Union, 2,000*l.* for erection of casual wards, &c.; Battersea Borough Council, 650*l.* for electric lighting works of public libraries; Woolwich Borough Council, 2,300*l.* for works at public baths; Poplar Union, 8,000*l.* for various purposes; Mile End Old Town Guardians, 1,300*l.*

for purchase of premises required for poor-law purposes; and Islington Guardians, 16,000, for infirmary buildings. Sanction was also given to the following loans:—Westminster City Council, 4,600, for plant for street cleansing, 1,800, for provision of hydrants, and 894, for street lighting; Hampstead Borough Council, 2,830, for boundary walls at stoneyard.

Chairman's Annual Address.—The greater part of the sitting was occupied in the reading of the Chairman's annual address. In speaking of improvements, the Chairman said the Council had carried through four schemes of improvement on the recommendation of the Improvements Committee, at an estimated cost of 462,552. During the year one important improvement was completed—namely, the construction of Tower Bridge-road. Considerable progress had been made with thirty-three improvement schemes in course of execution—the two most important of which were the new street from Holborn to the Strand, and the Westminster improvement scheme. Some of the improvements now being undertaken were in districts rich in historical associations. Wherever possible, but when it was absolutely necessary to demolish them, the greatest care was taken to preserve the most interesting portions. Moreover, during the work of excavation vigilance was exercised to secure and preserve any objects of archaeological interest which might be brought to the surface, a reward being offered to the finders thereof. In that work of preserving objects of interest the Committee had had considerable assistance from the Historical Records and Buildings Committee.

Speaking of the Main Drainage Committee, he said:—

"The Committee supervises and advises the Council on the all-important work incidental to the conveyance, treatment, and disposal of the sewage and main drainage from an area of 1,403 square miles, with a population of 5,137,435 persons. The magnitude of the work may be judged from the fact that 85,505 millions of gallons of crude sewage were chemically treated at the precipitation works last year. This enormous volume represents an average flow of nearly 235 millions of gallons every day. The quantity of sludge taken to sea was the largest on record for any one year, and amounted to 2,479,000 tons, or nearly 48,000 tons a week. The net maintenance expenditure was 246,694, which is equivalent to a rate of 1/63 in the pound, while the outlay on capital account amounted to 175,920. It may be interesting to recall the fact that the net capital cost of the system as at present established has been 3,368,490, of which a sum of 1,561,613, has been incurred by the Council during the thirteen years of its existence. The work of the Committee being more or less of a technical nature has figured but little in the debates of the Council, but the unobtrusive manner in which it has been done speaks none the less of its efficiency. The growth of the population of London since the establishment of the main drainage system about forty-five years ago has, however, made it incumbent upon the Council to take measures for providing additional main sewer accommodation, and the special feature of the year's work has been the progress of the extension of the system. The expenditure voted by the Council previously to March 31 in respect of the scheme amounted to 1,263,000, but the final completion of the scheme, including the construction of large intercepting sewers from east to west of London, and the provision of additional machinery at pumping stations, involves an estimated expenditure of 2,947,000. Sections which are estimated to cost 267,390, are already well advanced, while the amount actually paid during the year was 93,217. The Committee is impressed with the importance of pressing forward the work as rapidly as possible, and every endeavour is made to retain the system in an efficient state to meet present and prospective demands."

As to bridges, he said:—"The Thames Tunnel Act, 1900, empowered the Council to construct a tunnel under the Thames from Rotherhithe to Ratcliff. The scheme is being steadily advanced, some 77,000, having been expended in the acquisition of property. A draft scheme for relocating the 2,397 persons of the working classes who will be displaced has been submitted to the Home Secretary, and every effort is being made to secure that the necessary accommodation shall be ready before any of the persons are actually displaced. It is expected that the drawings for the construction of the tunnel will be completed by the end of the year, and the contract let in the early part of 1903. The total length of the tunnel will be 6,825 ft., or about 14 miles, the external diameter will be 30 ft., or 3 ft. under the Blackwall Tunnel, and sufficient to obtain a carriageway of 17 ft. in width, and two footways each 4 ft. 2 in. wide. . . . Vauxhall Bridge, so far as the work of reconstructing the piers and abutments is concerned, is rapidly ap-

proaching completion, and it is hoped that matters may be sufficiently advanced to let the contract for the superstructure in the early part of next year. About 106,000, has been expended upon the work, which should have been completed in March, 1901. The contractors, Messrs. Pethick Brothers, having completed only two-thirds of the work, the Council's Engineer has exercised the power conferred upon him by the contract, and has called upon the contractors to provide more plant and engage more men and to work by night as well as by day whenever practicable. The work of reconstruction of Bow Bridge, Cat-and-Mutton Bridge, and Rosemary Branch Bridge is in hand. . . . With regard to 'housing' good progress has been made with the development of the Tottenham Fields estate, Tooting, where cottages may be expected to be ready for letting in the late autumn. A new estate at Old Oak Common-lane, Hammer-smith, has also been purchased. This estate is within the county, and will, on its 50 acres, afford accommodation for some 9,200 persons. Under Part III. of the Housing Act of 1890 and under the Act of 1900, the Council has power to acquire sites inside or outside the county and irrespective of any obligation. The Metropolitan Borough Councils also have powers under the Housing Acts to provide accommodation within and without their boroughs. To prevent any overlap in the exercise of these powers between the Central and the Local Authorities, a conference has been held and resolutions passed which are fully set out in the Committee's report. The Council has now about 348 acres of land acquired for 'housing' purposes, at a cost of 217,000, and upon this land dwellings, chiefly cottages, for about 6,000 persons have been, are being, or will be built at a cost of nearly 3,000,000. Having regard to the large sums of money which have to be paid by the Council for the acquisition and clearance of insanitary areas, the question is suggested whether it is just that a public authority should be required to pay such large amounts to an owner who has neglected his property and allowed it to become insanitary. It is now coming to be generally admitted that the slum owner, whose neglect of his property often jeopardises the health and life of a large community, ought to be required by law either to put his property into good order or pay the public authority for executing the clearance scheme which has become necessary owing to his neglect."

As to the work of the Fire Brigade, he said:—

"The amount paid for maintenance last year was 213,820, as compared with 115,425, in 1888, and the expenditure on capital account was 69,294, as compared with 47,631. The fact that since the Council came into existence it has spent nearly 700,000 on capital account proves that there has been no hesitation on the part of the Council to keep the brigade in the highest possible state of efficiency. To this end the Committee has been steadily occupied in giving effect to decisions of the Council to largely increase the protection against fire, not only by considerably adding to the number of fire-stations throughout the county, but by substituting new and improved buildings for several existing stations, and by enlarging others. The past year has witnessed the completion of stations at West Hampstead, East Greenwich, and Perry Vale, and the commencement of the erection of new stations at Highbury, Homerton, and Euston, and the enlargement of the station at Stoke Newington. In several other cases drawings of stations to be erected on sites which have been secured are well in hand, and negotiations for the acquisition of the sites are in progress. Some of these works form part of the big scheme approved by the Council in 1898 and involving a capital expenditure of nearly a quarter of a million sterling. During the year 1901 there were 297 lives endangered by fire—of these ninety-seven persons lost their lives. Of the remaining 200 persons, forty-one were rescued by horsed escapes and otherwise, fifteen of the ninety-seven persons mentioned were taken out alive by firemen but afterwards died, and seventy either died or were taken out alive before the brigade was called. The policy of increasing the number of horsed escapes has been continued, the desire being that eventually there shall be a horsed escape at every station. At present fifty-six of the sixty-eight land stations are thus equipped. The increase of the number of horsed escapes has enabled a further reduction to be made in the number of manual escape stations, the public thoroughfares. There are now 750 fire-alarm vans, many more are on order. Nearly all the 750 have been adapted for the transmission of telephonic messages. There are now 27,000 hydrants in all parts of the County of London, more than two-thirds of these having been fixed since the Council came into existence. The number of fires in the year amounted to 4,805; of these 3,684 were calls for fires of which ninety-nine were classed as serious and 3,585 as slight. This percentage of 2.6 of serious fires is the lowest average that has been known, showing the alertness of the brigade in preventing small fires from becoming serious. . . ."

The following portions of the address will be of interest to some of our readers. —

"During the year two very important sets of bye-

laws made by the Council have come into force, viz., those relating to the construction of drains and those regulating seamen's lodging-houses. The drainage bye-laws are enforceable by the metropolitan borough councils. These bye-laws, by providing a uniform code of requirements in drainage matters, supply a need long felt in London. The bye-laws respecting seamen's lodging-houses enable the Council to insist on the houses being kept in a proper sanitary condition and free from overcrowding. The Council has also during the year obtained the approval of the Local Government Board to bye-laws which have the effect of requiring the removal of peat moss manure in properly constructed and covered vehicles, and it is hoped in this manner to remedy a nuisance which has been the cause of much complaint. The Committee's report gives some interesting details as to the result of experiments undertaken by the Council with a view to ascertain the value of various disinfectants under the conditions of their use in dwelling-houses. Corrosive sublimate was fatal to all microbes, while carbolic acid, formalin, and sulphurous acid gas only failed to destroy the most strongly resistant germs. The increasing attention shown to matters of sanitation is evidenced by the fact that the number of sanitary inspectors employed in London has increased from 188 in 1803 to 275 in 1901."

For the purposes of the administration of the Building Act, the County of London is divided into districts, each of which a district surveyor is appointed. In 1880 there were seventy-four such districts; the number is now fifty-eight, the policy of the Council having been to alter the districts as opportunities arose, so that each district should afford an income sufficient to attract the services of men of ability and character. During the year under review, the Committee dealt with 5,690 cases under the Building Act, nearly half the number relating to dangerous and neglected structures, and 7,041 new buildings were examined by the District Surveyors, for which fees amounting to over 21,000, were received, being the greatest amount in fees received in any year since 1888. Nearly twice as many old buildings were examined, the fees on these amounting to nearly 20,000. It has been necessary to take legal proceedings in a large number of cases, either to obtain authoritative decisions or to enforce compliance with the law. The London Government Act, 1890, considerably affected the old areas of the Local Authorities, and the areas of the districts of the District Surveyors have been rearranged so as to make them, as far as possible, coterminous with the boundaries of the Metropolitan Boroughs. In connexion with the naming of streets, 166 subsidiary and other names were abolished, and the numbers of 3,826 houses rearranged. Sixty-five names for new streets were approved, and 142 streets were ordered to be renamed and renumbered. An interesting and useful book, entitled 'Names of Streets and Places in the County of London,' has been published by the Council, and has already been found of great service. During the year the Factory and Workshop Act, 1901, has come into operation. It has made but little difference in the Council's powers and duties with regard to the provision of means of escape in case of fire from factories, etc. It is true that means of escape can now be required from all floors instead of only from the floors above the ground floor, but the difficulties against which the Council has had to contend in the earlier Acts still remain. During the year 135 fresh cases have been considered by the Committee and proposals approved, or requisitions served on the owners. Of cases in which some progress was made in previous years, sixty-two have been completed and sixty-six others have been taken off the list, as after several inspections it was found that they did not within the scope of the Act. In addition, some 300 reports on proposals to provide means of escape, or to amend proposals already approved, or as to the progress of the work, have been considered by the Committee. This branch of the Committee's work necessarily calls forth considerable opposition from factory owners, but every endeavour is made to avoid unnecessary interference with the trade or manufacture carried on at the premises."

The Technical Education Board of the Council had done very good work during the year. Technical classes for artisans were carried on mainly in the ten polytechnics which were aided by the grants from the Council, but very useful work was also done in special institutions, such as the L.C.C. School of Photo-Engraving and Lithography, and the Dyeing and Tanning School at Herold's Institute, Brompton. The aggregate number of artisans who were taken into the last session, as compared with nineteen classes eight years ago, while in the polytechnics aided by the Board the student hours worked in the principal technical subjects had increased from 118,732 eight years ago to 454,363 last year. Further developments of trade instruction were in contemplation, and arrangements had already been made for the erection of a large technical institute at Poplar, of a large building trade school at Brixton, and of a technical institute

Sydenham, as well as a new institute in Hackney. Increasing attention was being given by the Council to the organisation of conatory education, and there was now no conatory school for London aided by the Council which was not well equipped with science laboratories.

In concluding his address, Sir John D'Ongall referred to the criticisms which we recently heard made of municipal work, and said that such criticism was not always so judicious, nor was it always dictated by honest endeavour to improve where they might have fallen into error. The truth was, municipal institutions were being attacked in a way which made one think they had succeeded too well to please those of their fellow-citizens who could not see anything good in municipal effort, but were always content to blame upon the effort of private capitalists.

Protection of Buildings from Fire.—Buildings in Upper Thames-street.—The Building Act Committee brought up the following report:—

"In the discharge of the duty devolving upon the Council under the Factory and Workshop Acts, we have had occasion to deal with the City Mills Buildings, which were reported to the Council by the Home Office in January, 1898. These premises are situated in Upper Thames-street, between Wheatheaf Wharf and Puddle Dock, and abut at the rear on the river. They consist of basement and ground floors, with seven floors over. The seventh floor, is about 7 ft. above the street level." . . . The report here gives particulars of the work done by the Council, and the number of persons employed on the different floors. The various floors are in the occupation of several firms. "A sealed notice was served on the owner of the premises on December 13, 1900, containing requirements for the provision of a brick enclosed incombustible staircase at the southern end of the building, connected with all the floors, and with Wheatheaf Wharf at the ground level, by doorways having fire-resisting doors, and requirements as to doors, handrails, &c., to the existing staircases at the northern end of the premises. The sealed notice was not complied with, and a difference of opinion having arisen as to the necessity of the requirements, the matter was referred to arbitration in July, 1901. The case was heard by the umpire on December 6 and 8, 1901, and the award was made on March 4, 1902. The award is to the effect that the premises are used for factory purposes, and are not provided with means of escape in case of fire for the persons employed therein as can reasonably be required under the circumstances of the case, and that the need of a remedy is very urgent and that no consideration of any other consideration; that a second floor is not a factory where upwards of 10 persons are employed, and that, with the exception of certain portions, which are specially exempted, it is leased to Messrs. Wright & Co., eight males being employed on the floor; that the requirements contained in the Council's sealed notice relating to the construction of an additional staircase cannot be reasonably required under the circumstances of the case, as they would involve the owner in a question of trespass on a portion of the premises occupied by Messrs. Wright & Co., but that the provision of a staircase in the position set forth in the Council's sealed notice, starting at the level of the third floor and extending up to the seventh (top) floor, or in communicating with the intermediate floors between the third and seventh floors, would materially diminish the risk of injury or loss of life in case of fire breaking out in any of the upper floors of the building. The award directs that a notice served by the Council shall be amended so as to require the provision of such a staircase, and further, that the Council shall pay the owner the costs of and incidental to the reference, and that he shall bear its own costs and the cost of the award, however, makes no provision for means of escape from the first floor, which is admittedly part of the factory in the occupation of Messrs. Wright & Co., and from which it would be difficult to relieve the persons employed thereon from the risk of the event of their being driven to the southern end of the building, by reason of the narrowness of Wheatheaf Wharf on the east side, and the fact that Puddle Dock extends along the west side of the premises within about 40 ft. of the front, the premises being 220 ft. deep from front to back. The effect of providing the staircase in accordance with the award will be, in the event of a fire occurring at the north end of the building, to reduce the persons employed on the four upper floors to use the new staircase, which will land them at the third floor level, and in the event of the staircase in the north-east angle of the premises, which is of step-ladder construction, being itself involved with fire, the persons descending by the staircase required by the award, will be trapped instead of escaping, and the staircase must therefore be regarded as a possible source of danger. The floors of this building are constructed of flagstones on cast-iron joists, without any protection to the stone on the underside, and in the event of a

fire the stone would be expected to disintegrate and fall away, probably causing, with the load on the floor, the destruction of the floors below; moreover, the construction appears inadequate for the purposes to which the building is devoted.

Having regard to the facts that the umpire by his award has found that the whole of the premises, excepting the second floor, come within the provisions of the Acts, a point which was strongly contested by the owner, and that the requirements set forth in the Council's sealed notice are best fitted to supply the needed means of escape, it seems somewhat surprising that the Council should have been called upon to pay the costs of the owner and the costs of the award. In view of the unsatisfactory character of the award and the futility of the suggestions made for the provision of means of escape, we have given instructions for a copy of the award to be forwarded to the Secretary of State, in order that he may see the difficulties which the Council has to encounter in carrying out the provisions of the Act."

Mr. Gilbert said there were other buildings in the City like City Mills building. The facts stated in the Report showed the need of fresh legislation.

Mr. John Burns said that originally the building was in one occupation, and then no exception could be taken to it. Dr. Longstaff and the Building Act Committee were to be congratulated upon their clear Report.

Mr. Cohen asked if it was not a fact that beyond the confines of the City of London many houses originally in the occupation of one tenant were being converted into flats.

Dr. Longstaff said he did not think there was any very considerable change of this kind as to lofty buildings. The Council should bear in mind that the City Mills building was one of the worst of the kind, and that there were not many like it. As to fresh legislation, he might add that during the recess correspondence had passed between the Home Secretary and the Council, and in the course of that correspondence the Home Secretary had stated that the Building Act required amending in regard to provision against fire. They were still in communication with the Home Secretary, and at present it was not desirable to add more.

District Surveyors' Districts.—The Building Act Committee reported as follows, the recommendation being agreed to:—

"The Council, on March 4, 1902, abolished the district of West Newington, adding the eastern portion to the district of East Newington and part of St. George-the-Martyr, Southwark, and the other portions to other districts. As there is no longer a district of West Newington, it would be more convenient if the word 'East' were omitted from the designation of the district of East Newington and part of St. George-the-Martyr, Southwark, and this has in fact been done in the new list of district surveyors recently published. It is, however, necessary to obtain the Council's formal sanction to the omission, and we recommend that the district of East Newington and part of St. George-the-Martyr, Southwark, be designated 'Newington and part of St. George-the-Martyr, Southwark.'"

Streatham Fire-station.—The Fire Brigade Committee reported as follows:—

"The Council on July 29, 1902, authorised tenders to be invited by public advertisement for the erection of the proposed Streatham station, and empowered our chairman and vice-chairman to accept the lowest satisfactory tender, provided it did not substantially exceed the architect's estimate. We have now to report that in response to the advertisement five tenders were received as follows:—Messrs. Potter Bros., 10,000l.; Messrs. J. & C. Bowyer, 10,584l.; Mr. B. E. Nightingale, 10,595l.; Messrs. Stimpson & Co., 10,990l.; and Messrs. Martin, Wells & Co., 11,438l. The architect's estimate was 11,000l. Examination of the bills of quantities accompanying the lowest tenders revealed some clerical errors, which, on being rectified, resulted in the amount of the tender being increased by 80l. Messrs. Potter Bros. have recently erected for the Council the Inebriates' Home at Horley, and under the authority of the above-mentioned resolution, the firm's tender has been accepted, and a contract having been entered into, arrangements have been made for the commencement of the work."

Proposed New Theatre at Poplar.—The Theatres and Music-halls Committee reported that they had considered plans submitted by Messrs. Owen & Ward, on behalf of Mr. Dalby Williams, of a theatre which it is proposed to erect in East India Dock-road, at the corner of Stainsby-road, Poplar. The premises will accommodate 2,110 persons. Objection was taken to the erection of the theatre by persons living in the neighbourhood, but the committee were unable to deal with such objection. It was intended, however, to use premises for dramatic entertainments, and it would be necessary, therefore, for an application to be made to the

Lord Chamberlain for a licence for such purpose, and the persons objecting had been so informed. The intended name of the theatre was the Eldorado. The committee recommended that the plans be approved.

The report was adopted.

Tree-planting in the Streets.—The Improvements Committee reported that it was the usual practice of the Council when carrying out an extensive street improvement to plant trees in the new street or widened thoroughfare. This course would have been adopted in that part of Kensington High-street which was now being widened, but a petition had been received from the principal residents and shopkeepers, alleging that the planting of trees would cause interference with light and air and also damage to trade. A letter to the same effect was received from the Borough Council. Having regard to those representations, the Committee now recommended that no provision be made for the planting of trees in the thoroughfare in question.

This was agreed to.

Theatres, &c.—The Theatres and Music Halls Committee reported that the following plans were approved:—

Balham Empire.—Extra seating in the balcony, &c. Submitted by Mr. H. Percival.

Cripplegate Institute.—Alterations. Submitted by Mr. F. S. Hammond.

Elephant and Castle Theatre.—New staircase and passage. Submitted by Mr. H. V. D'Esterre.

Hackney Empire.—New pay office. Submitted by Mr. F. Matcham.

Hyde Park Hotel.—Work on ground floor. Submitted by Messrs. Lee & Pemberton.

Jack Straw's Castle, Hampstead Heath.—Saloon. Submitted by Mr. J. Clark.

King's Hall, Fulham.—Premises to occupy 300 persons. Submitted by Mr. J. P. Mobbs.

Ladbroke Hall, W.—Seating. Submitted by Mr. M. J. Zimmermann.

Battersea Empire.—Alteration to exits. Submitted by Messrs. Mote & Son.

Bechstein Hall.—Alterations to openings in party wall. Submitted by license.

Camden Theatre.—Extra sanitary accommodation for stage hands. Submitted by Mr. W. G. R. Sprague.

Empress Theatre of Varieties.—Amended proposal of Alteration to stage entrance. Submitted by license.

Excelsior Baths.—Alteration to flooring of baths. Submitted by Mr. W. Emden.

Foresters' Music Hall.—Re-arrangement of area seating. Submitted by Messrs. Lazarus & Son.

New Cross Empire.—New converter chamber. Submitted by Mr. H. Raymond.

St. James's Hall, Piccadilly. Alteration to the Regent-street entrance. Submitted by Mr. W. Emden.

St. Pancras Baths.—Rearrangement of hydrants. Submitted by Messrs. Aldwinckle & Son.

Savoy Theatre.—Fixing of a fire-resisting screen to the proscenium opening. Submitted by Mr. A. B. Jackson.

South-Western Polytechnic, Manresa-road, Chelsea.—Large hall proposed to be erected and for which application for a licence for music will be made next licensing sessions. Submitted by Mr. F. G. Knight.

Star Music Hall.—Method of complying with requirements of detailed inspection. Submitted by Messrs. Stock, Page, & Stock.

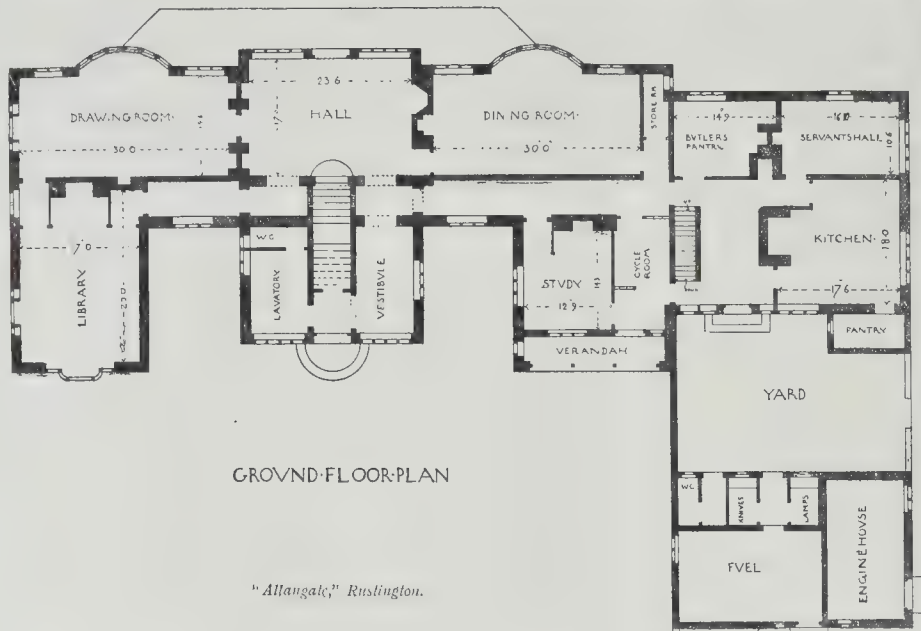
Strand Theatre.—Removal of two boxes on dress circle level and substitution of seating. Submitted by Mr. F. T. Verity.

Willis's Restaurant.—Alteration to upper portion of premises to be used as a club. Submitted by Messrs. Wimperis & Arber.

The Council adjourned shortly after 6 o'clock.

OPERATION THEATRES, LIVERPOOL ROYAL INFIRMARY.—According to the Liverpool Post, a friend of this institution has undertaken the cost of the replacement, for operation purposes, of the old theatre by two new ones, and their equipment. The alterations comprise the substitution for the skylight of the old theatre of a new floor at the level of the upper corridor, leaving the previous space available as a lecture-room and for photographic work in connexion with the use of the Röntgen rays. Upon this floor two new operation rooms have been erected, with a central lobby giving access to both, and apartments on either side for the administration of anaesthetics. The theatres are lighted on three sides with a sloping skylight, 5 ft. high, from the east, and to the north the end is occupied by a large bow window, providing horizontal illumination. The walls have been lined to the height of 5 ft. with alabaster. Above that they are parian cement, coated with a white enamel paint. The electric light fittings have been installed by Messrs. Boothroyd & Co., of Bootle. The plans are those of Messrs. A. Waterhouse & Son, who designed the original building, and they have been carried out by Messrs. Morrison & Sons, of Waverley.

GOODWYNS PLACE, DORKING. GROUND FLOOR PLAN.



GROUND-FLOOR-PLAN

"Allangate," Rustington.

Illustrations.

MARINE HOTEL, TROON.

THE hotel is situated on the famous golf-links, and faces the sea at Troon. The main building, with the three-gabled front, was built in 1897, at a cost of about 16,000*l.* The new addition, with square tower, was added in 1901, at a cost of about 10,500*l.* There are in all seventy visitors' bedrooms.

The walls are built with an outer wall of red stone and an inner wall of brick, with air space between. The main stairs are built of stone, with an oak balustrade.

The hotel is fitted throughout in a very complete, but reserved, manner. The stable, in the rear of the site, is built of brick, rough cast, and half timber work, at a cost of about 1,500*l.*

The architects are Messrs. James Salmon & Son, of Glasgow; the builders are Messrs.

Muir & Son, of Kilmarnock; and the joiners' work is by Messrs. George Rome & Son, also of Kilmarnock. Mr. D. Powrie, of Glasgow, acted as clerk of works.

GOODWYNS PLACE, DORKING.

This house is built of stock bricks and plastered inside and out, all the quoins being formed of plain hand-made roofing tiles, bedded flat and bonded in with the brickwork. The main cornice of the south front is of Douling stone.

All the floors are concrete, and the roof trusses are of steel, carrying the purlins which support the boarding on which the tiles are laid. There is a complete system of passages and flues, allowing the house to be ventilated and warmed with hot air. This heating was carried out by Messrs. Mackenzie & Moncur. All the casements are of gunmetal, and were made by Messrs. Hope, of Birmingham, who also did the lead glazing.

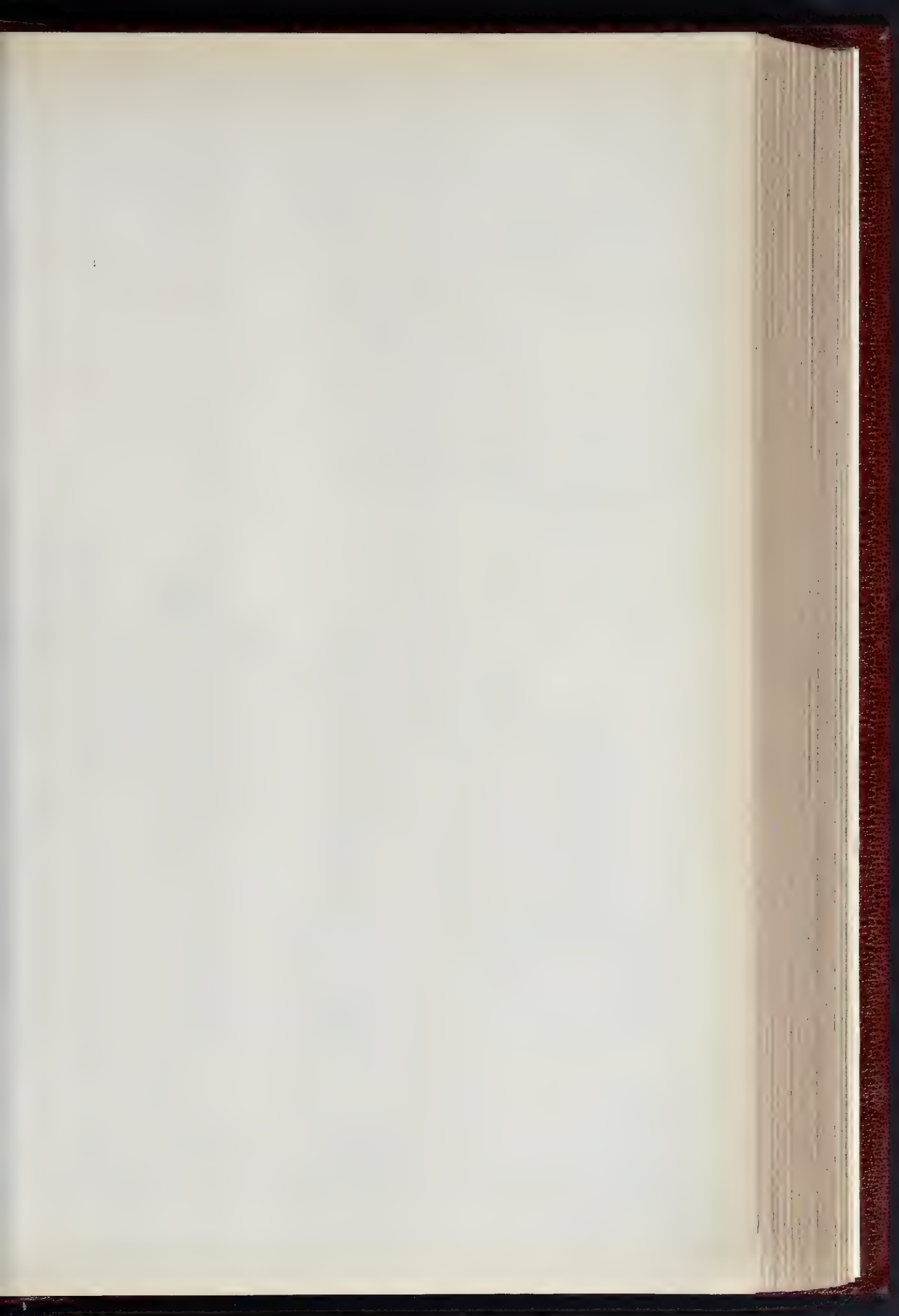
The house is completely lighted by electricity, which is generated on the site, the work being carried out by Messrs. Benson, of Bond street, in consultation with Mr. Carling, of Guildford.

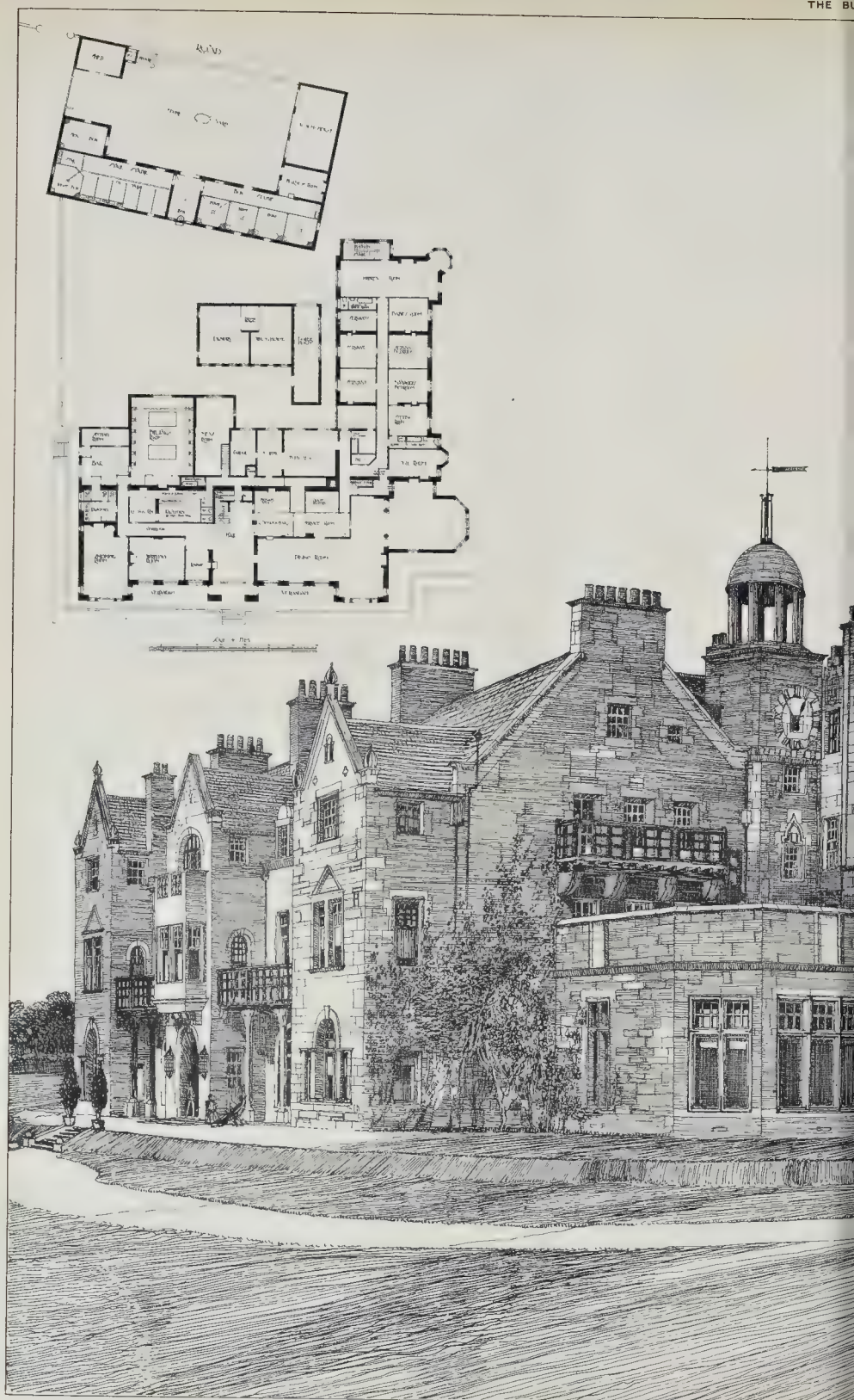
The plumbing was done by the North British Plumbing Co., and the general work were in the hands of Messrs. Holt, of Croydon, who carried out the work according to a schedule of prices.

The architects were Messrs. Balfour & Turner, of London.

"ALLANGATE," RUSTINGTON, SUSSEX. We give two views and a plan of this house, which has been erected from the designs of Mr. R. Heywood Haslam, architect of London.

The materials are local hand-made red facing-bricks and rough-cast. The roof is covered with local hand-made tiles, and is at an angle of 50 deg. The stonework is of

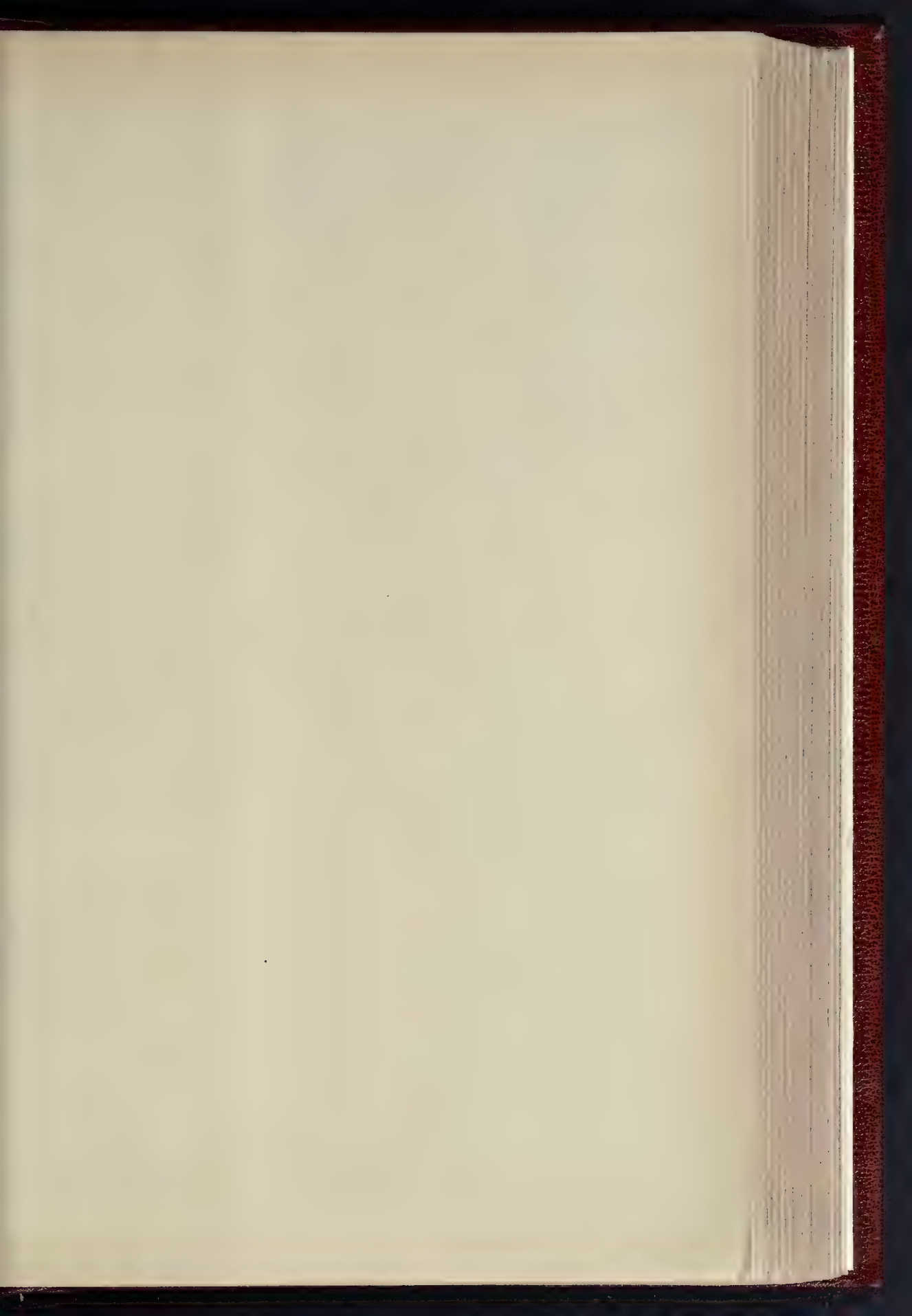




MARINE HOTEL, TROON



PHOTO. THOS. SPRAGUE & CO. 4 & 5 EAST HANCOCK STREET FETER LANE E.C.



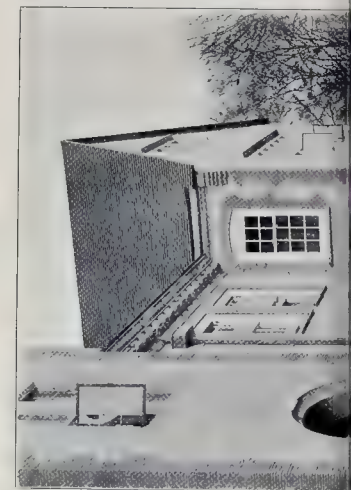
THE BUILDER. OCTOBER 11, 1902



WEST FRONT.



PART OF SOUTH FRONT.





PART OF SOUTH FRONT.



EAST END OF SOUTH FRONT.



WEST END OF SOUTH FRONT.

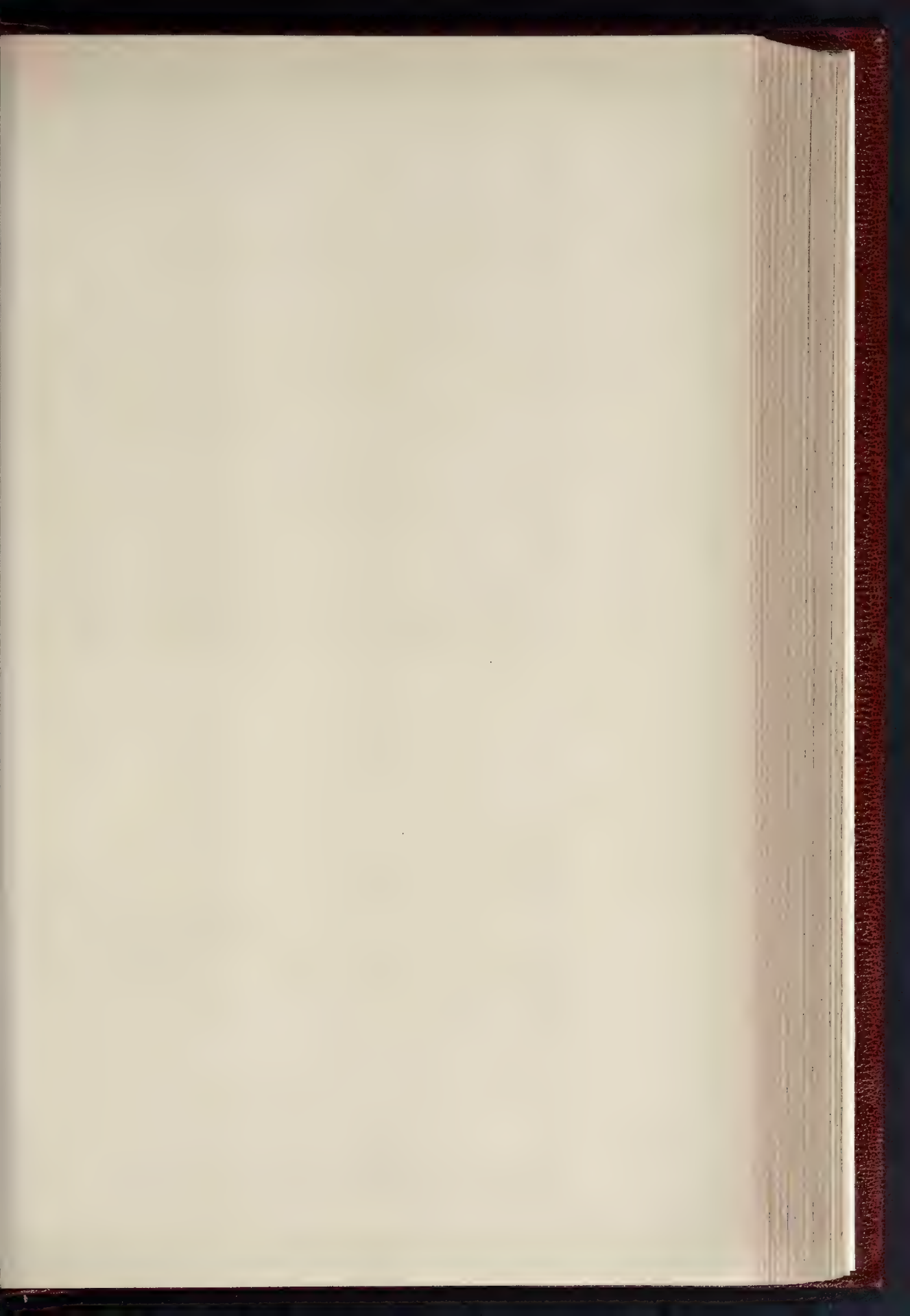


PART OF NORTH FRONT.



STAIRCASE SCREEN.

GOODWYN'S PLACE, DORKING. MESSRS. PALMER & TURNER, ARCHITECTS.





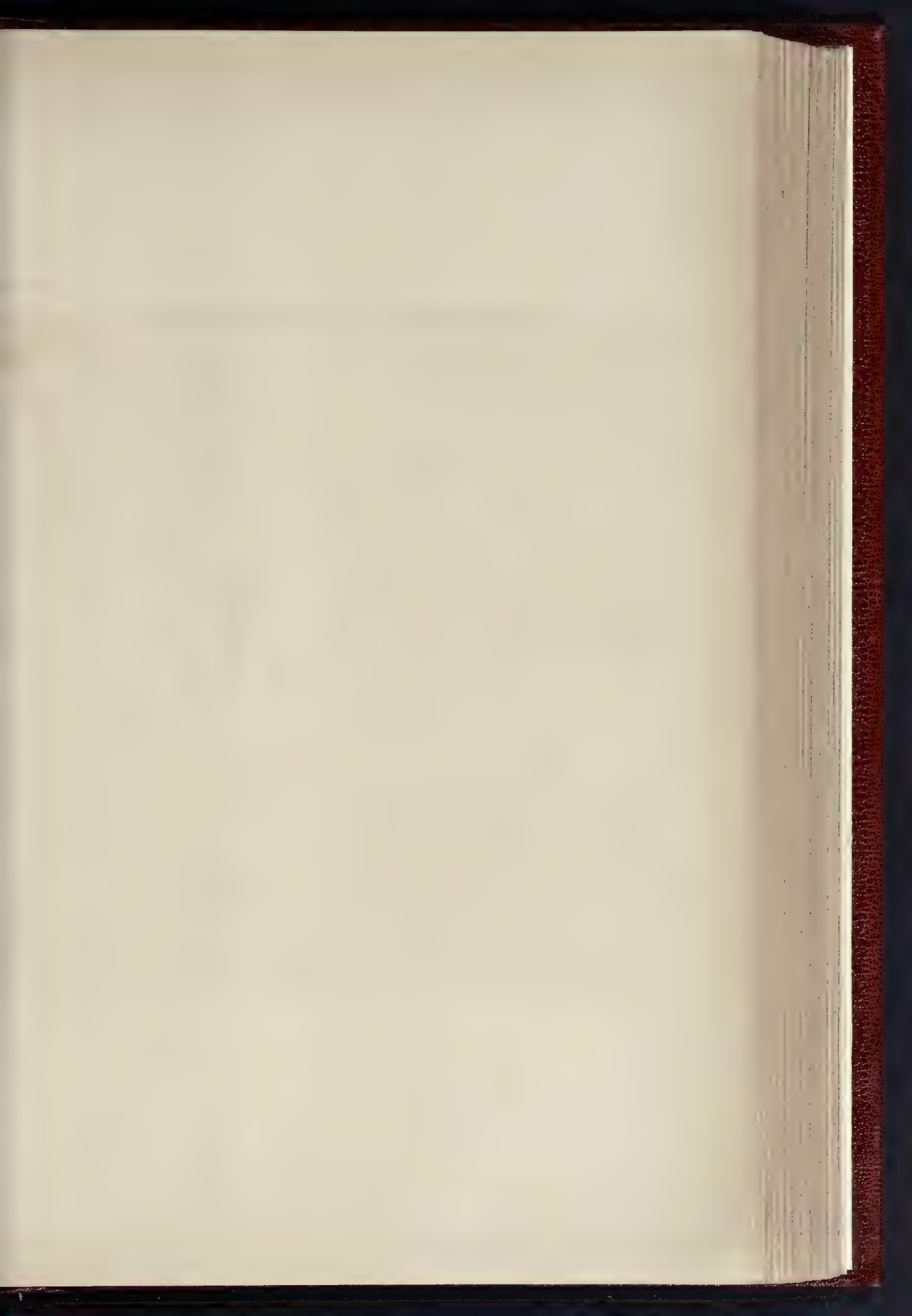
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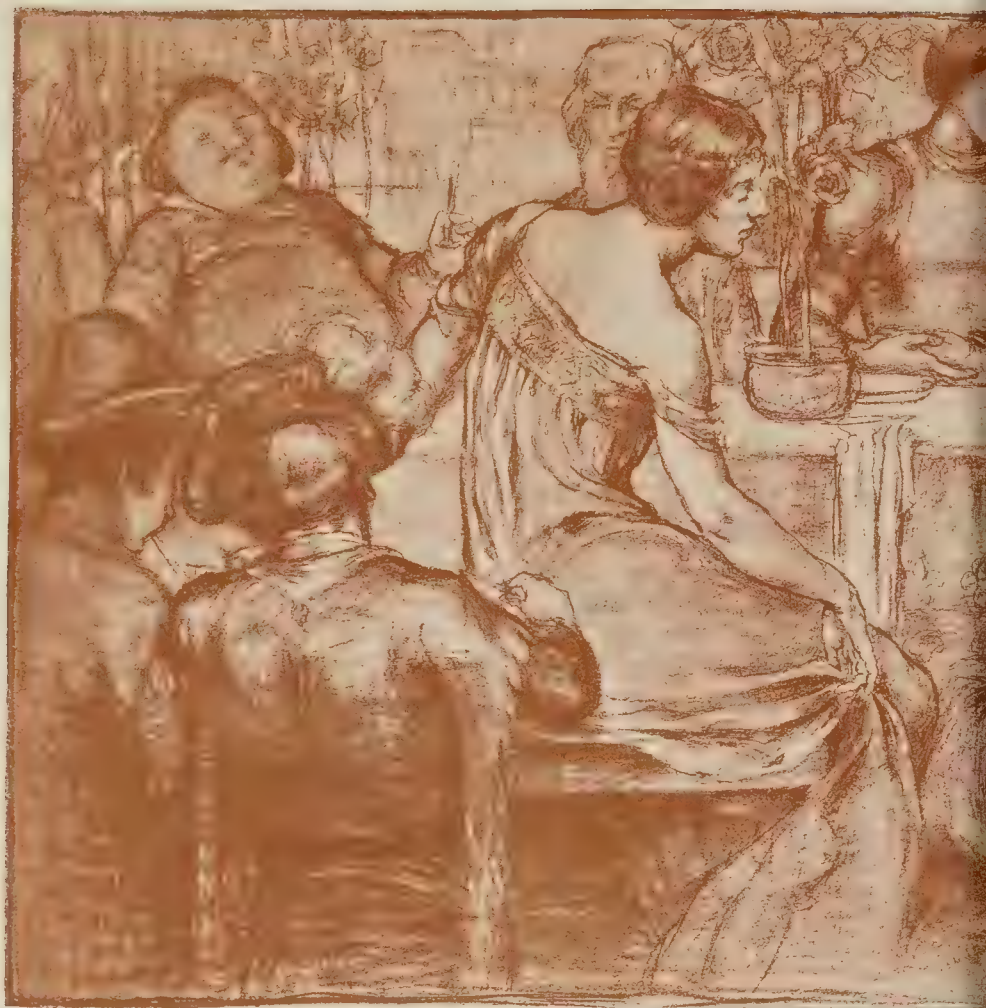


GAR



INK PHOTO OF MAULE & CO. P. 4 & 5 EAST HARDING STREET, KETTER LAKE, E.





PAINTED PANEL FOR DIN

Silver Medal, National Competition 1900

1, 1902.



INK PHOTO SPRAGUE & CO. 4 & 5 EAST WARD NC STREET FETTER LAKE E C

—13 MISS ANNE McLEISH

ulting stone, and the floors both upstairs and downstairs are of concrete, with flooring boards nailed over them.

Messrs. Cornish & Gaymer, of North Walm, are the builders; Messrs. Tucker & Untley, of London, the quantity surveyors.

PAINTED PANEL FOR A DINING-ROOM.

This panel is one of three designs illustrating "The Blind Beggar's Daughter" (Percy Reliques"). Its position in the room will be over the mantel, and the other two panels will be placed on the wall on each side of the chimney breast.

The painting is by Miss Annie M. McLeish, of the Mount-street School of Art, Liverpool, and gained for its author a silver medal in the national competition of this year.

ARCHITECTURAL SOCIETIES.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.—The opening meeting of the Discussion Section of the Architectural Association is to be held on Wednesday, the 12th inst., when Mr. N. F. Barwell will read paper on "Some Recent Theories concerning Norman and Early Norman Work in England." The following is the syllabus for the forthcoming session, which includes, as will be seen, some excellent subjects for discussion:—November 5, "The Buildings about a Farm," Mr. H. Munro Cautley; November 26, "Decorative Plaster Work," Mr. G. P. Bankart; December 10, "Crosses," Mr. J. S. Blunt; December 17, Architectural Association Camera and Cycling Club joint meeting; January 7, 1903, "Some Points in Ancient Lights Practice," Mr. J. H. Pearson; January 28, "Poor Law Buildings," Mr. T. Norman Dinwiddy; February 11, "Gold and Silver Smiths' Work," Mr. Edward Spencer; February 25, "Valuations," Mr. W. L. Trant Brown; March 11, "Electric Lighting of a Small House" (author to be announced); April 1, "Some Unorthodox Views about Building," Mr. A. M. Watson; April 29, "A Tour in Gloucestershire," Mr. Henry Cotman.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—At a meeting held at the Royal United Service Institution on Monday evening, October 6, Mr. Percy Griffith, President, in the chair, a paper was read on "The Hennebique System of Ferro-Concrete Construction," by Mr. Augustus de Rohan Galbraith. The author commenced by observing that ferro-concrete construction appeared not to be very widely known in the profession. He then sketched the early history of the system, pointing out that the first authenticated adoption of the principle was by Napoleon, in the erection of fortifications near Strasburg in Alsace-Lorraine towards the close of the eighteenth century, and in which works hoop iron bonding in concrete was employed. He then referred to the various systems of ferro-concrete construction, stating that the originator of the principle was M. Joseph Monier, a Frenchman, and that it was first applied to the manufacture of slabs and pipes in ferro-cement. He then described the ferro-concrete system invented by M. Hennebique, a French engineer, which system has been widely introduced in practice in France, including the construction of a bridge of three arches at Châtelleraut, 26 ft. 3 in. wide, and having a centre span of 172 ft. and two side spans of 135 ft. each. This system is also being adopted in this country in various engineering works—notably in connexion with the Old Quay widening and new dock works of the London and South-Western Railway Co. at Southampton. The Hennebique principle consists in embedding in concrete straight and cranked iron or steel tension bars and stirrups, to take the shearing stresses, together with distance pieces, the system being applicable to and employed in, entire buildings from foundation to roof inclusive. The piles used at Southampton are built up in vertical moulds, in which are placed long steel rods, which give the required strength. These are laced together with wire stirrups, and Portland cement concrete of the best quality is filled into the moulds and rammed round the steel. After a month the pile is taken out of its mould and driven in position, much in the same way as timber piles are. The ram is exceptionally

heavy, generally 30 cwt. The head of the pile is protected from injury by covering it with a helmet, or iron case, filled with sawdust; a timber dolly is always used. The author then pointed out the care required in the selection and preparation of the materials, explaining that the usual proportions of the concrete were 5 to 1, and giving the preference of Siemens-Martin steel to Bessemer steel owing to the purer and more uniformly good quality of the former. He then dealt with the application of the system in general construction, giving the results of some tests of Hennebique beams with and without stirrups, which proved the superior strength of the former. He then stated that the results of experiments by Professors Baushinger and Ritter showed that the adherence of iron to concrete was about 570 lbs. per square inch. The coefficient of expansion and contraction of steel and concrete was found by M. Durand Claye to be identical up to the fifth decimal, giving the breaking strain of concrete as between 3,000 and 4,000 lbs. per square inch. The advantages of the system as regards fire resistance were then illustrated by the light of some severe fire tests carried out at Ghent, together with the results of a fire which occurred at a spinning-mill at St. Etienne, Belgium, which proved that ferro-concrete structures were perfectly fireproof. The author then gave the following examples of the cost of the Hennebique system as carried out in different structures. The Châtelleraut Bridge, 181 ft. long, per lineal foot; a grain warehouse at Plymouth, 44d. per cube foot of space; a flour-mill at Swansea, 44d. per cube foot; grain silos at Swansea, 64d. per cube foot; and some coal hoppers at Portsmouth, 74d. per cube foot. In conclusion, the author referred to the development of the ferro-concrete system on the Continent, owing to which the French Government recently created a special department at the Ministry of Public Works to take into consideration all matters relating to that principle of construction. He observed that, although the system had not hitherto made very great headway in England, its advantages were becoming recognised and its adoption was increasing.

SANITARY INSPECTORS' ASSOCIATION: ANNUAL MEETING.

THE annual meeting of the Sanitary Inspectors' Association was held at the Holborn Restaurant on Saturday last. Mr. W. W. Wilkinson, the Chairman of the Executive Council, presided.

The report of the Council, presented by the Chairman, recorded that the progress of the past year had been without a parallel in the history of the Association. The session practically concluded in August with the annual provincial conference held at Middlesbrough—a conference which proved to be the most successful of a long series. The recent progress of the Association had been much helped through the prestige of their President, Sir J. Crichton Browne. Through the President, the offer of a gold medal and 50l. had been made by the Chadwick Trust to be awarded to the member of the Association whose report to his authorities this year is considered most satisfactory and worthy. The accession of the Belfast branch of the Association had greatly strengthened them, and they had in addition received an accession of ninety-three other members to their ranks.

On the motion of the Chairman, seconded by Mr. Alexander, the report was adopted. Mr. I. Young (Battersea) was elected Chairman of the Council, in succession to Mr. Wilkinson. The following were chosen as the new Council:—Messrs. Wilkinson, Alexander, Grigg, West, MacMahon, Strutt, Anderson, Bottomley, Lee, Brooks, Humphrey, Jacklin, Errington, Hudson, Snedley, Kemp, Skinner, Johnson, Paterson, and Terry.

The Treasurer's statement showed that 24,118.10d. had been carried to the capital account, in which, he added, over 3,000l. already stood.

The new Chairman, in returning thanks for his unopposed election, said he realised that he had been elected to the highest honour the Association could confer. His interest was their interest; therefore he asked for their support during the year.

Votes of thanks were then accorded to the retiring Chairman and to the Carpenters' Company, whose hall had been so generously placed at the disposal of the Association.

Before the meeting separated the Chairman announced that the Council had that day considered a matter of serious importance to sanitary inspectors. In a recent prosecution at the Southwark Police-court against the Metropolitan Dwellings Company in respect to defective drains, Dr. Wynter Blyth, in giving as his opinion that it was unreasonable to expect an old drain to stand the water test, stated that he was Chairman of the Council of the Sanitary Institute. In other words, the doctor laid it down that a drain which did not stand the water test might be regarded as a fit and proper sanitary arrangement to remain in a dwelling-house. This statement, from one holding such a prominent position, had so much weight with the magistrate that he dismissed the case. The Council had passed a resolution strongly protesting against this statement, and urging the Sanitary Institute to dissociate itself from any implied concurrence with this statement.

A member called attention to the fact that one of the Vestries of London some time since passed a resolution protesting against a medical officer from one district giving evidence against the officers in another.

The Chairman said it would be useless to make representations against medical officers giving evidence against sanitary officers. That was not what they complained of. Quite 95 per cent. of the members had been crucified by the Sanitary Institute as competent to discharge their duties. They believed in the principles they had been taught, and they found by experience that what they did was right and proper.

The action of the Council was approved.

METROPOLITAN ASYLUMS BOARD.

THE usual meeting of this Board was held on Saturday at the offices of the Board, Thames Embankment. Mr. Hensley presided.

On the recommendation of the Works Committee the tender of Mr. J. B. Potter, of Sutton, in 11,099l. was accepted for the erection of a laundry at the Banstead-road school, in accordance with the plans and specifications of Messrs. Newman & Newman. The other tenderers were:—S. Page, Croydon, 11,100l.; R. L. Tonge, Watford, 11,157l.; W. Smith & Sons, Croydon, 11,538l.; Goddard & Sons, Farnham, 11,744l.; Cropley Bros., Epsom, 11,829l.; T. Cole, Islington, 11,388l.; J. Horrocks, Croydon, 11,876l.; Gardner & Hazell, Canonbury, 11,916l.; William Reason, Rosebery-avenue, 11,945l.; Potter Bros., Horsham, 12,131l.; J. R. Bex, South Croydon, 12,222l.

The same Committee reported that for new entrance gates, weighbridge, foundation, and road paving at the North-Eastern Hospital there were five tenders. That of Messrs. Gardner & Hazell, of Canonbury-road, N., in 198l. was accepted. The other tenderers were: A. T. Catley, Lloyd-square, W.C., 210l.; Geo. Bell, Tottenham, N., 220l.; M. Webb, Stoke Newington, N., 231l. 2s. 6d.; F. Jones, Edmonton, 267l.

The Works Committee also presented a long Report on isolation accommodation at Tooting Bec Asylum. In July the Board decided to make application to the Local Government Board for their sanction to the omission of the proposed isolation accommodation in connexion with the receiving home for children at this asylum, and to the substitution thereof of an isolation block in a separate group of buildings, and directed that the plans of this separate isolation block should be transmitted to the Local Government Board for their formal sanction under seal. A letter, dated September 16, having been received in reply from the Local Government Board returning these plans, and stating that they are unable to assent to an isolation block to serve both for the adult asylum and for the receiving home, with a view to expediting matters the Committee had instructed the quantity surveyors to proceed at once with the taking out of the necessary quantities for the receiving home and stable buildings, retaining the isolation accommodation in connexion with the home.

The action of the Committee was approved. The Ambulance Committee reported that they had had before them a copy of a memorandum by the Surveyor to the Board, stating that his revised estimate of the cost (based on the bill of quantities) of the building portion of the proposed sanitary annexes to patients' blocks at Leavesden Asylum was 2,677l. In addition to this sum there was an amount of 700l., estimated by the Engineer to the Board, for the engineering portion of the work, which raised the total estimated cost to 3,377l. The cost of the work in connexion with these annexes was estimated by the Surveyor in October, 1900, at 1,429l., and expenditure of this sum was sanctioned by the Local Government Board. Since then, however, expenditure of a further sum of 520l. for glazed brickwork has been

sanctioned, so that the total amount already sanctioned is 1,949l.; but the latest estimate of cost, including the engineering portion, exceeds this amount by 1,428l. The Committee had been in communication with the Surveyor as to the reason for this considerable increase in the estimated cost, and he stated, *inter alia*, (1) that the proposed drainage arrangements had had to be entirely revised owing to the discovery (made in the course of the progress of the general drainage alterations) that the then existing plan of the asylum drainage was inaccurate, which had entailed the provision of new drains and manholes; and (2) that there had been a considerable rise in the prices of labour and materials at Levensden since the first estimates were prepared.

In the opinion of the Committee there could be no doubt that the approximate cost of the work was under-estimated in the first instance, but it should be borne in mind that this estimate was based on sketch plans only. They recommended that the Local Government Board be asked to assent to an additional expenditure of 1,428l. in connexion with the works, and this was agreed to.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Fulham.—Buildings on the site of Nos. 18 to 23 (inclusive), Edith-villas, Fulham (Mr. W. Cave for General James Gunter).—Consent.

Clapham.—One-story shops on part of the forecourts of Nos. 55 to 60 (odd numbers only) inclusive, Northcote-road, Battersea (Mr. A. Boon for the executors of the late J. Boon).—Consent.

Lewisham.—Seventeen two-story dwelling-houses with bay windows on the west side of Brockley Rise, northward of Honor Oak Park (Mr. A. H. Kersey for Mr. R. Kersey).—Consent.

Paddington, South.—An iron and glass shelter in front of the entrance-porch of No. 2 Craven Hill, Paddington (Mr. M. E. Collins).—Consent.

Paddington, South.—Retention of additions at the side of No. 2, Craven Hill, Paddington, abutting upon Devonshire-terrace (Messrs. Wuld & Collins for Mr. M. E. Collins).—Consent.

Strand.—Retention of an iron and glass shelter at the entrances to Nos. 37 and 38, Tavistock-row, St. James's (Messrs. H. Poole & Co.).—Consent.

Chelsea.—A projecting wooden hood over the entrance to a house on the east side of D'Oyley-street, Chelsea, opposite Wilbraham-place (Messrs. Boardier, Burmester, & Galsworthy for Mrs. Gordon's trustees).—Consent.

Greenwich.—Brick and wood porches to two semi-detached houses in course of erection on the north side of Shooter's Hill road, Blackheath (Mr. D. Wilson).—Consent.

Hampstead.—Projecting bay-windows to Nos. 23, 24, 25, and 26, Lyndhurst-road, Hampstead (Mr. W. A. Barr for Mr. J. T. Penny).—Consent.

Holborn.—A projecting doorway with window over to No. 44, Bedford-row, Holborn (Mr. P. Hoffman for Mr. F. Britton).—Consent.

St. George, Hanover-square.—An addition in front of No. 9, Grafton-street, Piccadilly (Mr. W. A. Large for Messrs. Matkin & Lawson).—Consent.

Brixton.—Buildings on the north side of Acre-lane, Brixton, at the corner of Brixton-road (Mr. Payne Wyatt and Mr. C. W. Stephens for Mr. J. E. L. Clark and Messrs. Isaac Walton & Co.).—Consent.

Hampstead.—Buildings with one story shops in front, and a porch, with bay windows over, at the bank, on the south-west side of Finchley-road, Hampstead, northward of West End-lane (Messrs. Boehmer & Gibbs for Mrs. E. J. Cave).—Consent.

Marylebone, West.—The retention of a lantern light erected on the roof of the scullery in the area on the north side of No. 12, Montague-street, St. Marylebone, abutting upon Upper George-street (Messrs. Hudson & Hunt for Messrs. W. Phillips & Son).—Refused.

Greenwich.—The retention of a wood and glass conservatory at the rear of Siebert House, Glenelg-road, Greenwich, abutting upon Westcombe-hill (Mr. E. Mills).—Refused.

Lewisham.—The retention of a wooden porch to the entrance doorway of a house on the south side of Canonbie-road, Honor Oak Park (Messrs. Bowie & Barrett for H. Grief).—Refused.

Strand.—An iron and glass shelter at the entrance to the grill room at the Grand Hotel, Charing Cross, to overhang the footway in the Strand (Mr. W. Woodward for the Gordon Hotels, Ltd.).—Refused.

City.—Balconies at the second, third, and fourth-floor levels of proposed premises for the Clerical, Medical, and General Life Assurance Society, No. 1, King William-street, City, to overhang the public way of King William-street and St. Swithin's-lane (Messrs. Dunn & Watson).—Refused.

Clapham.—Four houses on the south side of Deauville-road, Clapham, at the corner of Roden-

hurst-road (Mr. H. Bignold for Mr. Billham).—Refused.

Hammersmith.—A one-story shop on part of the forecourt of No. 10, Shepherd's Bush Green, Hammersmith (Mr. E. H. Dance for Mr. J. T. Penny).—Refused.

Hampstead.—An iron and glass projecting porch and covered way in front of No. 93, Canfield-gardens, Hampstead (Mr. J. D. Scott for Mr. A. J. Benjamin).—Refused.

Lewisham.—A one-story office building on the west side of Burnt Ash Hill, Lee, southward of the South-Eastern railway-bridge (Messrs. Knott & Davies).—Refused.

Lewisham.—A bank building on the south side of London-road, Forest Hill, at the corner of Dartmouth-road (Messrs. Tolley & Son for the London and South-Western Bank, Ltd.).—Refused.

Marylebone, East.—Projecting porches and balconies to blocks A and B, Clarence Gate-mansions, Clentworth-street, St. Marylebone (Messrs. Hudson & Hunt for the Clarence Gate Mansions Company).—Refused.

St. George, Hanover-square.—An iron and glass hood over the entrance doorway of No. 315, Vauxhall Bridge-road, Westminster (Mr. J. Ems for Mrs. Langel).—Refused.

Width of Way.

Camden, North.—Retention of a forecourt boundary in front of two houses on the north-west side of Nottley-street, Camberwell, at less than the prescribed distance from the centre of the roadway of that street (Mr. H. L. Upham, for Mr. J. Moore).—Consent.

Greenwich.—That the application of Mr. J. W. Ramsay for an extension of the periods within which the erection of a one-story office building at the Thames Engineering Works, Greenwich, with the external walls of such building at less than the prescribed distance of the centre of the roadway of John Penn-street was required to be commenced, be granted.—Agreed.

City.—Warehouses on a site on the east side of Moor-lane, City, between Tenter-street and New Union-street (Mr. A. Graham for Mr. S. Margelson).—Consent.

Marylebone, West.—That the application of Mr. F. W. Hunt for an extension of the period within which the erection of buildings on the south side of Samford-street, St. Marylebone, with the forecourt boundary at less than the prescribed distance from the centre of the roadway of the street was required to be completed, be granted.—Agreed.

Hammersmith.—The retention of a boundary-fence on the north side of a footway leading from Bridge-avenue to Mall-road, Hammersmith, at less than the prescribed distance from the centre of the roadway of such street (Messrs. Flew & Co.).—Consent.

Wandsworth.—Re-erection of the Forester branch-house, on the north side of Allitribing-lane, Wandsworth, with the external walls of the new building at less than the prescribed distance from the centre of the roadway of Vermont-street (Messrs. N. Parr & A. E. Kates for the Royal Brewery Co.).—Consent.

St. Pancras, East.—A two-story workshop at the rear of No. 28, Camden-road, St. Pancras, with the external walls of such workshop at less than the prescribed distance from the centre of the roadway of Camden-mews (Messrs. J. & H. Bangs).—Refused.

Width of Way and Lines of Frontage.

Paddington, South.—An addition to a projecting porch at No. 54, Cambridge-terrace, Paddington, with the external walls at less than the prescribed distance of the centre of the roadway of Cambridge-place (Mr. J. R. McIntosh for Mr. R. F. Reynard).—Consent.

Marylebone, West.—A one-story addition and four stone steps adjoining in front of the stables and coachhouse, No. 24, Gloucester-mews, West Marylebone (Messrs. W. H. Romaine-Walker & Besant for Mr. D. H. Leverson).—Consent.

Battersea.—A baker's oven building at the rear of No. 122, Bridge-road, West Battersea, with the external walls at less than the prescribed distance from the centre of the roadway of Althorpe-grove (Mr. R. D. Hanson for Mr. J. C. Pocock).—Consent.

Chelsea.—An addition at the rear of No. 4, Chelsea Embankment (Mr. H. T. A. Chidgey for Major W. Evans Gordon, M.P.).—Consent.

Dulwich.—A mission church with projecting buttresses on the east side of Waghorn-street and north side of Nutbrook-street (Mr. J. W. Horsfield for the Trustees of St. John's Mission Church).—Consent.

Marylebone, West.—An addition at the rear of No. 61, Montagu-square, St. Marylebone, with the external walls at less than the prescribed distance from the centre of the roadway of Althorpe-mews West (Messrs. Hudson & Hunt for Messrs. W. Phillips & Sons).—Consent.

City.—An open iron and concrete gangway across Water-street, City, to connect warehouses on the east and west sides of that street (Messrs. Cheston & Perkin for Messrs. Spicer Brothers, Ltd.).—Consent.

Lewisham.—No order with respect to the application made by Mr. J. W. Webb for consent to the

erection of a house to be approached by a proposed footway out of Ravensbourne-road, Catford. —Agreed.

Brixton.—An additional story on the one-story shops at Nos. 300 and 302, Brixton-road, Brixton, with the external wall of such addition at less than the prescribed distance from the centre of the roadway of Thornton-street (Mr. H. Bignold for Messrs. Dagharty).—Refused.

Greenwich.—A one-story shop on part of the forecourt of No. 3, Earlswood-street, Greenwich (Mr. W. Bailey).—Refused.

Clapham.—One-story shops on the forecourts of Nos. 103, 105, Wirtemberg-street, Clapham (Mr. H. Hillier for The Auxiliary Stores, Ltd.).—Refused.

Space at Rear.

Lewisham.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of houses with shops on the site of Nos. 217-223, Lewisham High-road, with an irregular open space at the rear (Mr. F. Wheeler for Mr. R. W. Essex).—Consent.

Holborn.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of a block of chambers on a site on the west side of Herbrand-street, Holborn, at the corner of Bernard-street, with an irregular open space at the rear (Mr. G. D. Martin).—Refused.

Strand.—Deviations from the plans certified by the District Surveyor, under Section 43 of the Act, so far as relates to the proposed erection of a building on the site of Nos. 1, 3, and 5, Ryder-street, St. James's (Mr. W. Woodward for Mr. C. Guffanti).—Consent.

Formation of Streets, &c.

St. George-in-the-East.—A modification of a scheme for the erection of twenty houses in Samuel-street, James-street, Langdale-street, and William-street, St. George-in-the-East, and the widening of those streets so far as relates to an increase in the widths of Samuel-street, James-street, and Langdale-street (Mr. H. H. Collins for Messrs. N. & R. Davis).—Consent.

Poplar.—That an order be issued to Mr. H. Hooper sanctioning the formation or laying out of a new street for carriage traffic to lead from East-ferry-road to Chapel House-street, Poplar (Lady Margaret Charteris).—Consent.

Brixton.—That an order be issued to Mr. W. Hunt sanctioning the formation or laying out of a new street for carriage traffic to lead from Landor-road to Hemberton-road, Stockwell, and in connexion therewith the widening of a portion of Landor-road (for Mr. W. P. Goosey).—Consent.

Woolwich.—That an order be issued to Mr. T. J. Young sanctioning the formation or laying out of a new street for carriage traffic, to lead from Abbey-grove to Abbey Wood-road, Plumstead (for Messrs. J. & C. E. Pearson).—Consent.

Poplar.—That an order be issued to Mr. H. Hooper, refusing to sanction the formation or laying out of new streets for carriage traffic out of East-ferry-road and Subondale-street, Millwall (for Lady Margaret Charteris).—Refused.

Poplar.—That an order be issued to Mr. F. E. Duckham, refusing to sanction the formation or laying out of a street for carriage traffic out of Judkins-street, East Ferry-road, Millwall (for the Millwall Dock Co.).—Refused.

Buildings for the Supply of Electricity.

Poplar.—A building for the supply of electricity at the Island Baths, Glengall-road, Poplar, and the construction of a temporary iron enclosure at the western end of such building (Mr. H. Heckford for the Metropolitan Borough Council of Poplar).—Consent.

* * * The recommendations marked † are contrary to the views of the Local Authorities.

Correspondence.

CHARING CROSS, EUSTON, AND HAMPSTEAD RAILWAY BILL.

SIR,—Will you allow us to call the attention of your readers to the fact that this Bill, which asks for powers to tunnel under the centre of Hampstead Heath, is now awaiting its third reading in the House of Commons.

We consider that the construction of a railway under the Heath will create a very bad precedent, and we fear that, notwithstanding any protective clauses that might be inserted in the Bill, the picturesqueness of the Heath will be seriously injured before many years have passed.

We call on every one of your readers who loves the Heath, to write to their Member of Parliament NOW, asking him not to agree to the route under Hampstead Heath, which route is, to put it at the lowest, absolutely unnecessary.

If the present opportunity is taken, the safety

by dissolving tin in twice its weight of copper, and this hard metal is subsequently added to the required proportion of molten copper.

In the case of phosphor-bronze, the bronze is made by adding either phosphor-tin or phosphor-copper to the molten alloy of copper and tin. Phosphor-tin contains about 11 per cent. of phosphorus, and is made by pouring molten tin upon phosphorus. Phosphor-copper is made in a similar manner.

Properties of Lead.—Lead exhibits a bright metallic lustre when freshly cut, but rapidly tarnishes when exposed to the atmosphere. A thin film of lead carbonate is formed on the exposed metal, but the film protects the lead from further attack, and the metal does not corrode to any considerable extent under normal conditions. Lead is soluble in nitric acid, but almost insoluble in dilute sulphuric or hydrochloric acid. It is sufficiently soluble in pure water or in rain water to cause such water when collected in lead tanks or conducted through lead pipes to cause lead poisoning in persons drinking the water. Most river waters do not dissolve lead because they contain an appreciable quantity of carbonate and sulphate of lime in solution, and may, therefore, safely be conducted through lead pipes. Lead has a low tensile strength, but is very malleable. Its specific gravity is 11.4, and its melting point 327 deg. C. At high temperatures it is to a certain extent volatile. Lead is not a good conductor of heat or electricity.

Sources of Lead.—Lead is chiefly obtained from the sulphide (PbS) known as *galena*. This ore is found in Derbyshire, Cumberland, and other places in Great Britain, and is also abundant in Spain, Germany, and the United States. In smaller quantities lead is found in the form of sulphate, carbonate, and phosphate of lead. Galena always contains a certain quantity of silver.

Smelting Lead Ores.—The galena is first roasted in contact with air in a reverberatory furnace to convert it into a mixture of sulphate and oxide of lead. The temperature is then raised until the mixture melts and the two compounds react upon one another, causing the sulphur to be evolved as gaseous sulphur dioxide, while the lead, together with the silver present in the ore, is obtained in the metallic state. Any part of the ore which has escaped reduction by this treatment is mixed with lime and again roasted and melted, and a further quantity of metallic lead is thereby obtained.

Another process for obtaining lead from galena consists in melting the ore with iron oxide or scrap iron. The iron combines with the sulphur in the galena to form iron sulphide, and the lead is left in a metallic condition.

Removing Silver from Lead.—The silver present in the galena is also reduced to the metallic condition, and forms an alloy with the lead. Until comparatively recent years the silver, which is very variable in quantity, remained in the lead, and often hardened it to a very appreciable extent. The quantity of silver in 1 ton of the lead may not be as much as 1 oz., or it may exceed 1 cwt. The silver is now usually extracted by the Parkes or zinc process, in which the lead is remelted, heated above the melting point of zinc, and then treated with about 5 per cent. of zinc. Zinc will alloy with silver, but not with lead. When the zinc is stirred into the molten lead it alloys with the silver, and, when the molten metal is allowed to cool, the zinc carrying nearly the whole of the silver with it floats to the surface and solidifies on top of the lead. The zinc is then removed and distilled in a retort. The zinc distils over and is condensed, while the silver, contaminated with a little lead, remains in the retort. The small quantity of lead is removed from the silver by remelting the impure silver on a bone-ash cupel and exposing it to a current of air. The lead oxidises to litharge, and the silver remains as an almost pure metal.

The Pattinson process for desilvering lead depends upon the fact that lead containing silver remains fluid at a lower temperature than pure lead, although the melting point of silver is much higher than that of lead. The argentiferous lead is melted and then allowed to slowly cool. The purest lead solidifies first, and is fished out by means of a perforated ladle. The portion which solidifies last is richest in silver. By repeatedly remelting the metal, and separating the portions of different melting points, the quantity of silver in the greater portion of the lead may be reduced to about 1/2 oz. per ton, while the silver in the

smaller and richer portion may be recovered by cupellation.

Refining the Lead.—After desilvering, the lead contains small quantities of antimony, copper, zinc, and other metals which tend to harden it. These impurities are removed as completely as possible by keeping the lead in a molten condition, and exposed to the air for several hours, the metal being stirred from time to time. The impurities are oxidised, and, together with a portion of the lead which is also oxidised, form a scum on the surface of the molten metal. The scum is removed at intervals, and the molten lead is left in a comparatively fine and soft condition.

Impurities in Lead.—Commercial lead is usually a fairly pure metal, but contains traces of silver, zinc, iron, and other metals. Zinc is especially objectionable in lead to be used for sulphuric acid chambers, and lead desilverised by the Pattinson process is therefore preferred for this purpose to that purified by the zinc process. The following analyses of a sample of commercial lead before and after refining have been published by Mr. H. J. Phillips:

	Unrefined Lead.	Refined Lead.
Lead	98.550	99.955
Antimony ...	1.102	.006
Copper .....	.175	.025
Iron .....	.102	.004
Silver .....	.022	.001
	99.951	99.991

Alloys of Lead and Tin.—Pewter is an alloy of 20 per cent. of lead with 80 per cent. of tin, and soft solders usually contain only lead and tin.

White metal is a name applied to several different soft, fusible, silver-white alloys. These metals are chiefly used for the bearings of machines. The metal wears smooth, does not become heated, and offers little resistance to the shaft which rotates upon it. It is sometimes termed anti-friction metal. **Babbitt's metal** is a name applied by some makers to an alloy of copper and tin, while others apply it to an alloy of tin, copper, lead, and antimony. The composition may be tin 93 per cent., and copper 4 per cent.; or tin 81 per cent., copper 4 per cent., antimony 7 per cent., and lead 8 per cent.; or tin 62 per cent., lead 26 per cent., antimony 10.5 per cent., and copper 1.5 per cent.; or any other suitable alloy which the manufacturer chooses to describe as Babbitt's metal.

Magnolia Metal is another anti-friction metal, and is said to consist mainly of lead and antimony, with traces of other metals. There are a number of other white alloys in the market known by their inventors' names, but they are mostly alloys of tin, antimony, and copper, with the addition, in some cases, of zinc.

The Properties of Aluminium.—Aluminium is a silver-like metal, having the remarkably low specific gravity of 2.6. The weight of a cubic foot of aluminium, compared with the same bulk of other abundant metals, is shown in the following table:—

	Weight per Cubic foot.
Aluminium.....	162 lbs.
Iron (cast).....	450 "
Zinc	450 "
Tin	456 "
Copper	550 "
Lead	710 "

When compared by weight aluminium is the most expensive of the above metals, but when compared by bulk aluminium is cheaper than copper or tin, although it still remains more costly than lead, iron, or zinc. Aluminium is readily dissolved by hydrochloric acid or by caustic soda, but is not appreciably attacked by nitric acid or organic acids such as acetic acid, or by water or moist air.

Aluminium is capable of assuming a polish, but the surface becomes dull on prolonged exposure to the atmosphere. It is not blackened by sulphuretted hydrogen, like silver, nor does it corrode like brass or iron. Aluminium is not the lightest of the metals, for magnesium and a few rare metals have even lower specific gravities.

Manufacture of Aluminium.—Aluminium is obtained from bauxite, an impure mixture of hydrated oxides of aluminium and iron. Extensive deposits of bauxite have been found in Ireland. Oxide of aluminium is extracted from the bauxite and is subjected to electrolysis in a bath of molten cryolite (a double fluoride of aluminium and sodium). As the oxide becomes reduced to metallic aluminium more oxide

passes into the bath, and thus the process of manufacture is carried on continuously.

Antimony is a very brittle metal, having a bluish-white colour. It has a sp. gr. of 6.7; melts at 425 deg. C., and volatilises at a red heat. At ordinary temperatures it is not affected by exposure to the atmosphere. It is attacked by strong acids. Antimony is chiefly used as a hardening agent in alloys. It is a constituent of type metal, Britannia metal, and some forms of pewter.

BOOKS RECEIVED.

THE ACTS RELATING TO THE SUPPLY OF GAS AND WATER. By Joseph Reeson. (Butterworth & Co.)

GENERAL BUILDING NEWS.

CHURCH, PORT SUNLIGHT.—The foundation-stone of the new church at Port Sunlight was laid by Mrs. W. H. Lever on the 30th ult. The edifice, which will be called Christ Church, is being erected upon land donated by The Trustees of the Port Sunlight Estate for the church are Messrs. Wm. and Segar Owen, Warrington, while the construction is being carried out by Messrs. Lever Brothers' building department. We gave an illustration and description of the building in our issue for September 13 last.

RESTORATION OF ST. ANDREW'S PARISH CHURCH, EDINBURGH.—The committee entrusted with the scheme for the restoration of St. Andrew's Parish Church have issued a statement, which recounts the history of the church and embodies the architect's scheme of restoration. It states that the plan proposed by Mr. Macgregor Chalmers is simply a restoration of the medieval plan, so far as possible. The galleries will be removed. The side aisles will be widened to their original height, which has recently been discovered. The pillars and arches will resume their old places and form, and on them the clearstory will be rebuilt. The so-called "Bishop's" or communion aisle will be remodelled and the corresponding one of smaller size built to the north. A new aisle will be built to the east of the Bishop's aisle. The stretch shown in every plan and drawing up to and including that of 1767 will be rebuilt on its former foundations, if they can be found. The tracery of the windows and the mouldings and decorations of the doors will be in keeping with the suggestions given by these old sketches and by contemporary churches. It is probable that there were chapels of smaller size on the west side of the north and south chapels. If the foundations of these structures are preserved, two rooms to be used as a vestry and session-house will be erected in conformity with the original work. A space towards the east end of the central aisle in the church will be reserved for the pulpit. The new altar will be reserved for special seats for local corporations. Room will be provided for organ and choir. The walls will be of stone throughout. The greater part of the seats will be of oak. It has been decided that the funds raised to commemorate the late Dr. A. K. H. Boyd should be devoted to the erection of the pulpit in the restored church. The restored church will accommodate practically as many persons as the present one, allowing the same amount of room to each sinner. The estimate of the probable cost of the whole work, including all fees, is 23,375l.—*Edinburgh Evening Dispatch*.

CHURCH, STEPNEY.—On the 4th inst. the Bishop of Stepney consecrated a new church dedicated to St. Faith, in the East End parish of Stepneys. The new church, which has been built from the plans of Messrs. J. E. K. & J. P. Cutts, of London, is of red brick and Bath stone, and is in the thirteenth century style. The site and the erection of the church and the parochial buildings attached have together cost the sum of 16,000l.

METHODIST CHURCH AND SCHOOLS, WHITBY.—On the 1st inst. the foundation-stones were laid for the Primitive Methodist new church and schools in Church-street, Whitby. The new church will consist of entrance vestibule, two staircases to the gallery, which will seat about 200 persons, the area on the ground floor also seating the same number, making the total accommodation about 400. The church, including the recess for orchestra, will be about 35 ft. long by 24 ft. 6 in. inside. The school-room behind the church will be 51 ft. by 25 ft., and can be divided into one room 25 ft. by 25 ft. with four class-rooms 13 ft. 6 in. square, by folding screens. The builders are Messrs. J. Brim & Sons, Whitby, and the architect, Mr. W. G. Smithson, of Leeds.

CHURCH, TOLLROSE, LANARKSHIRE.—The Victoria U.F. Church, Tollrose, has just been opened. The architect was Mr. J. Bryden, Glasgow.

RESTORATION OF YORK MINSTER.—Next week will mark an interesting change in the restoration of the west front of York Minster, it being anticipated that the last of the stages of massively-built scaffolding which have since 1899 surrounded the north-west tower will by that time have been removed. When this is done the scaffolding will be re-erected round the south-west tower, and probably after that the great central gable of the west front will be restored. The fourth occasional report by the Dean of York on the

restoration of the Minster, just issued, gives some interesting figures as to the work carried out in the north-west tower. There have been carved 618 crockets, 118 birds, 62 grotesques, 61 ovals, 87 gargoyles, and a number of bosses. Up upon 7,000 cubic feet of stone have been used, and the approximate weight of the new masonry will be between 400 and 500 tons. The statement of accounts shows that so far £11,182.1 has been collected towards the restoration fund. A special fund has also been started for the protection and repair of the stained glass in the chapter-house, which, according to the report of Mr. Grylls (London), is in a most deplorable state. The glass is very corroded and crumbling into dust, much of it being as thin as tissue paper and breaking at the slightest touch. All the decorated glass in the Minster is corroded in the same manner. The windows of the Chapter House, however, in the worst condition, but, unless something is done to protect the outside surface from the atmosphere, before very long the nave windows will be in the same condition. The north transept "five sisters" has been protected, but the large sheet of plate glass which looks ugly from the outside. Mr. Grylls is of opinion that the protecting glass might be leaded in square. The cost of putting the Chapter House windows into order will certainly not be less than 500l.—*Newcastle Chronicle*.

TINTERN ABBEY.—The ruins of Tintern Abbey came into possession of the Crown recently on the disposal of the Beaufort Estates in Monmouthshire, and the Department of Public Works and Forests is engaged in works of preservation and restoration. Mr. Waller, of Gloucester, one of the Crown architects, has the supervision of the work, and an endeavour is being made to restore old material to its original position where possible. In connexion with this object extensive excavations have been made, and portions of the ruins which long have remained hidden beneath several feet of soil have been disclosed, notably the lay brothers' quarters and the ancient watercourse made by the builders of the abbey.—*Bristol Times*.

THE HERIOT-WATT COLLEGE EXTENSIONS, EDINBURGH.—Last year the Heriot-Watt Governors, in order to provide for the extension of the College, acquired from Messrs. Raeburn, at a cost of £1,500l., the old brewery buildings and ground lying between the back of the College and Cowgate. Part of the small-houses and other buildings have now been adapted into art and other class rooms at a further cost of 8,000l. from designs by Mr. Anderson, Superintendent of Works. The alterations have been carried out by Mr. Colin Macandrew. The new building is entered from the Heriot-Watt College by a bridge thrown over Scott's Close. On the ground floor is a room, 50 ft. square, giving accommodation for 180 elementary students; adjoining is a lecture-room for eighty students of intermediate subjects; while there is also on this floor a large modelling-room for forty-five students, and a smaller room for casting models is also provided. On the first floor is a room capable of accommodating 150 advanced students of black and white, design, or architecture. A hall with gallery is also on this floor. From it access to the other rooms is obtained, and in it thirty students may be placed. On this floor also is a smaller room for the teaching of perspective, &c. On the second or upper floor is a room for fifty students of drawing from the life, and another for fifty students of the antique. A gallery on this floor may accommodate twenty-five students, and there is also a room capable of containing thirty-five students of painting. There is thus in the building accommodation for 685 students being taught at one time, while if the rooms are utilised at different hours the teaching of 1,500 art students could be undertaken in the building. All the rooms are lined, to nearly the wall head, with plain wood stained an iron green, and the ceilings and any frieze spaces above the lining are painted white. The north gable has been pierced by twelve large windows, and several of the rooms have also a top light. As much of the work will be done at night, an installation of the electric light has been introduced. Each student will have, in the antique and life classrooms, an electric lamp at his or her bench. There is room left still between the College and the Cowgate for any further extension of the College which may be considered necessary. A new boiler-house has also been built at the back, and a tall chimney in connexion with the heating of the whole College.

SANATORIUM, DELAMERE.—The foundation-stones of the new sanatorium at Delamere have just been laid. The hospital occupies a site of seventy acres in Delamere Forest, about three miles distant from Mouldsworth, Delamere, and Frodsham, at an altitude of 450 ft. above the sea level. In addition to this building, which will have a frontage to the S.E. of 310 ft., and provide accommodation for ninety patients and a resident medical officer, a detached "home" for the matron, housekeeper, nurses, and servants, forms part of the scheme. There are separate buildings for the laundry and mortuary. The patients' rooms, all of which will be on the front of the building, vary in size, there being four wards for six beds each, ten for four beds, the remainder being single bedrooms. Sitting-rooms will be provided at each end for the patients of either sex. On the north side of the building on the ground floor, a dining

hall will be provided, as well as a chapel seated for 120 persons. The building materials employed are Ruabon red brick and terracotta, the upper portions of the elevations being finished in "rough cast," and the roofs covered with red tiles. The corridors will have a dado, 4 ft. 9 in. in height, of salt-glazed bricks, the walls above being finished in granite plaster, except where, as in the turrets, kitchen, stores, &c., they are faced throughout, above the dado level, with cream enamelled bricks. The whole of the corridor floors will be of steel and concrete construction, finished in terrazzo. The windows will open down to the floor. The work in connexion with the foundations of both the main building and nurses' home is being done by Messrs. Gerrard & Sons, of Swinton, while the contractors for the superstructure are Messrs. James Hamilton & Son, of Altrincham, Mr. J. Broadbent being the resident clerk of works. The scheme is being carried out in accordance with designs prepared by Mr. W. Cecil Hardisty, architect, of Manchester.

BUILDING IN GLASGOW.—At a recent sitting of Glasgow Dean of Guild Court, Lord Dean of Guild Gourlay said:—"I have to ask you to bear with me this morning while I, very shortly, go back on the work this Court has done during the past year. I think we may claim it to be a record, for, while on two occasions have the number of linings exceeded those granted this year, the value of these has never been surpassed. Three times in thirty years has the total value of the linings been over 2,000,000l. This year they amount to 2,549,698l., or 424,449l. above the highest figure hitherto reached, and that was before the extension of the city in 1875-76, and during the boom in everything which preceded the failure of the City of Glasgow Bank. Of the above linings—660 in number—107 are for dwelling-houses and shops, thirteen for public buildings, ten for churches, halls, and schools, 166 for warehouses, 244 for alterations and additions, and thirty-nine are for new streets of 11,720 yards in all, equal in length to between six and seven miles, the largest extension that has ever taken place in one year. Of the dwelling-houses, 611 are of one apartment, an increase of 234 as compared with last year, chiefly in the Eastern and St. Rollox districts; 2,420 are of two apartments; 1,527 are of three apartments. Of the three-apartment houses, more than one-half of those over the whole city are in the Queen's Park district, chiefly in Langside. This is a significant fact, and shows that with the great facilities given by our railways and electric trams, an increasing number of the well-to-do class are making their abodes in the country and suburbs. 202 are of four apartments, 143 of five, and 356 of six. The single-room houses are 11,424 per cent. of the total apartments lined; two-room, 45.24 per cent.; three-room, 28.54 per cent.; four-room, 5.45 per cent.; five-room, 2.67 per cent.; and six-room, 0.65 per cent. The districts in which the greatest amount of building is going on are Queen's Park, Maryhill, and the Eastern. The linings for houses in the first are 35.09 per cent. of the total; second, 13.38 per cent.; and third, 20.90 per cent. The value of those in Queen's Park is 660,300l.; Maryhill, 302,980l.; Eastern, 225,040l. These three districts represent 1,188,320l. of the total value of houses lined, viz.:—1,438,710l. as compared with 678,571l. in the previous year. The value of the public buildings, churches, &c., passed by the Court this year was 1,090,988l., as compared with 980,726l. in that preceding it. These are represented by—Public buildings, &c., 447,000l.; churches, halls, and schools, 63,000l.; warehouses, stores, and workshops, 349,000l.; alterations and additions, 230,000l. Besides ordinary applications for the erection of buildings, the Court has had during the year to deal with upwards of 100 petitions for the approval of plans of buildings of the warehouse class. Many visitations were made by the Court during the year, many of these being to inspect the site of buildings proposed to be erected in hollow squares. This is a new duty devolving upon the Court under the Building Act of 1900, as is also the consideration and disposal of applications for the erection of hoardings or billposting stations. The Buildings Regulation Act of 1900 may not, as yet, be fully understood in all its clauses, but it has at times appeared to the Court that a little more help might have been given it by builders of great experience, their architects, and their law agents, if, in their plans, even although it involved a small money loss, they had been a little more liberal in the matter of light and air. They would be benefiting in future years the dwellers around hollow squares and well lighted back areas."

CHELTEMHAM TOWN HALL.—When the old Assembly Rooms in the High-street, Cheltenham, were removed to make room for the new bank for Lloyd's, it became necessary to provide a new building in which to hold the balls and other entertainments, which had, up to that time, been given in the Assembly Rooms. The Town Council decided to erect the necessary premises on the vacant land adjoining the Winter Gardens. The main entrance (with carriage porch outside) is on the north-east side of Imperial-square, and leads into the entrance hall. At each end of this entrance hall is an octagonal inner hall, from which access is obtained to the ladies' cloak rooms, &c., on the

south-east side, and to the gentlemen's cloak rooms, &c., on the north-west side; this latter side also contains a large staircase leading to the galleries above. From each of these inner halls a corridor, 12 ft. wide, runs the whole length on either side of the main hall, and these corridors give access at several points to the main hall and to various other rooms which will be used in connexion therewith, thus:—Opening out of the corridor on the south-east side of main hall are the drawing-rooms (57 ft. by 27 ft. and 26 ft. by 16 ft. 6 in.), cardroom (26 ft. by 16 ft. 6 in.), and smoking-room (21 ft. by 16 ft.), and on the north-west side the supper-room (55 ft. 6 in. by 35 ft. 6 in.), refreshment-room with service-room adjoining, and kitchen, &c., beneath. The north-west corridor connects the new town hall with the winter gardens. The main hall, which will be used for balls, concerts, &c., is 112 ft. long, 53 ft. wide, and 43 ft. high, with coved ceiling. Galleries are placed at one end over the entrance hall and along each side over the corridors, and open into the hall by a series of arched openings, these being reached by staircases at the opposite end of the building. At the other end of the main hall is the platform and orchestra with organ-chamber behind same, access to which is obtained by a separate staircase. Large storage accommodation for various purposes is provided under the floor of the main hall. Great care has been bestowed upon the planning of the buildings to make the arrangements as simple and workable as possible, and to provide ample approaches and exits. The structure is already far advanced, part being nearly roofed in. The design of the building was entrusted to Messrs. Waller & Son, architects, of Gloucester, and the estimated outlay is about 35,000l.

CO-OPERATIVE STORES, WOKING.—The Woking, Horsell, and District Co-operative Society, Ltd., have erected premises on a site in Church-street, opposite Percy-street, which has a frontage of 65 ft. and a depth of 130 ft. The architect was Mr. G. Pooley, of Horsell, from whose designs Messrs. H. Ingram & Son, of Woking, have erected the building.

THEATRE, ST. MARTIN'S-LANE, LONDON.—A new theatre is to be erected at the corner of St. Martin's-lane, Charing Cross. The name of the theatre is to be the Colisseum. Mr. Frank Matcham will be the architect.

SANATORIUM, BAGULEY, CHESHIRE.—The hospital for the treatment of infectious diseases built for the Withington Urban District Council has been erected at Baguley. The site of the hospital and the surrounding grounds are about twelve acres in extent and some 155 ft. above the sea level. Inside the main entrance is a porter's lodge, with a covered verandah for shelter. Opposite to the lodge is the discharge ward. Besides dressing and bath-rooms, a waiting-room has been built for friends of patients. The administration block or home contains the resident doctor's, matron's, and nurses' quarters and the committee-room. The building is in the form of three arms of a Greek cross. There are rooms for twenty-five nurses, a sickroom, and cubicles for five maidservants. Recreation, dining, and writing rooms have been provided. There is a bicycle storehouse in the basement of this block, and on the first floor level a balcony. Immediately behind this block, and connected with it by a glass covered roof, is the kitchen and stores block. In this part of the building rooms have been provided for the servants. The accommodation in this and in the administration block is considerably in excess of what is now actually required. The main hospital road runs approximately east and west, and along this road stand the pavilions. There are two pavilions for scarlet fever, containing fifty beds; one pavilion for diphtheria, with sixteen beds; one pavilion for enteric fever, with twenty beds; and one isolation block containing eight beds, making a total altogether of 100 beds. The scarlet-fever pavilions are at the westerly end of the site. They are two in number and two stories high; they are entered from the end, and each floor contains one ward for twelve beds, one double-bedded ward, with offices. The enteric and diphtheria pavilions face each other, the entrances are centrally placed, with wards for male and female patients on either side of the entrance hall. The isolation wards are at some little distance from the others, and consist of two two-bedded and four four-bedded wards and three separate kitchens. The floors of all the wards are of terrazzo. The walls are finished in parian cement and varnished, and the woodwork is enamelled ivory white. Heating and ventilation are obtained by ventilating hot-water radiators and ventilating stoves. All the angles in the walls and at the ceilings and floors are rounded off. The mortuary is at the westerly end of the hospital road, and there is a laundry block with a laundry, besides an electricity-generating station. Red Ruabon bricks have been used for all external walls, and terra-cotta instead of stone. The lighting throughout will be by electricity, and all the blocks are in telephonic communication with each other. The roofs are covered with green slates, with the exception of the lodge and discharge ward, near to the main entrance, where brindled tiles are used. Extensive asphalted airing grounds have been laid out near the wards for the patients, and there are tennis and croquet lawns for the officers. The water-supply is obtained from the mains of the

North Cheshire Water Company, and, as there are no public sewers, it has been necessary to treat the sewage by the septic tank process on land adjoining the site. The architect is Mr. J. B. Broadbent, of Manchester.

LIBRARY, GOVAN.—The Elder Library is now being erected at Govan. The buildings are to be in Classic in style, and will comprise library, reading-rooms. The estimated cost of erection was about 8,000l. Mr. John Burnet, A.R.S.A., is the architect.

SUNDAY SCHOOLS, WALTHAMSTOW.—New Sunday schools at Walthamstow were opened on Saturday last for the trustees of the United Methodist Free Church. The total cost, apart from the land, is about 3,500l. The whole conception has been planned and designed with two main objects: One to provide ample and suitable accommodation for dealing with 800 scholars in classes, and the other to provide an assembly-hall capable of accommodating a similar number. But this is not the limit provided for. There is also an infant class-room capable of seating 180, and a young women's classroom for another 100. Three separate assembly meetings can be going on in these buildings at one time, and practically 1,100 children can be accommodated. The cost (exclusive of land) works out at 3l. 3s. per head in assembly, and 4l. 7s. 6d. per head in classes. The figures include the amounts expended on caretaker's apartments with six rooms, a school kitchen, superintendent's and secretary's rooms, heating chamber, and the usual offices. The assembly-hall is adapted for public meeting purposes. The hall is lofty, well lighted, heated, and ventilated. The centre is in the form of a square, with recesses on the ground floor on three sides suitable for classroom purposes, and on the remaining side for platform purposes. On the first floor a gallery has been formed round three sides, and from off this further classroom accommodation has been provided. The width of the hall is 53 ft. and the depth 57 ft., and the height from floor to ceiling 32 ft. The gallery is separately approached by two fireproof staircases with easy-going treads. The roofing is open timbered, and carried partly on columns, which also support the gallery. The internal walling is faced with brickwork and tinted with a buff-coloured distemper. The ceilings have been plastered. A pine dado has been formed round the whole of the internal walling. The platform, over which is constructed a large semi-arch, contains a special arrangement for doubling its size, to be used for orchestral and other purposes. Incandescent gas-lighting has been adopted. The contractors for the whole of the work were Messrs. Sands, Palmer, & Co., of Walthamstow. Mr. Purley has acted as their representative. The heating arrangements were executed by Mr. E. R. Longdon, of Rosebery-avenue, E.C.; the fireproof staircases by Messrs. Macleod & Co.; and the gas-fittings by Mr. Richardson, of Walthamstow. Mr. J. Williams Dunford, of Queen Victoria-street, E.C., is the architect.

TEMPORARY NEWGATE CELLS.—Between the demolition of the existing Newgate and the erection of the new building it is necessary to provide a series of temporary prison cells, the construction of which has been put in the hands of the Fireproof Partition Syndicate. The cells are being made with dovetailed corrugated steel sheeting, fixed to uprights, and covered with cement and plastered.

EXTENSION OF FAISLEY REFORMATORY.—The new wing which has been added to the reformatory has almost doubled the size of the institution. It consists of a two-story building, built of brick and rough cast on the outside face, with stone dressings. On the ground floor there is a hall, 60 ft. by 32 ft., which can be used as a gymnasium or muster-hall, as well as for entertainments. The hall is also connected with the boys' playgrounds and the old existing premises and the reading-room. A staircase leads from the ground floor to the upper floor, which comprises an additional dormitory and two new schoolrooms, divided by a sliding partition. In addition to this extension, various important improvements have also been carried out on the old premises. The back buildings of the old block have been remodelled, making a new and extended dining-hall, and converting the former schoolroom into an observation dormitory for the better classification of the boys. The extension and improvements have been carried out from plans prepared by Mr. B. A. Hamilton, architect, Paisley.

SAILORS' REST, CARDIFF.—There has just been opened in Bute-road, Cardiff, the John Gory Sailors' and Soldiers' Rest. The building is in the Renaissance style, and is constructed of Bath stone. From a vestibule, swing doors give access to a hall, from which entry is obtained to the main staircase, whilst off the hall is a coffee bar. A lift is provided from this room to the office of the main hall, the English hall, which is off the main hall, is arranged so that it can be divided into two halls, each with its own entrance and fireplace. A main feature of the ground floor is the floral hall, which is fitted with a glass roof, and the mosaic floor is decorated with palms and shrubs. The waiting-room is beyond the floral hall, and is reached through an arched, and opening out of this is the games room. These two rooms can, by means of folding doors, be thrown into one large room. On the first floor the chief feature is the Scandinavian hall, which has been designed to adopt, as far as possible, the features of Scandinavian houses. In the front, on

the first floor, are two large rooms devoted to the workers, which can be, if necessary, thrown into one by means of a movable partition. On this floor also are rooms devoted to the secretary, and a parlour for the use of the lady members of the committee. On the top floor there is also a bookroom, the caretaker's room, and a room for the use of the superintendent of the Rest. Provision is made for captains, officers, and engineers, one of the largest rooms in the building being devoted to their use. The builders were Messrs. Lattey & Co., the architects being Messrs. Jones, Richards, & Budgen.

COTTAGE HOSPITAL, ABERGAVENNY.—A new cottage hospital and dispensary has just been opened near Bailey Park, having been erected at a cost of about 1,925l. The building has a frontage to the Bailey Park. Accommodation is provided for nine beds in the hospital, and there is also an outdoor department, comprising waiting-room, consulting-room, and dispensary. The operating-room has a north light. The floor is of terrazzo marble mosaic, and the angles in the walls here, and in the wards, are all rounded in part to prevent accumulation of dust, &c. Externally the building is faced with Cyfarthfa terra-cotta and Star Co.'s bricks, the roofs being of Broseley tiles. The work has been carried out by Messrs. J. G. Thomas & Messrs. T. H. & F. Healey, of Bradford, are the architects of the building.

NEW CHURCH SCHOOLS, HARROGATE.—The foundation-stone of the new Sunday schools which are being erected in connexion with St. Andrew's Church at Starbeck, Harrogate, was laid recently. Messrs. T. H. & F. Healey, of Bradford, are the architects of the building.

CLAREMONT HALL, PENTONVILLE, N.—On the 2nd inst. this hall, formerly Old Claremont Chapel, was reopened as a mission centre of London Congregationalism, the whole building having undergone radical alterations. The upper galleries of the chapel have been removed; new fireproof staircases constructed in lieu of two wooden ones, which were only 3 ft. in width, and which formerly gave access to two galleries; new lecture-hall, classrooms and kitchen have been erected, and premises acquired in White Lion-street in the rear for access from that direction, and for caretaker's residence. The reconstruction has involved an expenditure of about 8,000l. The work has been carried out by Mr. John Greenwood, and Messrs. James Williams, Ford, & Griffin, architects, Mr. M. Brady acting as clerk of the works, and the contractors for the electric lighting being Messrs. A. W. Penrose & Co., Ltd.

SANITARY AND ENGINEERING NEWS.

INTERNATIONAL COMMITTEE OF STREET HYGIENE.

—Convened by the Chairman, Mr. H. Alfred Roehling, the International Committee of Street Hygiene met at Brussels from September 21 to 23 last to arrange for the next International Congress of Hygiene and Demography to be held in Brussels in September of next year. This Committee, which was appointed by the last International Congress at Paris in 1900, and is now confirmed by the Belgian Government, consists of seven members, representing England, America, Belgium, Holland, France, Switzerland, Germany, Austria, Hungary, Italy, Russia, Poland, Sweden, and Norway, and is charged with the study of all questions relating to street hygiene. As it became necessary to clearly define the scope of the Committee's work, to adopt, if possible, general rules to guide sanitary or local authorities when dealing with important questions relating to the cleansing of towns, and to prepare the report for next year's Congress, the Committee was convened and met at Brussels, as already mentioned, in the Salle d'Hygiene in the Belgian Ministry of Agriculture, where the Minister had kindly placed at its disposal. In two lengthy sittings the Committee discussed the material prepared by the Chairman, and adopted, with some alterations, the propositions submitted by him, which will in due course be laid before the next Congress of Hygiene and Demography. The rest of the Conference was taken up with visits of inspection to some of the works belonging to the city authorities, such as the works belonging to the Street Cleansing Department, the Sewerage Works, the Waterworks, Swimming Baths, and Morgue. During these visits the construction and maintenance of the streets were likewise examined, and another feature of considerable interest was the laying of the conduit system of electric traction near the Station du Nord. On the Quai de la Voirie the members saw a refuse destructor of twenty-four cells that has just been erected by the Horsfall Engineering Co. They expressed their thanks to Pr. Professor Putzeys, Mr. A. Putzeys, the Chief Engineer of Brussels, and Mr. Alph. Meyers, the Chief of the Cleansing Department of the city, who did all in their power to bring about the great success of the meeting.

FOREIGN.

FRANCE.—M. Redon is at present arranging the rooms in the Louvre, and the Robert Gallery, in which will be placed the sculpture brought from Persia by M. Morgan.—A new railway line is to

be made from Miramas to L'estayne, in the skirts of Marseilles, at an estimated cost of 30,000,000 fr.—Operations are to be carried out for the dredging of the ports of La Rochelle and La Pallice.—The church of St. Vincent at Blois is to be thoroughly repaired, at a cost of 15,000l.—The new railway from Rodez to Carmaux was opened on Sunday last.—M. Cavel, architect, Paris, has been commissioned to carry out a covered market at Angoulême.—M. Bartholdi completed the model for a monument to be erected on one of the public squares of Besançon, in memory of the three sieges which the town successively sustained.—The jury in the competition opened at Chambéry for the erection of a savings bank, has awarded the first premium to M. Martin, of Grenoble.—The Municipality of Colombarville has advertised a competition open to all architects to alter the department of Seine and Marne, for a new municipal theatre for the town.—Various works are to be carried out shortly for the improvement of the Port of Havre at a total cost of nearly three million francs. Among these is the construction of a boom 70 metres long, and a new pier 100 metres long, extending to the site of the Fravanti Station, where the French has been commissioned to execute a monument in memory of Mariette Bey, to be placed by public subscription, on a site on the banks of the Nile.—The death is announced, at the age of sixty-nine, of M. Raymond Barthélemy, the sculptor who obtained the Grand Prix de Rome in 1860, having studied in the atelier of David, and obtained medals in the Salons of 1867 and 1869, and the great exhibition of 1889. Among the various works carried out by him as commissions, either from the Government or from the Municipality of Paris, may be mentioned the "Sacré Cour" for the church of St. Joseph, the "Presentation in the Temple" for the church of Notre Dame de la Croix, and the statue of Fagon which decorated the façade of the Hôtel de Ville of Paris.—The death is also announced, at the age of seventy-seven, of M. Jacques-Aristide Faure, architect, and Inspecteur des Travaux to the Department of Assistance Publique, and that of M. Franz Maestle, member of the Société Centrale des Architectes. He carried out important works in domestic architecture, and took a considerable part in drawing up the scheme of prizes offered by the Société Centrale.

AUSTRIA-HUNGARY.—The Hungarian Parliament met for the first time in its new house at Budapest on the 8th inst. This edifice, situated on the banks of the Danube, is described as one of the most splendid piles in Europe, though much of the "marble" work in the interior is artificial. The building has taken more than fifteen years to erect and has cost a million and a half sterling. It is in the Gothic style, and the Houses of Parliament at Westminster are said to have furnished a model for it. In spite of the imposing character of the building, however, the lower part is only 30 ft. long, 75 ft. broad, and 30 ft. high; but it has double tiers of galleries, and accommodation is provided for 414 members, besides a press gallery capable of seating thirty-eight persons. The House of Magnates is of the same dimensions, and there are numerous reception rooms. **INDIA.**—The North-Western Railway engineering department is constructing a siphon for Rakh distributary in the Punjab for the Irrigation Department.—The Lieutenant-Governor of Burma has sanctioned the erection of new port workshops, the cost of the plans and estimates submitted by the Port Commissioners.—An area of nearly 38 acres is to be taken up in Mandalay for the extension of the municipal offices; the Rangoon municipality has also acquired about an acre of ground for additional office accommodation at the city buildings.—Works for the manufacture of armaments are about to be erected at Attock.—The Government of India has sanctioned expenditure for additional large buildings at the harness and saddle factory, Cawnpore.—A lakh of rupees is to be spent in connecting the central gun-carriage factory at Jubulpore with the line of the East Indian Railway.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—The partnership between Messrs. Wimperis & East, architects, is dissolved, Mr. East being about to leave England. Mr. Wimperis will carry on the practice, and is removing the office from 51, Conduit-street, to 6, Vigot-street, W.—Messrs. Law & Allen, architects, have taken into partnership Mr. Edward L. Guy, architect, the style of the firm will in future be "Law, Allen, & Shield." They are also about to open a branch office in South Africa, at Johannesburg.—Messrs. J. H. Sankey & Son, cement, brick, and slate merchants, of Essex Wharf, Canning Town, are opening a new depot for their goods at the Midland Railway goods yard, Kensal Green.—Mr. Edward L. Guy, architect, has removed his Welshman law and arbitration offices to 4, Verulam Buildings, Gray's Inn, W.C.—**BRITISH FIRE PREVENTION COMMITTEE TESTS.**—The winter session of the British Fire Prevention Committee has now commenced. Reports are being issued during this month and next on tests with armoured doors, and oak and deal doors com-

red, as well as on Uralite doors and the Pearson alarm. Testing operations will recommence on the Testing Station at Forchester-road, on October 22, with a partition by the British Uralite, and a heavy oak floor for warehouse purposes. The executive are occupied at their weekly meetings on the question of standardising the tests of the committee, and particulars of the results arrived at will shortly be published with the object of facilitating comparisons.

SAFETY HOSE COUPLINGS.—Messrs. Nunan & Co. send us a description and illustration of their recent couplings for fire, deck, and garden hose. The importance is in the case of fire hose, as the couplings, instead of the usual screw connexion, is made with a swivel connexion (somewhat on the same principle as the breech pieces of modern guns), and are interchangeable, so that the hose, which sometimes occurs from bringing the strong ends together, in the case of screw hose, are one away with; the connexion is instantaneously made, and any end on the same calibre of hose will fit any other. The coupling is fitted with a revolving neck or sleeve which enables any kink or twist in the hose to right itself automatically, thereby the pressure is turned on. As far as we are aware, this is the first in operation, this appears to be a really important improvement in the hose connexion.

CHURCH OF ST. THOMAS I BECKET, SALISBURY. This church, of which, as we stated in our last issue, the repair will be superintended by Mr. T. G. Jackson, R.A., was originally built in 1240 as a chapel-of-ease to the cathedral at Salisbury. In 1525 the rectory was added to the Dean and Chapter, an appropriation *ad mensam*, that is, in the words of the confirmation by Pope Boniface IX., to their table in common. The tower was erected about that time, and some years afterwards the Dean and Chapter added the chancel. It is an long on plan, measuring 138 ft. by 71 ft. The nave arcade has four arches, 16 ft. wide, on each side, resting upon square piers, and the triforium and having four shafts with octagonal capitals carved with vine leaves and grape clusters. A slender shaft from each pier divides the upper wall into panelled compartments; the clerestory windows finish in a cataract arch; the nave and its aisles have roofs of oak. The arcade arches are separated by the chancel piers; its aisles are decorated at the crown and turned upon two centres; the shafted piers and their capitals are more elaborated and later than those in the nave; the shafts above are pierced on each side with six small windows, irregularly placed, of three lights with foliate heads. The chancel was restored by Street. The window has replaced the north porch. The roofwork of the roof was wantonly painted many years ago, and the chancel screen was broken into pieces. A new stone font, with an ornamented wooden cover, was dedicated a few days ago as a memorial of the late Rev. W. J. Birbeck, vicar: it is as designed by Mr. Doran Webb.

BRADFORD MASTER BUILDERS ASSOCIATION.—A speaking concert was held at the Bradford Building Trades and Stone Exchange on the 6th inst. The president of the Association, Alderman Holdsworth, took the chair. During an interval in the programme Mr. A. Gadie and Mrs. Gadie were the recipients of a silver tea and coffee service, suitably engraved, as an acknowledgment of the valuable services rendered by Mr. Gadie as Secretary to the Association, which post he resigned a few months ago. A silver salver was also presented to Mr. Dawson, the present Secretary, on the occasion of a marriage. The presentations were made on behalf of the members of the Association by the president, Alderman Holdsworth, who dwelt at some length on the practical manner in which Mr. Gadie had carried out his duties as Secretary. Mr. Gadie and Mr. Dawson responded.

HOUSING OF THE WORKING CLASSES.—Gainsborough-buildings, Millbank estate, have just been opened for occupation. In all seventeen blocks of dwellings have been built on the estate for the Town Council, providing accommodation for 4,430 persons in two tenements of one room, 484 tenements of two rooms, 392 tenements of three rooms, ten tenements of four rooms, and one tenement of five rooms. The whole of the tenements in Gainsborough-buildings, Duke's Court, are now fully occupied. The tenements are reserved for the persons who had been displaced in connexion with the Clare Market scheme and Holborn to Strand improvement, and the whole of the rooms have now been occupied by persons actually displaced in connexion therewith. These persons are making it, it is stated, by the fact of having their rent paid regularly, and no disturbance or damage has taken place at the buildings. The rents of the tenements are fixed 6d. per week below those that could have been obtained and are being paid at the Holborn-street dwellings. The rent of a one-room tenement is 4s. for two rooms 6s. 6d., for three rooms 8s. 6d., and for four rooms 10s. 6d., and these consequently compare favourably with the rents paid by the tenants for the same number of rooms in their old homes. In the old houses rents varying from 2s. to 6s. were paid in respect of a single room, a large number being let at 4s. and 5s. Two rooms were let at rents varying from 3s. to 8s. 6d., several being let at

6s. and 6s. 6d.; three rooms were let at 7s. to 10s. 6d., but in the majority of cases 9s. and over was paid. Rents varying from 9s. to 12s. were paid for four rooms. The tenements in Sheridan, Beaumont, and Fletcher buildings are all self-contained, and the accommodation afforded is far superior to that in the old houses. In seventy-one cases tenants have taken more rooms than they previously occupied, and consequently pay more rent than they did formerly. In eight cases, however, the families being small, they have been able to take a smaller number of rooms than they previously occupied; and in forty-nine cases they occupy a similar number of rooms, but with the addition in each case of a scullery. The dwellings on the Churchway Estate consist of Wellesley, Seymour, and Somerset buildings. Wellesley buildings were opened in March, 1901, and contain eighty tenements, the rents of which are 7s. 6d. and 8s. for two-room and 10s. 6s. for three-room tenements. Some little difficulty was experienced in letting a few of the tenements, but they were all let by May 13, 1901, or just two months after the first letting. Seymour Buildings, containing sixty tenements, were opened on July 2, 1902, and Somerset Buildings, containing forty tenements, on August 14, 1902. The rents in most cases are about 6d. per week lower than those in Wellesley Buildings, the rooms being smaller. Very little difficulty was experienced in letting these tenements, the majority being occupied within three weeks. The last tenement in Somerset Buildings was let on September 8, 1902, or just five weeks from the time of the opening of the buildings. As regards the tenants in occupation, 84 out of 180 came from the immediate locality of St. Pancras, 28 from St. Marylebone, and 18 from other districts.

MEMORIAL STALLS, ST. AGNES CHURCH, KENNINGTON PARK.—We have received some photographs of the carved stalls which have been erected in St. Agnes Church, Kennington, as a Queen Victoria Memorial. They are designed by Mr. Temple Moore, and executed by Mr. F. O. Greenwood carver, of Walworth. The fronts of the stalls are divided up into square panels treated with geometric tracery in varying designs, capped by a band of conventional foliage of rather flat character. The effect is very good, and, judging from the photographs, the work appears to be very well executed.

STEPNEY BOROUGH COUNCIL.—The first annual report of the Council's proceedings contains a noteworthy account of the measures that have been taken and are still in progress in respect of schemes for local improvements and for re-housing members of the labouring classes. The latter projects relate to new buildings on the King John's-court, Queen Catherine-court, and London Terrace areas, involving a net aggregate outlay of nearly 22,000l. for the acquisition of the land, the London County Council contributing 5,800l. The Borough Council will shortly undertake the laying out for public resort of a space appertaining to the churchyard of St. George-in-the-East, which was consecrated in July, 1729. Some twenty-seven years ago the former Vestry and the late Metropolitan Board of Works, and in 1885 the Metropolitan Public Gardens Association, laid out the burial ground at a cost of nearly 4,200l., including 2,700l. for the adjacent Wesleyan graveyard.

LEGAL.

BUILDINGS IN ADVANCE OF THE BUILDING LINE.

AT the meeting of the London County Council on Tuesday, the Building Act Committee reported as follows, the recommendation being agreed to:—

"It having been reported to the Committee that the premises adjoining No. 494, Woolwich-road, at the corner of Ransom-road, were being erected in advance of the general line of buildings, proceedings were taken against the builder, Mr. Ellis, for an infringement of Section 22 of the London Building Act, 1894, with the result that the magistrate (Mr. D'Eyncourt) made orders for the demolition of so much of the buildings as was in advance of the general line. The magistrate having declined to state a case for the opinion of the High Court, Mr. Ellis applied to the Divisional Court for a *rule nisi* to the magistrate to show cause why he should not state the case. The Divisional Court declined to grant the rule, as, in the opinion of the Judges, the application was frivolous. Mr. Ellis appealed against this decision to the Court of Appeal, which Court granted him a *rule nisi* to the magistrate. On the argument of the rule, Mr. Avory, K.C., who, with Mr. Dalry, appeared on behalf of the Council, took the preliminary objection that the matter was a criminal cause or matter, and therefore the Court had no jurisdiction. The objection was upheld, and the appeal was dismissed with costs, which were duly taxed and paid by Mr. Ellis. Mr. Ellis, after some further delay, then pulled down the main portion of the unlawful buildings in advance of the general line, but almost immediately re-erected the portion on the same foundations, using much of the same materials for the purpose. Further proceedings were therefore on our instructions taken against Mr. Ellis for non-compliance with the magistrate's orders, on which the magistrate (Mr. Baggallay) convicted him, and imposed a penalty of

50l., and ordered him to pay 10l. for costs. On the application of Mr. Ellis the magistrate agreed to state a case for the opinion of the High Court on the question of law whether or not what Mr. Ellis had done was a compliance with the magistrate's order. This case has been stated and set down for argument. We recommend—That the solicitor be instructed to take all necessary steps to support the decision of the magistrate in the case of the Council v. Ellis, re No. 494, Woolwich-road, and adjoining premises."

At Cheltenham Police-court on the 6th inst., Mr. W. J. Merrett was summoned, at the instance of the Charlton King's Urban District Council, for bringing forward houses which he is erecting in Copple-road beyond the frontage line of the adjoining house. The proceedings were taken under the Public Health, Buildings, and Streets Act of 1888. Mr. George E. Brydges, Clerk to the Council, prosecuted, and Mr. Langley-Smith defended.

The case turned on the question of consent. It appeared that Mr. Merrett had submitted the plans of the houses to the Urban Council, and that these had been returned stamped with the word "Approved," and the names of the Chairmen of the Roads and Public Health Committees respectively. When, however, some progress had been made with the building operations, it was discovered that the frontage line was exceeded. Notice requiring the setting back of the building was served on Mr. Merrett, but he held to the sanctioned plans and ignored the notice.

After hearing arguments by counsel, the Bench intimated that a majority of the magistrates were of opinion that the consent given by the Council was not the consent required by the Act for extending beyond the frontage line, and they fined defendant 5l., with costs. Stay of execution was granted pending an appeal.—*Birmingham Post.*

CASE UNDER THE BUILDING ACT.

AT Tuesday's meeting of the London County Council, the Building Act Committee reported as follows:—"On August 5, 1902, a building notice was served upon the District Surveyor of the intention of Mr. G. F. Havell to unite the premises, Nos. 5, Obelisk-buildings, Lewisham, with the adjoining premises, Nos. 1 to 4, which had already been united. The District Surveyor served a notice of objection under Section 150, against which Mr. Havell appealed. The appeal was heard before Mr. Baggallay at the Greenwich Police-court on September 10, 1902, when it was contended for the appellant that what was proposed to be done was the uniting of buildings within the meaning of Section 77 (2), and not the alteration of a building within the meaning of Section 207. Counsel for the appellant argued that as the buildings Nos. 1 to 4 had been erected and united prior to the passing of the Act of 1894 they were to be deemed to be erected or constructed in compliance with the Act of 1894 within the meaning of Section 210, and that as they were already over ten squares in area it was not by reason of the alteration, that is, the uniting of Nos. 5 to them, that they came within the provisions of Section 71 (2). He further stated that, treating No. 5 as an addition to Nos. 1 to 4, the appellant had made No. 5 comply with the provisions of Section 74 (2). The Council's solicitor contended on behalf of the District Surveyor that the difficulty in the case arose from confusing Section 72 with Sections 207 and 209, and that what was really proposed to be done in this case was the uniting of existing buildings in contravention of the provisions of Section 77 (2). Such buildings when united and considered as one building would not be in conformity with the Act, as they would not have in the portion known as Nos. 1 to 4 the necessary fire-resisting construction to comply with Section 74 (2). He further contended that Section 210 only protects the owner so long as he chooses to retain the building in the form in which it was erected, and that directly he united the building it would lose the protection of that section.

The magistrate upheld the objection of the District Surveyor, and, in dismissing the appeal, said, "If the intended operation amounted only to an addition or alteration to the existing buildings, no doubt the builder's contention would be sound; but he (Mr. Baggallay) was of opinion that the real effect would be to unite the two buildings within the meaning of Section 77, Sub-Section 2, and that in that case Section 210 did not exempt him from the consequences."

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

11,583.—IMPROVEMENTS IN SINKS: *J. Hirst.*—In a hopper-shaped slop-sink, which is fixed against the outside of the wall of the house, the inventor contrives that the waste-pipe shall enter an upper chamber, from which an arrow-shaped passage for discharge leads to the gully or trap. The grating is fashioned in two portions, in order that the sink may be more readily cleaned.

11,584.—LIGHTNING CONDUCTORS AND THEIR ATTACHMENTS: *K. W. Hedges.*—Parallel conductors along the ridge and edges of the roof join the con-

ductors, which are arranged arch-wise to one another, and the spikes are made, in one form, upon divided clamps fastened to the conductors with eaden packing. Different methods of attachment are specified, the conductor to earth (for which see No. 10,678 of 1899) taking the conductor through a branch plugged with lead.

11,613.—JOINTS FOR CLOSET-PIPES: *W. Thorpe.*—A spigot and socket joint for the earthenware outlet of a closet and the leaden soil-pipe consists of a metallic thimble or ferrule, of which the two portions are bolted together lengthwise. At the end of the soil-pipe has been inserted into the smaller end of the ferrule it is spread out so as to fit the socket in which the outlet-pipe is cemented or otherwise secured. In another mode the end of the outlet-pipe has an outside flange, and the mouth of the socket has an inside flange. One half of the ferrule is bolted on when the outlet-pipe has been put into the other half.

11,637.—APPLIANCES FOR DRAWING-BOARDS: *J. Trimming.*—A support for a drawing-board comprises a hinged trestle having struts at its sides, which sustain a rod or tube that engages with notches cut in the back struts, and having surfaces that take pins upon a frame. An increased slope can be effected by means of the engagement of the notched bars upon the frame with a cross-bar of the front struts. Recesses in the frame, which is lifted by tackle, sustain the board. Flanges on the frame guide a counterbalanced sliding frame provided with a straight-edge, and serving as a holder for instruments. The main frame is available for separate use with a transparent sheet instead of the drawing-board.

11,644.—A CEMENT FOR MAKING TILES AND SLABS, AND COVERING PURPOSES: *G. Harding.*—An admixture of water, magnesium chloride, pigment, calcined magnesite, and waste matter such as wood pulp, lime, cork, rope rovings, for covering various surfaces and for making tiles, slabs, and similar goods, is described as being acid, water, and fire proof, and it can be used as either a plaster or a paint.

11,651.—A CIRCULAR-SAW GUARD: *J. E. K. Long.*—The pressure of the wood in its advance automatically raises the shield that covers the top of the saw by lifting the lower end of a lever which turns upon a fulcrum and is joined to a chain for winding up a cord which pulls up the shield. The shield has a counter-weight. When the work has been passed forwards a suspended weight pulls up a guard, carried by a radial arm, in front of the saw. The guard is forced downwards until the wood passes over it by a hinged flap, and since the counter-weight arrests the fall of the other weight the guard will not rise whilst the shield is in the lower position. If the saw-cut falls short of the top of the board the riving knife can be detached and slipped through a hole at the rear of the saw.

11,670.—JOINTING FOR WATER-CLOSET PIPES: *W. E. Delehanly.*—An annular groove for packing is made in the discharge-leg of the closet between its tubular portion and the base-plate; the soil-pipe has a flange which is carried up to the level at least of that pipe, and it is surrounded by the floor-plate; the bevelled flange is grooved around its top and is soldered on to the soil-pipe; the base-plate is laid over the floor-plate, and screw-bolts tighten the parts together.

11,715.—MASONS' WORK: *C. Lorenz.*—The inventor seeks to make masonry strong enough without the use of iron in the building, and fire-proof, lasting, and free from excrecence; for a mortar having a tensile strength equal to that of the stone which is used he mixes infusorial earth, water-glass, and trass (including volcanic rocks, tufas, trachyte, and scorified lava) with sand and Portland cement, or other cements, lime, gypsum, and so on. For the sand may be substituted such substances as marble, ashes, limestone, burned clay, chalk, asbestos, fibre, &c. Before the stone is laid it is steeped in water and saturated with a solution of water-glass containing infusorial earth, and, as soon as the mortar is hard, the masonry is painted over with that solution, or with fluorides or clay. The inventor claims that his method will serve for the building in stone of hollow flat ceilings having a considerable extent of span and of self-supporting walls free from ironwork, and for making openings in main walls.

11,743.—AN APPLIANCE FOR STEAM CRANES AND WINCHES: *T. Sewell.*—In cases where only one eccentric is adopted for both reversing and winding purposes, a lever is arranged behind the winch, and the shaft is held in plunger-blocks in order that one may lift it out upwards instead of taking it out lengthwise, the lever being joined to a sleeve which regulates the position of the eccentric by means of a helical groove and a pin. The sleeve and the other cylinder is worked by the eccentric through a cross rock-shaft. The lever which throws the double and multiple gear both in and out is mounted in a manner similar to that described above.

11,767.—A METHOD OF MEASURING METRICAL LENGTHS: *C. E. Johansson.*—All the measures which, for example, differ by 0.01 mm. between 1 mm. and 100 mm. may be ascertained by the combining of, in that particular instance, three series of gauge-pieces whereof one series consists of four pieces for measures of 2500 mm., 5000 mm., 7500 mm., and 10000 mm., respectively. The second series consists of forty-nine pieces for

measures ranging from 1.01 mm., by a constant increase of 0.01 mm., to 149 mm.; and the third of forty-nine pieces for measures ranging from 0.50 mm., by a constant increase of 0.50 mm., to 24.50 mm. To the third series may be added another gauging to 0.001 mm.

11,808.—KILNS AND APPARATUS FOR BURNING AND DRYING BRICKS, &c.: *J. P. B. Fiske.*—Air which is heated in cooling the bricks and similar goods is utilised for drying them in an apparatus at the end of the kiln, over both of which travels an overhead crane; the bricks are stacked upon ribs and the parallel floors disposed cross-wise in a row, and having flues at their sides, the hot air being admitted by one flue and taken away by the other. The cells of the kiln are also disposed cross-wise in a row, with flues in the side walls; openings from one chamber to another are made through the dividing walls, and each has a flat cover for the passage of fuel, the removal of products of combustion, and abstraction of air drawn through the chambers in which the bricks are cooled. The covers are made of fireclay blocks bound together in metallic girder-frames, and can be lifted with hooks in engagement with the ends of the girder-frames.

11,877.—A JOINT FOR THE FLUSHING-PIPES OF LAVATORY-BASINS, CLOSETS, &c.: *W. J. Bassett.*—A joint for flushing-pipes comprises a packing-ring which is to be compressed between a recessed flange and a clip, the screwing-up being effected by means of nuts that engage with screws which are affixed to the clip.

11,928.—A COMBINED TOOL: *P. J. E. Caron.*—The tool comprises a screw-driver and a hammer which are fashioned at the ends respectively of the handle and the jaw, and a nut and pipe wrench. The sliding jaw is provided in some instances with a vernier, and in grooves upon the opposite sides of the handle are riveted logarithmical and foot rules. The fixed and sliding jaws will set, as a call gauge, and may be soothed for tapping-pipes, for adjustment of the latter jaw the inventor pivots on to it a lever on which is mounted a spring-pivoted pawl; as one presses the lever downwards the pawl becomes engaged with the teeth upon the jaw, which is thereupon forced forwards with a toggle movement.

11,938.—FITTINGS OF LAVATORY-BASINS: *A. N. Chamberlain and W. L. Hall.*—To the sides of the casing are secured guides, in which will slide the trunnions that are either attached to the basin, or, in another form, carried by the ends of two links which are pivoted on to the floor. Under normal conditions the basin reposes against the back wall, but when it is to be flushed the links are turned against a stop and then turns it about the trunnions.

11,951.—A METER FOR ELECTRICAL CURRENTS: *H. Helberger.*—A continued record of current maxima is obtained in a maximum demand indicator by causing the current to flow through an expandable body or an adjacent heater, whereof the thermal expansion acts upon a marker set, as a call gauge, an indication upon a surface which is moved in the opposed direction by means of a ratchet contrivance that joins it to the body and at the same time prevents it from returning. In one adaptation the current through a coil heats two expandable rods which the marker joins on to three levers, one of which is pivoted at its ends to the ends of the arms respectively, and another is pivoted at its ends upon a shaft; on the shaft is mounted a recording disc which a fixed pawl prevents from rotating in a reversed direction. A ratchet-wheel set to engage with a driving-pawl upon the lever is mounted upon the shaft.

12,000.—A PORTABLE FOLDING PONTOON BRIDGE: *O. Nitzsch.*—The bridge, which is devised for use in bridge-building, water-surveying, and kindred operations, has floor-sections that are held up with air-bags on the outside of a tubular frame having diagonal jointed bars, of which the spreading out is controlled with chains; from the end-bars are hung cross-bars that sustain the floor-sections, and which repose upon the horizontal arms of middle diagonal bars affixed to steel tubes which join the diagonal jointed bars to one another. Forked rail-posts and tongued joints join the floor-sections together, the latter consisting of iron bars with boards between them, and having beneath them snap-rings for engagement with the hanging transverse bars.

12,069.—A METHOD OF GLAZING SKYLIGHTS: *H. C. Lassar.*—A flange and wings are fashioned upon a glazing-bar which is made of lead or some suitable composition drawn in one piece upon an angle-iron core. A coating of adhesive material is applied for dressing one wing over the glass, whilst the other wing is turned over a wooden or iron rail at the end or side, and fastened by copper nails.

12,110.—IMPROVEMENTS IN THE WAGGONS: *E. Serrall.*—The wagon is carried upon pivots set in engagement with slots cut horizontally and disposed between the positions of the centres of gravity of the wagon when it is charged and is empty; pinions, to be turned for tilting the wagon, are

geared with curved racks and mounted upon guiding-pivots which fit in circular grooves at the sides; sprocket-wheels or rope tackle worked by hand turn the pinions. Provision is made for regulating the extent of the tipping with a brake, and the wagon is in an upright position.

12,173.—MEANS OF UTILISING TIDAL ENERGY: *J. Gamison.*—Water for driving turbines or water-wheels is stored in reservoirs, which are sub-divided and communicate severally with a system of eight water-wheels that are moved in turns by the tide. At defined quarter intervals during the flowing and ebbing of the tide, certain pairs of the eight wheels are shut down, whilst other pairs are at the same time kept in motion so as to discharge water into the falling tide or into the reservoirs in succession.

MEETINGS.

FRIDAY, OCTOBER 10.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., on "Sanitary Law." 11.11. 7 p.m.

SATURDAY, OCTOBER 11.

Incorporated Association of Municipal and County Engineers.—Home District meeting at Aldershot.

The City of London.—Address by Messrs. E. S. Prior, E. Guy Dawber, and E. W. Mountford. 7 p.m.

British School at Athens.—Annual meeting of Subscribers in the rooms of the Society of Antiquaries, Burlington House. 5 p.m.

MONDAY, OCTOBER 13.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., on "Duties of a Sanitary Inspector." 7 p.m.

Clerks of Works' Association (Carpenters' Hall).—Paper by Mr. John Davies on "Some Barns of the West." 8 p.m.

TUESDAY, OCTOBER 14.

Architectural Association.—Opening meeting of the School of Design (Elementary and Advanced) at 9, Conduit-street. Address by Messrs. E. S. Prior, E. Guy Dawber, and E. W. Mountford. 7 p.m.

British School at Athens.—Annual meeting of Subscribers in the rooms of the Society of Antiquaries, Burlington House. 5 p.m.

WEDNESDAY, OCTOBER 15.

Architectural Association Discussion Section.—Mr. N. R. Barwell on "Some Recent Theories Concerning Saxons in Early Norman Works in England."

London Topographical Society (Society of Antiquaries' Rooms, Burlington House, W.).—Annual general meeting, chair to be taken by the Earl of Rosebery, K.G., President of the Society. 5 p.m.

Builders' Foremen and Clerks of Works' Institution.—Quarterly meeting of the members. 8 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Inspection of Disinfecting Apparatus and Model Steam Laundry, St. John's Wharf, Fulham. 2.30 p.m.

Institution of Mechanical Engineers.—Captain C. C. Longbridge on "Oil Motor Cars of 1902." 8 p.m.

THURSDAY, OCTOBER 17.

Architectural Association.—Mr. T. R. Spence on "Homer and Architecture." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., on "Duties of a Sanitary Inspector." 11. 7 p.m.

Institution of Mechanical Engineers.—Captain C. C. Longbridge on "Oil Motor Cars of 1902." 8 p.m.

FRIDAY, OCTOBER 19.

Architectural Association.—Mr. T. R. Spence on "Homer and Architecture." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., on "Duties of a Sanitary Inspector." 11. 7 p.m.

Institution of Mechanical Engineers.—Captain C. C. Longbridge on "Oil Motor Cars of 1902." 8 p.m.

SATURDAY, OCTOBER 18.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection of Disinfecting Apparatus and Model Steam Laundry, St. John's Wharf, Fulham. 2.30 p.m.

Institution of Mechanical Engineers.—Captain C. C. Longbridge on "Oil Motor Cars of 1902." 8 p.m.

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September 29.—By B. BAILEY & CO.	
Amberley—119, Marlow-rd., u.t. 74 yrs., g.t. 74, s.t. 324.	2,400
By FISHER, STANHOPE, & DRAKE.	
Stoke Newington—78, Weymouth-rd., u.t. 84 yrs., g.t. 104, e.t. 75.	855
37, Fountain-rd., u.t. 74 yrs., g.t. 104, e.t. 65.	710
45, Osbaldeston-rd., u.t. 76 yrs., g.t. 84, e.t. 84.	585
Stanford Hill—5, Castlewood-rd., u.t. 68 yrs., g.t. 61, e.t. 36.	335
By OSBORN & MERCER.	
Geldstone, Norfolk—Dunburgh House and 8 a. f. 17 p., f. p.	2,800
By J. A. TRYHALL.	
Norwood—17 to 22 (odd), Werndorff-rd., u.t. 97 yrs., g.t. 304, y.t. 150.	1,160
South Kensington—44, Spynay-st., u.t. 24 yrs., g.t. 61, e.t. 65.	430
By FRED. VARLEY & SON.	
Finchbury Park—99, Wilberforce-rd., f. p.	730
Stroud Green—8, Carlton-rd., u.t. 74 yrs., g.t. 71, e.t. 45.	490
By MASSEY & SONS (at Great Grimby).	
Immingham, &c., Linc.—A freehold estate, 174 a. (in lots).	10,365
By H. J. BROMLEY.	
Forest Hill—6, Hurstbourne-rd., u.t. 69 yrs., g.t. 84, y.t. 42.	405
Norwood—8, Arncliffe-rd., f. p.	280
Canbury—59, Leconfield-rd., u.t. 47 yrs., g.t. 104, e.t. 64.	305
Tottenham—20, Ashmount-rd., f. y.t. 34.	1,300
By WESTON & SONS.	
Brixton—5, Gordon-gr. (S), u.t. 62 yrs., g.t. 84, e.t. 42.	270
By FREDERICK WARMAN.	
Stoke Newington—127, Green-lanes, u.t. 47 yrs., g.t. 156, p.	965
Highbury—7, Hilbury-rd., u.t. 47 yrs., g.t. 74, e.t. 46.	385
Canbury—17, Leconfield-rd., u.t. 47 yrs., g.t. 34, e.t. 42.	375
By HARRIS & SONS (at Leeds).	
Leeds—6, 8a, and 10, Park-lane (S), with three workshops in rear, area 318 yds., f. y.t. 225.	4,100
By C. R. SMITH (at Masons' Hall Tavern).	
Battersea, St. John-rd., the Buck's Head, p-h., and two shops adjoining; improved rental of 63d. for 204 yrs., with reversion.	8,000
Clapham—Clapham Park-rd., the Oxford Arms p-h., u.t. 35 yrs., y.t. 100, with goodwill.	7,010
October 1.—By W. ASHMOLE.	
Ilford, Essex.—Vicarage-lane, the Vicarage Building Estate, 3 a. 3 r. 16 p., f. p.	4,600
By COCKREY & HENDERSON.	
Broadstairs, Kent—1, The Broadway (S), f. y. r. 1902.	1,700
By A. PRESTON & SON.	2,420
Canning Town—102 and 104, Rathbone-st., u.t. 401 yrs., g.t. 44, 48, w.t. 324, 168.	1,900
Stepney—78 and 80, Duckett-st., f. w.t. 34.	1,900
By WILKINSON & CLAY.	
Ratcliff—59, Brook-st. (S), y.t. 52.	330
Old Ford—3 and 4, Maverton-rd., u.t. 57 yrs., g.t. 74, w.t. 62.	305
By RALPH APPLETON & SON (at Stockton).	
Norton, Durham—White House Farm, 102 a. or 26 p., f. y.t. 100.	3,350
By PERKINS & SONS (at Southampton).	
King's, Soome, Hants—Parnhill Wood, 475 a.	5,000
Bailey's Down Farm, 120 a., f.	800
Farley Farm, 303 a., f.	3,000
Furley School and 1 a., f.	210
October 2.—By NEWBORN, EDWARDS, & SIEVHARD.	
Islington—Highest, The Grand Theatre (as a 20-year term) also the White Swan tavern and house and shop adjoining, u.t. 34 yrs., y.t. 2,002, 165. 8d., with five leasehold redemption policies for 27,000.	10,000
Highgate—124, Garside-rd., u.t. 79 yrs., g.t. 104, w.t. 62.	440
Hoxton—65, Murray-st., u.t. 40 yrs., g.t. 52, 168.	340
Knightsbridge—21, Trevor-rd., u.t. 72 yrs., g.t. 82, 105, y.t. 45.	145
Bushey, Herts.—Belmont-rd., a plot of building land, f.	250
Barnsbury—108 to 116 (even), Georges-rd., also i.g.t. 174, u.t. 684 yrs., g.t. 474, w.t. 294, 108.	730
Clerkenwell—White Horse-rd., u.t. 70, u.t. 131 yrs., g.t. nil.	570
21, Maple-st., i.g.t.'s 214, u.t. 324 yrs., g.t. 14.	235
Canbury—17, Leconfield-rd., u.t. 47 yrs., g.t. 104, e.t. 64, reversion in 62 yrs.	290
Barnmoosey—3 to 10, Pleasant-pl., f., w.t. 144, 88.	730
Islington—21, Blayby-rd., u.t. 61 yrs., g.t. nil, g.t. 404.	100
By MAY & ROWDEN.	
King's Cross—5, Percy-circus, u.t. 171 yrs., g.t. 54, 58, y.t. 52.	368
By WM. STEVENS.	
Regent's Park—37, Mornington-rd., f., e.t. 704.	1,100
Dalston—78, Eleanor-rd., u.t. 55 yrs., g.t. 44, 58, y.t. 34.	350
Harringway—72, Burgoyne-rd., u.t. 844 yrs., g.t. 74, y.t. 384.	425
By C. C. TAYLOR & SON.	
Wapping—12 and 14, Moles-rd., w.t. 52.	450
By WALTER VINCENT.	
Hampstead—26, Messina-av., u.t. 83 yrs., g.t. 94, 128, y.t. 50.	500
By WILKINSON & SON.	
South Kensington—16, Onslow-cres., p., with shop adjoining, u.t. 324 yrs., g.t. 54, y.t. 150.	3,550
Lewisham—2 and 3, Lingards-rd., u.t. 57 yrs., g.t. 44, y.t. 1204.	1,190

Brookley—13, Eastern-rd., u.t. 92 yrs., g.t. 62, 104, e.t. 43.	4,505
By WORSFOLD & HAYWARD (at Dover).	
Wormswood, Kent. Woolwich Green, The Sawyers' bh., f. y.t. 194, 108.	770
Dover, Kent.—154, Sargate-st. (S), f. p.	335
164, Sargate-st. (S), f. y.t. 304.	390
7, Seven Stars-st., f. y.t. 184.	175
October 3.—By HILLARD & WHITINGHAM.	
14, 15, 16, 22, 24, and 26, Emmott-st., u.t. 68 yrs., g.t. 254, 48, w.t. 254, 68.	1,800
By A. PREBEE & SON.	
Shepherd's Bush—47, Shepherd's Bush-rd., u.t. 65 yrs., g.t. 94, y.t. 424.	399
Paddington—31, Amberley-rd., u.t. 60 yrs., g.t. 64, y.t. 504.	540
Westbourne Park—39 and 41, St. Ervan's rd., u.t. 64 yrs., g.t. 154, y.t. 824.	645

Contractions used in these lists.—F.g.t. for freehold ground-rent; l.g.t. for leasehold ground-rent; i.g.t. for improved ground-rent; g.t. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.t. for estimated rental; w.t. for weekly rental; y.t. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove.

PRICES CURRENT OF MATERIALS.

* * Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.	
£ s. d.	
Hard Stocks	1 10 0 per 1,000 alongside, in river
Rough Stocks and Grates	1 10 0 " " "
Facing Stocks	2 12 0 " " "
Shippers	2 5 0 " " "
Flettons	1 2 0 " " at railway dep't
Red Wire Cuts	1 12 0 " " "
Best Fareham Red	3 12 0 " " "
Best Red Pressed	" " " " "
Ruabon Facing	5 5 0 " " "
Best Blue Pressed	" " " " "
Staffordshire	4 5 0 " " "
Do., Bullnose	4 11 0 " " "
Best Stourbridge	4 8 0 " " "
Fire Bricks	" " " " "
GLAZED BRICKS.	
Best White and Ivory Glazed	" " " " "
Stretchers	13 0 0 " " "
Headers	12 0 0 " " "
Quoins, Bullnose, and Flats	17 0 0 " " "
Double Stretchers	19 0 0 " " "
Double Headers	16 0 0 " " "
One Side and two Ends	19 0 0 " " "
End	20 0 0 " " "
Splays, Chamfered, Squinted	20 0 0 " " "
Best Dipped Salt Glazed Stretchers and Headers	12 0 0 " " "
Quoins, Bullnose, and Flats	14 0 0 " " "
Double Stretchers	15 0 0 " " "
Double Headers	14 0 0 " " "
One Side and two Ends	15 0 0 " " "
Two Sides and one End	15 0 0 " " "
Splays, Chamfered, Squinted	14 0 0 " " "
Seconds Quality	" " " " "
Whitened Dipped	" " " " "
Best Glazed	8 0 0 " " less than best.
Thames and Port Sand	7 0 0 per yard, delivered.
Thames Ballast	6 0 0 " " "
Best Portland Cement	31 0 per ton, delivered.
Best Ground Blue Lias Lime	22 0 " " "
Norw.—The cement or lime is exclusive of the ordinary charge for sacks.	" " " " "
Grey Stone Lime	10s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 27s. 6d. per ton at rly. dep't.	" " " " "

STONE.	
s. d.	
Ancaster in blocks	1 11 per ft. cube, deld. rly. depot
Bath	1 2 " " "
Farleigh Down Bath	1 8 " " "
Hear in blocks	1 6 " " "
Grinshill	1 10 " " "
Brown Portland in blocks	2 4 " " "
Darley Dale in blocks	2 4 " " "
Red Corshill	2 5 " " "
Clooburn Red Freestone	2 3 " " "
Red Mansfield	2 4 " " "
YORK STONE—Robin Hood Quality.	
Scalped random blocks	2 10 " " "
6 in. sawn two sides landings to sizes (under 40 ft. sup.)	2 3 per foot super.
Do. Rubbed two sides	" " " " "
4 in. ditto	2 6 " " "
3 in. Sawn two sides slabs (random sizes)	0 114 " " "
2 in. to 2 1/2 in. Sawn one side slabs (random sizes)	0 74 " " "
1 in. to 2 in. ditto	0 6 " " "
BEST HARD YORK.	
Scalped random blocks	3 0 per ft. cube
6 in. sawn two sides, landings to sizes (under 40 ft. sup.)	2 8 per ft. super.
Do. Rubbed two sides	" " " " "
Ditto	3 0 " " "

PRICES CURRENT (Continued).

STONE.	
s. d.	
1 in. sawn two sides slabs (random sizes)	1 2 per ft. super deld. rly. depot
2 in. self-faced random flags	0 5 " " "
Hopton Wood (Hard Bed) in blocks	2 3 per ft. cube, deld. rly. depot.
" " " 6 in. sawn both sides landings	2 7 per ft. super, deld. rly. depot.
" " " 3 in. do.	1 24 " " "

SLATES.	
in. in. s. d.	
20 X 10 best blue Bangor	5 0 per 1000 of 1200 at rly. dep.
20 X 12 " " "	13 5 0 " " "
20 X 10 best seconds	12 15 0 " " "
20 X 12 " " "	12 17 6 " " "
16 X 8 best	6 17 6 " " "
20 X 10 best blue Portma-doc	11 7 6 " " "
16 X 8 best blue Portma-doc	6 5 0 " " "
20 X 10 best Eureka unfading green	15 0 0 " " "
20 X 12 " " "	16 10 0 " " "
18 X 10 " " "	11 11 0 " " "
16 X 8 " " "	7 10 0 " " "
20 X 10 permanent green	10 10 0 " " "
18 X 10 " " "	9 0 0 " " "
16 X 8 " " "	6 5 0 " " "

TILES.	
s. d.	
Best plain red roofing tiles	42 0 per 1,000, at rly. depot.
Tip and valley tiles	3 7 per doz. " "
Best Brosley tiles	50 0 per 1,000 " "
Do. Ornamental tiles	52 6 " " "
Tip and valley tiles	4 0 per doz. " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6 per 1,000 " "
Do. ornamental Do.	60 0 " " "
Tip tiles	4 0 per doz. " "
Valley tiles	3 0 " " "
Best Red or Mottled Staffordshire Do. (Peakes)	51 0 per 1,000 " "
Do. Ornamental Do.	54 6 " " "
Tip tiles	4 1 per doz. " "
Valley tiles	3 8 " " "

WOOD.	
BUILDING WOOD—YELLOW.	
At per standard.	
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	6 s. d. 16 s. d.
Deals: best 3 in. by 9 in.	14 10 0 15 10 0
Battens: best 2 in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	11 10 0 12 10 0
Battens: 2 in. by 6 and 3 by 6	7 in. and 8 in. 10 0 0 less than best
Deals: seconds	10 0 0 11 11 0
Second yellow deals, 3 in. by 11 in. by 9 in. and 2 in. by 6 in.	9 10 0 9 10 0
2 in. by 4 in. and 2 in. by 5 in.	8 10 0 9 10 0
Foreign Sawm Boards—1 in. and 2 in. by 7 in.	0 10 0 more than battens.
3 in. Fir timber: Best middling Danzig or Memel (average specification)	1 0 0 At per load of 50 ft.
Seconds	4 10 0 5 0 0
Small timber (8 in. to 10 in.)	3 12 6 3 15 0
Small timber (6 in. to 8 in.)	3 0 0 3 10 0
Swedish balks	2 15 0 3 0 0
Pitch-pine timber (30 ft. average)	3 5 0 3 15 0
JOINERS' WOOD.	
At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.	23 0 0 24 0 0
3 in. by 9 in.	21 0 0 22 10 0
Battens, 2 in. and 3 in. by 7 in.	17 0 0 18 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0 19 10 0
Battens, 2 in. and 3 in. by 7 in.	13 10 0 14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	15 10 0 16 10 0
Battens, 2 in. and 3 in. by 7 in.	12 10 0 13 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0 22 10 0
3 in. by 9 in.	18 10 0 19 10 0
Do.	13 10 0 14 10 0
Second yellow deals, 3 in. by 11 in.	15 0 0 16 0 0
3 in. by 9 in.	11 10 0 12 10 0
Battens.	12 10 0 13 10 0
Third yellow deals, 3 in. by 11 in.	13 10 0 14 0 0
Do.	10 0 0 11 0 0
Battens.	12 10 0 13 10 0
White Sea and Petersburg.	
First white deals, 3 in. by 11 in.	14 10 0 15 10 0
3 in. by 9 in.	13 10 0 14 10 0
Battens	11 10 0 12 10 0
Second white deals 3 in. by 11 in.	13 10 0 14 10 0
3 in. by 9 in.	12 10 0 13 10 0
Battens	9 10 0 10 10 0
Pitch-pine: deals	16 0 0 17 0 0
Under 2 in. thick extra	0 10 0 1 0 0
Yellow Pine—First, regular sizes.	33 0 0 upwards.
Oddments	22 10 0 24 0 0
Seconds, regular sizes	24 10 0 26 10 0
Yellow Pine Oddments	20 0 0 22 0 0
Kauri Pine—Planks, per ft. cube.	0 3 6 0 4 6
Danzig and Stentin Oak Logs—Large, per ft. cube	0 2 6 0 3 6
Small	0 2 3 0 2 6
Wainscot Oak Logs, per ft. cube.	0 5 0 0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 7 0 0 8 0
2 in. do.	0 0 0 0 1 0
Dry Mahogany—Honduras, Tabasco, per ft. sup. as inch	0 0 9 0 0 12
Selected, Figury, per ft. sup. as inch	0 6 0 0 9 0

[See also page 333.]

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Overseer or Inspector of Waterworks	Hong Kong Government	210 <i>l.</i> , &c.	Oct. 20
*Building Inspector	Whitless District Council	150 <i>l.</i>	Oct. 21
Tenements	Hamilton (N.B.) Town Council	15 <i>l.</i> 15 <i>s.</i> , 10 <i>s.</i> , and 5 <i>s.</i> 6 <i>d.</i>	Oct. 25
*Designs for Town Hall, Library, &c.	Durban (Natal) Corporation	500 <i>l.</i> , 300 <i>l.</i> , and 200 <i>l.</i>	Dec. 18
*Designs for Extension of Town Hall	Hull Corporation	300 <i>l.</i> , 200 <i>l.</i> , 100 <i>l.</i>	Jan. 31
Designs for University Buildings, Cape of Good Hope	Agt.-Gen. for Cape of Good Hope	400 <i>l.</i> , 200 <i>l.</i> , 100 <i>l.</i>	do.

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Underground Convenience, Roath	Cardiff Corporation	W. Harper, Civil Engineer, Town Hall, Cardiff	Oct. 13
Gravels Kerb	Brighton Town Council	F. J. C. May, Civil Engineer, Town Hall, Brighton	Oct. 14
Road-making & Paving Wks., Back-lane, Cricklewood	Wilkeson District Council	Council's Engineer, Public Offices, Dyke-road, Kilburn, N.W.	do.
Four Houses	Cwmaman Cottage Company, Ltd.	Smith & Davies, Architects, Aberdare	do.
Two Cottages	do.	do.	do.
Wooling Shed, Hunley, near Huddersfield	Meers, Eastwood Bros., Ltd.	J. Berry, Architect, 3, Market-place, Huddersfield	do.
Stone Wall, &c., Maccaesfield	Technical Instruction Committee	E. E. Adeshead, Borough Engineer, Maccaesfield	do.
Retaining Wall, Haywood's Quarry, Deepcar	Stockbridge U.D.C.	Fowler & Marshall, Engineers, Hartlepool, Sheffield	do.
Sewerage Works	Feintstone U.D.C.	F. B. Jennings, Town Hall, Feintstone	do.
Sanatorium, Eastby, near Skipton	The Guardians	F. Holland, Engineer, Huddersfield, Bradford	do.
Street Works	Rawtenstall Corporation	A. W. Lawson, Civil Engineer, Municipal Offices, Rawtenstall	Oct. 15
Road Works, King Edward-avenue, Shirley	County of Hants Land Soc., Ltd.	W. B. Hill, Surveyor, 31, Above-bar, Southampton	do.
Water Supply Works	Ware U.D.C.	G. H. Gossy, Town Hall, Ware	do.
Sewers, &c., Bury-street	Witney (Oxon) U.D.C.	G. Winamp, Civil Engineer, Borough Buildings, Abingdon	do.
Sewers, &c., Lest-rail	Rochdale Town Council	S. S. Platt, Civil Engineer, Town Hall, Rochdale	do.
Sewers, &c., Compton Giffard	Aldersburgh (Suffolk) Town Council	J. C. Gordon, Borough Surveyor, Aldersburgh	do.
Sewers, &c., at Stratford-on-Avon	Plymouth St. Mary R.D.C.	P. M. Worth, Engineer, 45, George-street, Plymouth	do.
Sewers, &c., at Antwerp Mills, Armley	Peworth School, Board	Harvey Bros., Architects, 30, King's-road, Epsom	do.
Resecting Chapel, Unkegate, Lincoln	Derby Corporation	J. Ward, Civil Engineer, Balmington-lane, Derby	do.
Additional to Rothen, Fahan-street, Londonderry	Uxbridge R.D.C.	C. S. Nelson, Architect, 15, Park-row, Leeds	Oct. 16
Two Houses, York-road, Great Yarmouth	Wesleysans	J. E. Stow, Engineer, Corn Exchange, Exeter	do.
Bakery, Mile Cross, Halifax	Mr. K. Gailagher	W. Mortimer & son, Architects, Lancashire	do.
Paving Works, Rutland-street	Preston Corporation	J. P. M. Grant, Architect, 29, Carlisle-street, Londonderry	do.
Well, Knickerbocker, Farnham	Ministries & D.C.	C. H. Baker, Architect, Town Hall Chambers, Great Yarmouth	Oct. 17
House, Five Roads, Llanelli	Wakefield Guardians	Borough Surveyor, Town Hall, Preston	do.
Electricity Works at Workhouse	Glanorgan County Council	T. M. O'Connor, Workhouse, Millstreet	do.
Auditions to Police Station, Forthcarril	Mrs. Coward	W. Beunton, Kesteven Farm, Five Roads, near Llanelli	Oct. 18
Villa, Connelton	Manchester Corporation	H. Beaumont, Tenney House, Wakefield	do.
Granite Sills (10,000 tons)	Brierley Hill U.D.C.	T. M. Franklin, Council Offices, Cardiff	do.
Technical School and Library	Bury (Lancs) Corporation	J. Bell, Architect, Coniston	do.
Stone Walls, Clow Bridge	Governors	J. M. Eloy, 55, Piccadilly, Manchester	do.
Additions to Schools, Sudeby Pottery, Colridge, Staffs	Belfast Police Committee	C. L. Harper, Town Surveyor, Town Hall, Brierley Hill	do.
Fire station, Ardoyne	Bury (Lancs) Corporation	J. Haslam, Bank-street, Bury	do.
Water Supply Works, Ogden Brook	Belfast Police Committee	A. Price, Architect, Sandbach	do.
Heating Town Hall	Borough Surveyor, Town Hall, Spalding, S.E.	Young & Shackleton, Civil Engineers, Belfast	Oct. 19
Sewers, Alder-lane	A. Holden, Civil Engineer, Council Offices, Hindley	J. Cartwright, Civil Engineer, Post Chambers, Bury	Oct. 20
Lavatories, South Cliff-road	Borough Surveyor, Town Hall, Bridlington	Borough Surveyor, Town Hall, Spalding, S.E.	do.
Reservoir	Early (York) Water Company	A. Holden, Civil Engineer, Council Offices, Hindley	do.
Swedish Deal Paving Blocks	St. Maryebone Borough Council	Borough Surveyor, Town Hall, Bridlington	do.
Supply of Broken Granite	Cardiff Corporation	Council's Surveyor, Town Hall, Marylebone-lane, W.	do.
Bridge Works, Loughor	Carmarthen County Council	Council's Surveyor, Clifton House, Boston-road, Brentford	Oct. 21
Twenty-eight Houses, Newbridge, Mon.	Abercrombie U.D.C.	J. W. Nicholas, County Offices, Carmarthen	do.
Waterworks	Kilkenny Corporation	G. Stevens, Surveyor, Council's Offices, Abercrombie	do.
Sinking a Well	Bradford (Sunderland) R.D.C.	A. M. Burden, Civil Engineer, Kilkenny	do.
Bridge Works, Bulley	L. & V. Railway	H. Walker & Son, Engineers, King-street, Nottingham	do.
Existing Town Church	Bradford Guardians	C. S. Irwin, Architect, Prospect Green-street, Leicester	do.
Eighty-four Cottages	South Dublin R.D.C.	F. Holland, Engineer, 11, Park-lane-chambers, Bradford	Oct. 22
Boiler House at Laundry, Carnalton	Committee	J. J. Byrne, Architect, 1, James's-street, Dublin	do.
School rooms at Salsop	Greenwich Union	E. W. Reed, County Asylum, Carmarthen	Oct. 23
New Coast Guard Bunking, near Dover	Admiralty	F. D. W. de Soto, 12, Crooms Hill, Greenwell	do.
Sewers, &c.	Brigg (Lincoln) U.D.C.	Director of Works Department, Admiralty, W.C.	Oct. 24
Artists Destructors, &c.	Beckenham U.D.C.	K. E. W. Serrington, Engineer, 28, Victoria-street, Westminster	do.
Inner Platform over Swimming Bath	Brentford Union	E. W. Carrington, Agt., Agt., 21, Dunstan's Hill, E.C.	Oct. 27
New Vagrant Ward at Workhouse	London General Omnibus Co., Ltd.	K. E. W. Serrington, Engineer, 28, Victoria-street, Westminster	do.
Timber and Lead for Annual Contracts	Devala, 13, York-st., W.1	W. H. Ward, Esq., Paradise-street, Birmingham	Oct. 28
Concrete car sheds at Wingrove	Borough of Lewisham	Manager, Company's Coach Factory, 255, Upper-st., Islington, N.	Oct. 29
Underground Sanitary Conduits at Lifford & Lee Green	U.D.C. Cannock	General Manager & Engineer, Massors Power Station, Newcastle	Oct. 30
Two short Outfalls, Rivers, Tanks, Engine, &c.	Worcestershire County Council	W. H. Ward, Esq., Paradise-street, Birmingham	Nov. 4
New Lunatic Asylum, Great Bromsgrove	Sale U.D.C.	C. R. Walker, 25, Victoria-street, Westminster	do.
Electricity Buildings	do.	Chief to Visiting Committee, Shireham, Worcester	Nov. 15
Exchange, Lough Fane, Waterbury	do.	C. Hopkinson, Civil Engineer, 25, Princes-street, Manchester	No date
Refectory, West Jesmond, Newcastle	do.	A. G. Wilson, Architect, Prospect Green-street, Leicester	do.
Rebuilding Business Premises, Academy-street	do.	W. H. Knowles, Architect, 37, Grainger-street, Newcastle	do.
Works and Offices, Queen's-road, Nottingham	do.	A. Hill, Architect, 22, George-street, Cork	do.
Bridge Works, Killy, North Wales	do.	F. Hall, Architect, 24, King-street, Nottingham	do.
Sewer, Fulcrass-street, Barnstable	do.	The Secretary, 13, Hanger-lane, Ealing, W.	do.
	do.	Borough Surveyor, Barnstable	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
Surveyor	East Grinstead R.D.C.	100 <i>l.</i>	Oct. 13

Those marked with an asterisk (*) are advertised in this Number.

Competitions, p. iv.

Contracts, pp. iv. vi. viii & x.

Public Appointments, xii.

PRICES CURRENT (Continued).

WOOD.		At per standard.	
		£ s. d.	£ s. d.
Walnut, American, per ft. sup.		0 0 10	0 0 10
do. as inch		16 10 0	16 10 0
do. per load		0 4 0	0 4 0
American Whitewood Planks		0 4 0	0 4 0
do. per ft. cube		0 4 0	0 4 0
Prepared Flooring		0 4 0	0 4 0
do. by 7 in. yellow, planed and shot		0 13 6	0 17 6
do. by 7 in. yellow, planed and matched		0 14 0	0 18 0
do. by 7 in. yellow, planed and matched		0 16 0	0 18 6
do. by 7 in. white, planed and shot		0 11 6	0 13 6
do. by 7 in. white, planed and matched		0 12 0	0 14 0
do. by 7 in. white, planed and matched		0 14 6	0 16 6
do. by 7 in. white, planed and beaded or V-jointed boards		0 11 0	0 13 6
do. by 7 in. do. do.		0 14 0	0 18 0
do. by 7 in. white do. do.		0 10 0	0 12 0
do. by 7 in. do. do.		0 11 6	0 13 6
do. 6 in. at 6d. to 9d. per square		less than 7 in.	

JOISTS, GIRDERS, &c.

In London, or delivered		Per ton.	
		£ s. d.	£ s. d.
Railway Vans, per ton		8 5 0	8 5 0
Steel Joists, ordinary sections		7 17 6	8 17 6
Merchant quality		8 5 0	8 5 0
Channels, ordinary sections		7 17 6	8 17 6
Flat Plates		8 5 0	8 5 0
Iron Columns and Stanchions, including ordinary patterns		7 2 6	8 5 0

METALS.

		Per ton, in London.	
		£ s. d.	£ s. d.
Common Bars	.....	7 15 0	8 5 0
Staffordshire Crown Bars, good merchant quality	.....	8 5 0	8 15 0
Staffordshire "Marked Bars"	.....	10 10 0	10 0 0
Mild Steel Bars	.....	0 0 0	9 10 0
Hoop Iron, best quality	.....	9 5 0	9 10 0
do. galvanized	.....	16 0 0	16 0 0
(* And upwards, according to size and gauge.)			
Sheet Iron, Black—			
Ordinary sizes to 20 g.	.....	10 0 0	10 0 0
do. 20 g. to 24 g.	.....	11 0 0	11 0 0
do. 24 g. to 26 g.	.....	12 10 0	12 10 0
Sheet Iron, Galvanized, flat, ordinary quality	.....	
Ordinary sizes 6 ft. by 2 ft. to 3 ft. to 20 g.	.....	12 15 0	12 15 0
do. 20 g. to 24 g.	.....	13 5 0	13 5 0
do. 24 g. to 26 g.	.....	14 5 0	14 5 0
Sheet Iron, Galvanized, flat, best quality—			
Ordinary sizes to 20 g.	.....	16 0 0	16 0 0
do. 20 g. and 24 g.	.....	16 10 0	16 10 0
do. 26 g.	.....	18 0 0	18 0 0
Galvanized Corrugated Sheets—			
Ordinary sizes, 6 ft. to 8 ft. to 20 g.	.....	12 15 0	12 15 0
do. 20 g. and 24 g.	.....	13 5 0	13 5 0
do. 24 g. to 26 g.	.....	14 5 0	14 5 0
Flat Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	.....	12 0 0	12 0 0
do. 20 g. and 24 g.	.....	13 0 0	13 0 0
do. 24 g. to 26 g.	.....	14 0 0	14 0 0
do. 26 g. to 28 g.	.....	15 0 0	15 0 0
do. 28 g. to 30 g.	.....	16 0 0	16 0 0
do. 30 g. to 32 g.	.....	17 0 0	17 0 0
do. 32 g. to 34 g.	.....	18 0 0	18 0 0
do. 34 g. to 36 g.	.....	19 0 0	19 0 0
do. 36 g. to 38 g.	.....	20 0 0	20 0 0
do. 38 g. to 40 g.	.....	21 0 0	21 0 0
do. 40 g. to 42 g.	.....	22 0 0	22 0 0
do. 42 g. to 44 g.	.....	23 0 0	23 0 0
do. 44 g. to 46 g.	.....	24 0 0	24 0 0
do. 46 g. to 48 g.	.....	25 0 0	25 0 0
do. 48 g. to 50 g.	.....	26 0 0	26 0 0
do. 50 g. to 52 g.	.....	27 0 0	27 0 0
do. 52 g. to 54 g.	.....	28 0 0	28 0 0
do. 54 g. to 56 g.	.....	29 0 0	29 0 0
do. 56 g. to 58 g.	.....	30 0 0	30 0 0
do. 58 g. to 60 g.	.....	31 0 0	31 0 0
do. 60 g. to 62 g.	.....	32 0 0	32 0 0
do. 62 g. to 64 g.	.....	33 0 0	33 0 0
do. 64 g. to 66 g.	.....	34 0 0	34 0 0
do. 66 g. to 68 g.	.....	35 0 0	35 0 0
do. 68 g. to 70 g.	.....	36 0 0	36 0 0
do. 70 g. to 72 g.	.....	37 0 0	37 0 0
do. 72 g. to 74 g.	.....	38 0 0	38 0 0
do. 74 g. to 76 g.	.....	39 0 0	39 0 0
do. 76 g. to 78 g.	.....	40 0 0	40 0 0
do. 78 g. to 80 g.	.....	41 0 0	41 0 0
do. 80 g. to 82 g.	.....	42 0 0	42 0 0
do. 82 g. to 84 g.	.....	43 0 0	43 0 0
do. 84 g. to 86 g.	.....	44 0 0	44 0 0
do. 86 g. to 88 g.	.....	45 0 0	45 0 0
do. 88 g. to 90 g.	.....	46 0 0	46 0 0
do. 90 g. to 92 g.	.....	47 0 0	47 0 0
do. 92 g. to 94 g.	.....	48 0 0	48 0 0
do. 94 g. to 96 g.	.....	49 0 0	49 0 0
do. 96 g. to 98 g.	.....	50 0 0	50 0 0
do. 98 g. to 100 g.	.....	51 0 0	51 0 0
do. 100 g. to 102 g.	.....	52 0 0	52 0 0
do. 102 g. to 104 g.	.....	53 0 0	53 0 0
do. 104 g. to 106 g.	.....	54 0 0	54 0 0
do. 106 g. to 108 g.	.....	55 0 0	55 0 0
do. 108 g. to 110 g.	.....	56 0 0	56 0 0
do. 110 g. to 112 g.	.....	57 0 0	57 0 0
do. 112 g. to 114 g.	.....	58 0 0	58 0 0
do. 114 g. to 116 g.	.....	59 0 0	59 0 0
do. 116 g. to 118 g.	.....	60 0 0	60 0 0
do. 118 g. to 120 g.	.....	61 0 0	61 0 0
do. 120 g. to 122 g.	.....	62 0 0	62 0 0
do. 122 g. to 124 g.	.....	63 0 0	63 0 0
do. 124 g. to 126 g.	.....	64 0 0	64 0 0
do. 126 g. to 128 g.	.....	65 0 0	65 0 0
do. 128 g. to 130 g.	.....	66 0 0	66 0 0
do. 130 g. to 132 g.	.....	67 0 0	67 0 0
do. 132 g. to 134 g.	.....	68 0 0	68 0 0
do. 134 g. to 136 g.	.....	69 0 0	69 0 0
do. 136 g. to 138 g.	.....	70 0 0	70 0 0
do. 138 g. to 140 g.	.....	71 0 0	71 0 0
do. 140 g. to 142 g.	.....	72 0 0	72 0 0
do. 142 g. to 144 g.	.....	73 0 0	73 0 0
do. 144 g. to 146 g.	.....	74 0 0	74 0 0
do. 146 g. to 148 g.	.....	75 0 0	75 0 0
do. 148 g. to 150 g.	.....	76 0 0	76 0 0
do. 150 g. to 152 g.	.....	77 0 0	77 0 0
do. 152 g. to 154 g.	.....	78 0 0	78 0 0
do. 154 g. to 156 g.	.....	79 0 0	79 0 0
do. 156 g. to 158 g.	.....	80 0 0	80 0 0
do. 158 g. to 160 g.	.....	81 0 0	81 0 0
do. 160 g. to 162 g.	.....	82 0 0	82 0 0
do. 162 g. to 164 g.	.....	83 0 0	83 0 0
do. 164 g. to 166 g.	.....	84 0 0	84 0 0
do. 166 g. to 168 g.	.....	85 0 0	85 0 0
do. 168 g. to 170 g.	.....	86 0 0	86 0 0
do. 170 g. to 172 g.	.....	87 0 0	87 0 0
do. 172 g. to 174 g.	.....	88 0 0	88 0 0
do. 174 g. to 176 g.	.....	89 0 0	89 0 0
do. 176 g. to 178 g.	.....	90 0 0	90 0 0
do. 178 g. to 180 g.	.....	91 0 0	91 0 0
do. 180 g. to 182 g.	.....	92 0 0	92 0 0
do. 182 g. to 184 g.	.....	93 0 0	93 0 0
do. 184 g. to 186 g.	.....	94 0 0	94 0 0
do. 186 g. to 188 g.	.....	95 0 0	95 0 0
do. 188 g. to 190 g.	.....	96 0 0	96 0 0
do. 190 g. to 192 g.	.....	97 0 0	97 0 0
do. 192 g. to 194 g.	.....	98 0 0	98 0 0
do. 194 g. to 196 g.	.....	99 0 0	99 0 0
do. 196 g. to 198 g.	.....	100 0 0	100 0 0
do. 198 g. to 200 g.	.....	101 0 0	101 0 0
do. 200 g. to 202 g.	.....	102 0 0	102 0 0
do. 202 g. to 204 g.	.....	103 0 0	103 0 0
do. 204 g. to 206 g.	.....	104 0 0	104 0 0
do. 206 g. to 208 g.	.....	105 0 0	105 0 0
do. 208 g. to 210 g.	.....	106 0 0	106 0 0
do. 210 g. to 212 g.	.....	107 0 0	107 0 0
do. 212 g. to 214 g.	.....	108 0 0	108 0 0
do. 214 g. to 216 g.	.....	109 0 0	109 0 0
do. 216 g. to 218 g.	.....	110 0 0	110 0 0
do. 218 g. to 220 g.	.....	111 0 0	111 0 0
do. 220 g. to 222 g.	.....	112 0 0	112 0 0
do. 222 g. to 224 g.	.....	113 0 0	113 0 0
do. 224 g. to 226 g.	.....	114 0 0	114 0 0
do. 226 g. to 228 g.	.....	115 0 0	115 0 0
do. 228 g. to 230 g.	.....	116 0 0	116 0 0
do. 230 g. to 232 g.	.....	117 0 0	117 0 0
do. 232 g. to 234 g.	.....	118 0 0	118 0 0
do. 234 g. to 236 g.	.....	119 0 0	119 0 0
do. 236 g. to 238 g.	.....	120 0 0	120 0 0
do. 238 g. to 240 g.	.....	121 0 0	121 0 0
do. 240 g. to 242 g.	.....	122 0 0	122 0 0
do. 242 g. to 244 g.	.....	123 0 0	123 0 0
do. 244 g. to 246 g.	.....	124 0 0	124 0 0
do. 246 g. to 248 g.	.....	125 0 0	125 0 0
do. 248 g. to 250 g.	.....	126 0 0	126 0 0
do. 250 g. to 252 g.	.....	127 0 0	127 0 0
do. 252 g. to 254 g.	.....	128 0 0	128 0 0
do. 254 g. to 256 g.	.....	129 0 0	129 0 0
do. 256 g. to 258 g.	.....	130 0 0	130 0 0
do. 258 g. to 260 g.	.....	131 0 0	131 0 0
do. 260 g. to 262 g.	.....	132 0 0	132 0 0
do. 262 g. to 264 g.	.....	133 0 0	133 0 0
do. 264 g. to 266 g.	.....	134 0 0	134 0 0
do. 266 g. to 268 g.	.....	135 0 0	135 0 0
do. 268 g. to 270 g.	.....	136 0 0	136 0 0
do. 270 g. to 272 g.	.....	137 0 0	137 0 0
do. 272 g. to 274 g.	.....	138 0 0	138 0 0
do. 274 g. to 276 g.	.....	139 0 0	139 0 0
do. 276 g. to 278 g.	.....	140 0 0	140 0 0
do. 278 g. to 280 g.	.....	141 0 0	141 0 0
do. 280 g. to 282 g.	.....	142 0 0	142 0 0
do. 282 g. to 284 g.	.....	143 0 0	143 0 0
do. 284 g. to 286 g.	.....	144 0 0	144 0 0
do. 286 g. to 288 g.	.....	145 0 0	145 0 0
do. 288 g. to 290 g.	.....	146 0 0	146 0 0
do. 290 g. to 292 g.	.....	147 0 0	147 0 0
do. 292 g. to 294 g.	.....	148 0 0	148 0 0
do. 294 g. to 296 g.	.....	149 0 0	149 0 0
do. 296 g. to 298 g.	.....	150 0 0	150 0 0
do. 298 g. to 300 g.	.....	151 0 0	151 0 0
do. 300 g. to 302 g.	.....	152 0 0	152 0 0
do. 302 g. to 304 g.	.....	153 0 0	153 0 0
do. 304 g. to 306 g.	.....	154 0 0	154 0 0
do. 306 g. to 308 g.	.....	155 0 0	155 0 0
do. 308 g. to 310 g.	.....	156 0 0	156 0 0
do. 310 g. to 312 g.	.....	157 0 0	157 0 0
do. 312 g. to 314 g.	.....	158 0 0	158 0 0
do. 314 g. to 316 g.	.....	159 0 0	159 0 0
do. 316 g. to 318 g.	.....	160 0 0	160 0 0
do. 318 g. to 320 g.	.....	161 0 0	161 0 0
do. 320 g. to 322 g.	.....	162 0 0	162 0 0
do. 322 g. to 324 g.	.....	163 0 0	163 0 0
do. 324 g. to 326 g.	.....	164 0 0	164 0 0
do. 326 g. to 328 g.	.....	165 0 0	165 0 0
do. 328 g. to 330 g.	.....	166 0 0	166 0 0
do. 330 g. to 332 g.	.....	167 0 0	167 0 0
do. 332 g. to 334 g.	.....	168 0 0	168 0 0
do. 334 g. to 336 g.	.....	169 0 0	169 0 0
do. 336 g. to 338 g.	.....	170 0 0	170 0 0
do. 338 g. to 340 g.	.....	171 0 0	171 0 0
do. 340 g. to 342 g.	.....	172 0 0	172 0 0
do. 342 g. to 344 g.	.....	173 0 0	173 0 0
do. 344 g. to 346 g.	.....	174 0 0	174 0 0
do. 346 g. to 348 g.	.....	175 0 0	175 0 0
do. 348 g. to 350 g.	.....	176 0 0	176 0 0
do. 350 g. to 352 g.	.....	177 0 0	177 0 0
do. 352 g. to 354 g.	.....	178 0 0	178 0 0
do. 354 g. to 356 g.	.....	179 0 0	179 0 0
do. 356 g. to 358 g.	.....	180 0 0	180 0 0
do. 358 g. to 360 g.	.....	181 0 0	181 0 0
do. 360 g. to 362 g.	182 0 0	182 0 0
do. 362 g. to 364 g.	183 0 0	183 0 0
do. 364 g. to 366 g.	184 0 0	184 0 0
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The Builder.

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OCTOBER 13, 1905.

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A Sketch Design for a Modern Anglican Cathedral: (No. 53 in the Liverpool Cathedral Competition) Elevation and Plan	Do.	Do.	Sections.	By Professor Beresford Pite, F.R.I.B.A.
Design for a Frieze: "The Canterbury Pilgrims"				By Professor Beresford Pite, F.R.I.B.A. By Mr. W. A. Chase.

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Mural Decoration.



FIFTY years ago hardly anything was heard in England of mural decoration; it was not only a lost art but almost a lost idea. Early in the century, indeed, Stothard was commissioned to paint his large picture of Antony and Cleopatra on the staircase wall of Burleigh House—a highly creditable work for the period at which it was executed; but it was a most exceptional commission at the time, nor did the painter, as far as we remember, receive any other of the same kind. One ought not to forget, also, previous to that date, the decoration of the walls of the Lecture Theatre of the Society of Arts by Barry, the *protégé* and friend of Burke, which still remains to show how little the art was understood at the time; though it is, in this sense, of a certain historical interest. The well-intended but hardly successful attempt at the Houses of Parliament showed that much still remained to be learned not only in regard to the method of execution but also to the æsthetics of mural decoration. During the last quarter of a century far more attention has been paid to the subject and an increasing number of opportunities are offered to artists, though in the latter respect we are still far behind France, where the decoration of any important building with mural paintings is almost a matter of course, and the building is considered incomplete without it; the decoration may be postponed for want of funds, but it is always regarded as a work to be done sooner or later. In England there is no such idea of it as a necessary complement to the architecture; but we have got to the point of thinking of it as a thing to be encouraged.

Simultaneously there has grown up in this country a perception that there is such a thing as a decorative element in painting and sculpture; that their object is not only to represent scenes, persons, or incidents,

but to represent them in a decorative manner. The English public generally, even the better-educated portion, have not come to this idea as yet; they still regard a painting or a piece of sculpture almost entirely in relation to the question whether it satisfies their idea of what the scene or the personage was actually like. On the other hand, some artists and most writers on art, at the present moment, have gone so far ahead in this direction, that they seem to have come to regard painting and sculpture as nothing if not decorative; not merely that it must have decorative quality (which all painting should have), but that it must actually be a decoration; that the highest function of these arts is to form decoration subordinate to architecture.

As the English public are so slow to take up the decorative idea, it may be desirable that at present it should be rather over-emphasised and thrust upon them; a little exaggeration is wholesome in furtherance of a subject much neglected. But on the other hand we have no doubt that this current language of art-criticism, which would reduce the arts of painting and sculpture to the subordinate position of being merely decorative arts, is a mistake and rests on a confusion of ideas between a picture or a statue which is "decorative" and one which is a decoration.

This is evident in the illustrated treatise recently published by Mr. Lys Baldry,* on the subject of modern mural decoration. In the first place the word "decoration" seems to be applied here in two senses. Mr. Baldry says that people think that "the designer does not rank with the picture painter . . . and they would condemn as a piece of unwarrantable assumption any demand of the decorator to be treated as a person of importance in the art world, and they would relegate decoration to the subordinate place which it seems to them to deserve." Well, in the usual and obvious sense of the word "decoration" they would surely be right. Decoration is generally understood to mean ornamental design to relieve a surface or a structure:

* "Modern Mural Decoration." By A. Lys Baldry. London: George Newnes, 1902.

such as a wall-paper design or the carving or inlay on a piece of furniture. Figure painting and figure sculpture, even when used as decoration, are surely not to be classed under the same title as ornamental design; they have a higher meaning and they demand higher powers in the artist. The nomenclature may be inadequate and awkward, but we should say that these two classes of art should be distinguished as "decoration" on the one hand, and "decorative painting" or "decorative sculpture" on the other hand. Things so essentially different cannot be classed together under the same term. Then we have a third distinction, for which also a convenient nomenclature is wanting, between decorative painting and sculpture, and painting or sculpture which, though not used as decoration, possess decorative quality; which is merely to say that they are pleasing in line and composition as well as in intellectual quality of expression; such works are those which are not "decorative" in the sense that they are used as decoration to a building, but only in the sense that they are beautiful in themselves; they are things that stand alone, and are not dependent on their position on a wall. This is just what Mr. Baldry and various other contemporary writers on art do not seem to recognise. To say that "whatever the form of expression—painting, sculpture, or design, it is the presence in it of the true decorative quality which determines its right to serious consideration" is putting the matter the wrong way. It would be more correct to say that "without decorative quality it has no claim to serious attention"; i.e., that is one quality which it must have; but it may have that and yet not be worth very serious attention. As evidence of this one may cite some at least of the late Mr. Albert Moore's pictures—his soulless and brainless female figures, always decorative, but often nothing more. And then again we read that "if the classic masterpieces of any school or period are analysed it will be found that their greatness in each instance is in exact proportion to their decorative quality." Is Millais' "Vale of Rest" a picture depend-

ing for its greatness on its decorative quality? or his "St. Agnes Eve"? or Walker's "The Plough"? But Mr. Baldry's argument apparently will not be disturbed by the instance of Millais, for on another page we observe that "the artists to whom we owe what is best in the record of the nineteenth century" are—Puvis de Chavannes, Albert Moore, Rodin, Alfred Stevens, Gilbert, G. F. Watts, Leighton, F. Brangwyn, and Burne-Jones. Millais was unquestionably the greatest English painter of the nineteenth century—future generations will recognise this if the present one does not; and his name is not thought worth mention! There must be something very much at fault in such a view of art as this.

No: the most intellectually complete work in painting or sculpture has its own individual life and interest, and is worth contemplation for itself alone, not as a portion of a decorative scheme. A work like Titian's "Bacchus and Ariadne" may be said in a sense to be decorative—that is, it has the decorative quality arising from splendid colour and composition; but it is a painted poem in itself, and of more intense and vital interest than any work could be which has to be regarded as a portion of a decorative scheme; you could not reduce it to such a position, since decoration must in a sense be subordinate to the architecture, and such a work cannot be subordinate to any surroundings. So with sculpture; although sculpture even in its most highly wrought forms retains more affinity with architecture, being built, as one may say, of the same materials; still a sculptural work of the highest order demands a position more independent than that of a niche in a building. An architectural background or surrounding it may be all the better for, but it is not to form a mere portion of the building; partly because the highest class of sculpture is emphatically "all-round" work, and requires even for that reason to stand apart. M. Mercie's group of "Gloria Victis" makes, no doubt, an admirable and in a sense a decorative centre to the courtyard in which it is placed in the Paris Hôtel de Ville; but to place it in a niche or framework in the building would be to do it injustice; and even if separated from all building and placed in the middle of a lawn, it would be a work of art quite sufficient unto itself, and worth study for its own sake. So with the best of the sculpture works exhibited from time to time at the Royal Academy; it is quite true that they are not seen to advantage there, but that is because they are in too confined a space and too crowded together, not because they have no architectural setting. Take, for example, such a work as Mr. Toft's "Spirit of Contemplation" in last year's Academy exhibition. That is a work of pure imagination, complete in itself; it would be entirely out of place as an adjunct to architecture; it represents an intellectual conception which cannot take a secondary place in a scheme of decoration.

It is only when we have got rid of this mistaken idea that sculpture and painting cannot stand alone, that we can come to consider rightly their function as decorative arts in connexion with architecture. And in regard to decorative sculpture what is said by Mr. Baldry is perfectly true, viz., that decorative sculpture is worth the attention

of the best sculptors, and that there has been recently a great change for the better in the ideas of both architects and sculptors (and to some little extent of the public) on this subject. It is now generally admitted that decorative sculpture which is mere "carving" is not worth having, and that sculptors who are true artists should be employed on any figure sculpture, be it only in panels and friezes, which it is desired to introduce into a building; and sculptors have now so far changed their attitude in regard to architectural sculpture that many of them are not only willing but desirous to put their talent into it. Nevertheless it remains true that the art of sculpture must put with some of its possible intensity and vitality when it is to be employed in a decorative sense as a portion of the structure of a building. Otherwise it will not keep its right place in the scheme; and this holds good not only of conception but of execution. Mr. Baldry expresses an admiration, which we fully share in a sense, for the work of Grinling Gibbons—for its technical mastery and thoroughness of execution. But for all that, Gibbons was not really a decorative artist; his work is not decoration; it does not blend sufficiently with the surroundings; it may be described rather as consisting of a series of brilliantly executed carvings of somewhat incongruous objects, attached to the architectural framework of a door or wainscot, not forming any portion of it. It is no more decoration than the carved knots of foliage on the exterior of St. Paul's are decoration.

Apart from this heresy which we have been combating, that all the best art is necessarily of the nature of decoration, Mr. Baldry's book is both a useful and ornamental publication; the latter in respect of its great number of excellent illustrations. Its usefulness will be rather to the general reader than to artists; it gives information as to the technical difficulties and requirements of various processes of mural decoration, a knowledge of which will very much assist those who are only lovers of art, and not actual workers, in understanding the conditions and the difficulties under which mural decorations are carried out, and therefore in forming a better judgment on the results. Artists who are actually carrying out important works in fresco, or tempera, or mosaic, will of course have already gone through a much more systematic study of the process they are employing than could be embodied in a general and rather popular treatise; but it is very desirable that amateurs should have such a degree of information on the subject as this book affords. The more generally the conditions of mural decoration are understood, the more public interest there will be in the subject; and it is on the degree of public interest in it that the encouragement of decorative art, and the extension of opportunities for it, mainly depend.

In regard to the methods of executing pictorial decoration on walls, there is no question that mosaic is that which best combines with architecture, being itself a kind of built-up work, with materials which are as hard and as permanent as those of the building itself; in fact, as far as resistance to surface wear goes, even more so. For this very reason, however, and also

in respect of its somewhat intractable character in regard to gradation of colour and *finesse* in detail, it necessitates, more than any other flat form of mural decoration, the greatest severity of conventional treatment, and any attempt at pictorial effect in this material must be a failure from the very nature of the material, even apart from the question whether pictorial treatment is proper for a wall surface at all. The best mosaic design in figures is rather symbolic, as one may say, than imitative. We agree with Mr. Baldry that mosaic is best placed at some little distance from the eye; we may add that, where possible, it is more effective on a concave surface than on a flat one, on account of the variety of effect got by the different angles at which the light strikes the surface.

When we come from mosaic to methods of work, such as fresco, which allow of a more free style of handling, we are then confronted with the question, How far are we to go in the direction of pictorial effect? And our answer is that realistic effect should be entirely avoided, and that the less there is of receding perspective effect, in general, the better. A mural painting is not to make one forget the existence of the wall (though Ruskin seems to have rather thought it was); it is to give a life and interest to the wall surface. Leighton's two frescoes of the Arts of Peace and War, at South Kensington, show a certain perspective effect in the presentation of an architectural alcove behind the groups of figures; but the whole is kept in its place, in a mural sense, by its exceedingly conventional treatment, which removes it from the category of pictures, in the usual sense of the word. But even this amount of perspective effect is rather risky; and anything like a "distance" is entirely out of place, more especially as fresco in any case is not well able to give the quality of aerial perspective. This is better understood now than it was when the Houses of Parliament frescoes were done; when E. M. Ward, for instance, simply copied one of his own oil paintings into fresco, with a result which is equally a failure in the pictorial and the decorative sense; it is neither the one thing nor the other. The best treatment, when the painting is to be an architectural decoration, is a flat treatment of figures, in which character can be expressed without realism. We publish in the present issue a clever piece of wall decoration by a young artist, which exactly illustrates this; the characters of the personages in the "Canterbury Pilgrims" are very distinctly indicated, but without detaching them from the surface of the wall; it is a procession reduced to mural conditions; and though the artist may sometimes go beyond this severity of treatment, on the whole he is safest in restricting himself to it. The system which the French have introduced, of painting mural pictures on canvas in their studios and having them affixed to the wall afterwards, is mentioned by Mr. Baldry, and the process of fixing described. It is a convenience to the painter, and gets over the technical difficulties incident to fresco painting; but it has the tendency (as is very pointedly shown in some recent French decorative work) of encouraging the artist to elaborate pictorial effects in the studio, which, when the picture is fixed in its

place in the building, are found to be quite out of keeping with the true ideal of mural painting. It is far better that the picture should be painted directly on the wall and amid what is to be its permanent architectural framework; so that the painter can see, while he is at work, what relation his painting bears to the architecture.

Ceiling painting, though it may be classed as part of the general subject, is really under rather different conditions from wall painting; and in fact it is not very often successful. It is a complete mistake to paint figure subjects on a ceiling as they would be painted on a wall—a mistake which even such a master of decorative art as Puvion de Chavannes made, in the only ceiling painting that he executed: there is always a sense of confusion as to the way in which the figures are to be regarded; and moreover, anything like a rigid treatment tends to weight the ceiling and bring it down. Figures, if used in a ceiling, should float, not stand, as they do in the ceiling paintings of M. Marioton, who is the best living master of this class of art. Boucher's ceiling at Fontainebleau, of which Mr. Baldry gives an illustration, represents the right kind of thing, though in a rather weak and tawdry style.

Another form of decorative painting which has received much attention recently in France is what is called decorative landscape; but the idea is almost a contradiction in terms; it can hardly be more, in fact, than a suggestion of the lines of landscape in a conventional manner, unless it is to transgress entirely the proper conditions of mural painting; and on the whole we are inclined to say that the less there is of it the better.

To sum up: mural painting is a great and noble art as a handmaid to architecture, and merits far more encouragement than it has yet received in this country; but it must be kept strictly within the bounds necessary to render it a decoration, not a picture. And on the other hand both painting and sculpture, in their most complete and intellectual form, have their own independent realm, and are not mere accompaniments to architecture.

THE CORK INTERNATIONAL EXHIBITION.

THE Cork Exhibition, which has been open since May 1, is to be closed on November 1. Nearly a million and a quarter people have passed through its turnstiles; and the financial results have been so encouraging that there will be a surplus of over 5,000£, besides the value of the buildings, after all expenses have been paid; and this result is most satisfactory considering the short time that elapsed between the conception of the idea and its becoming a practical reality.

The buildings for the exhibits consist of a large number of parallel aisles; and though there is nothing new or striking about them, they answer their purpose well, and have been carried out with economy and care. There are sundry restaurants and other structures about the grounds, all suitably and tastefully designed, especially the *chalet*, which is very good in its arrangements and general appearance. These buildings have, for the greater part, been designed and carried out by the City Engineer, Mr. Cutler; Mr. Wm. O'Connell being the building contractor. The section that

appeals most to architectural or building students is that of the Irish mineral exhibit, in which are many fine specimens of the granites and other building stones of the country, besides sundry marbles, especially the green, red, and black from, respectively, the counties of Galway, Cork, and Kilkenny. Good slates from different parts of Ireland are also in evidence, and there would, no doubt, be a larger market for these if the quarries were better worked, for it is complained that the supply is not reliable. Excellent stock bricks are made in the county of Cork, and a superior red facing brick is manufactured at Ballinphellie and shown on the stall of the Cork Brick Co., whose pottery goods are carried by aerial and surface railway for more than ten miles to the city. The aerial portion of this line is probably the only one of its kind in Ireland, and does its work very efficiently.

The Department of Technical Instruction and Agriculture for Ireland have given most valuable help in the fitting up and supervising of the mineral exhibits, and also those of the different building and engineering industries; but, taking into consideration that the principal industry of the South and West of Ireland is connected with agriculture, the educational value of the grounds at the west end is very great, for there the aspiring farmer or gardener can see the most modern modes of cultivating the several fruits and vegetables. The picture galleries are well worth a visit, and are of such moderate size as to enable the pictures to be seen without weariness.

In addition to the foregoing, all kinds of varied tastes may be gratified with the usual classes of stalls to be seen at all exhibitions, as also with the numerous side shows. But one of the chief attractions is that of the beautifully laid-out grounds, through which the river Lee flows. The grounds are planted with splendid trees and shrubs, and the river is made gay by numerous small boats. We trust many of our readers who have not already done so will visit this interesting exhibition before it closes.

NOTES.

The L.C.C. County Hall.

THE scheme for building a County Hall for the London County Council on the Adelphi site was considered at the meeting on Tuesday, and opposed by some speakers on the ground of extravagance; but we notice that not a single speaker had a word to say in regard to the regret which ought, at all events, to be felt at a proposal to destroy the whole site in which the names and ambition of the family of the Adams are enshrined. It may eventually come to pass that this interesting quarter may have to be demolished owing to the buildings being no longer suitable for any purpose for which they can be let; but that time has not come yet; and it seems discreditable (though alas! not surprising) that the municipal governing body of London should be first to urge the destruction of a site of so much historical and architectural interest.

A Rival to Niagara Power Plant.

A SCHEME of unparalleled magnitude is about to be undertaken in California, involving the construction of two reservoirs, one of 8,000 acres area, and the other, at a level of 250 ft. lower, of 2,000 acres area. Water is to be

furnished by the north branch of the Feather River, and the watershed area of the proposed reservoirs is about 600 square miles. The idea is that the reservoirs will so equalise the flow of water that a continuous supply of 1,500 cubic feet per second will be available for power purposes. A canal about ten miles in length will connect the reservoirs, from the lower of which water will be conveyed through a series of tunnels to Mosquito Creek, distant about five miles. Provision is there to be made for a vertical fall of 1,600 ft., and this it is calculated will develop energy equal to 270,000 horsepower, which will be applied in the generation of electric current for long-distance transmission.

Concrete Steel.

ALTHOUGH the theory of concrete steel is still in the stage of incubation, it appears to be progressing favourably. Some of the latest investigation bearing upon the subject relate to the ultimate resistance and the moduli of elasticity of concrete in flexure. With regard to the latter it may be said that wide diversity characterises the results obtained even when the specimens tested were of equal age and mixed in the same proportions. Tests conducted in 1895 by the Austrian Society of Engineers and Architects appeared to show that the average compression modulus for a Monier arch was about 4,750,000 lbs. per square inch, while the average tension modulus was about 5,700,000 lbs. On the other hand, some experts consider the compression modulus should be taken at a very much higher value than the modulus in tension. If a general balance be struck between these conflicting views, it gives an approximately equal value for the two moduli, but before this can be finally accepted as a reliable guide, further experiments are necessary upon simple and reinforced concrete. Another point upon which light is required is the variability of the compression modulus of simple concrete with variable stress intensities. Experimental records show that specimens of different constitution and age generally exhibit permanent set at stress intensities ranging from 200 lbs. per square inch to 1,000 lbs. per square inch, but in some cases almost perfect elasticity is maintained nearly up to 4,000 lbs. per square inch. Analysis of results reported by the Watertown Arsenal in 1899 leads to the conclusion that carefully made concrete of proportions not poorer than 1, 3, and 6, may be considered as possessing what may be termed an elastic limit under compression approaching closely to 1,000 lbs. per square inch. Probably when stress exceeds 600 lbs. per square inch, the value of the compression modulus of elasticity begins to decrease, but if the concrete be made in accordance with the most approved practice it is not likely that the decrease will become very marked until the limit of 1,000 lbs. per square inch has been reached. In the case of concrete in the proportions of, say, 1, 2, and 4, the limit may be taken without undue risk up to nearly 2,000 lbs. per square inch. As the tests from which these figures are deduced were conducted upon 1-ft. cubes of indifferently constituted concrete, it is scarcely correct to regard the material as one having practically no elasticity. The point is of some importance in the development of an intelligible theory for concrete-steel.

Municipal
Telephony.

WE have received a book on "Municipal Telephony," published for "The Ratepayers' League" of Tunbridge Wells. It criticises severely the manner in which the Glasgow and Tunbridge Wells Corporations manage their telephones, and proves, to its own satisfaction, at least, that their financial methods are all wrong, and that they have failed to grasp the difference between the telephone industry and other industries, like electric lighting, for example. The probable deficits that will have to be faced are exultingly anticipated and painted in glaring colours for the benefit of other municipalities who may be considering the question of telephony. The bias of the whole book is, however, too obvious, and the suggested remedy, that we should leave the whole industry a monopoly for the National Company, is an exceedingly doubtful one. We are told that the public does not realise the enormous capital required for this kind of work. "The National Company has now a capital of 8,000,000*l.* of money, and it could profitably employ another two or three millions." Even granting that this is its capital, we fail to see why this should secure a monopoly. The N.T.C. has not too favourable a record in the past, and although competing systems may be wrong theoretically, yet in practice the users of the telephone are the gainers. There has been a certain amount of grumbling recently amongst the telephone subscribers of the G.P.O., but this is only to be expected in the opening stages of such a great undertaking. We hope that in the future the whole telephone industry of the country will be worked by the G.P.O., thus securing unity of control and economy in working. It was with this end in view that the Telephone Act of 1899 expressly encouraged municipalities to manage their own telephones, and if they are careful to secure the best expert advice there is no reason why the enterprise should not be successful.

MANY municipal electrical engineers think that the great drawback to the growth of electric lighting is the high initial expense of the wiring. This is undoubtedly a drawback, as the cheapest possible price is about 10*s.* a point, and the average price varies from 1*l.* to 2*l.* The tenant does not want to make permanent additions at his own expense to his landlord's property; and the landlord, considering the risk of damage by incompetent wiremen, thinks that it may be a doubtful improvement. We think, however, that this drawback has been unduly magnified. If municipalities could sell the electric light as cheaply as gas, then the demand for it would make it profitable to the landlord to wire his houses. It is common now to see in gas showrooms a 16 candle-power electric lamp and a 75-c.p. incandescent gas burner placed side by side. The light given out by the glow lamp, especially if it be a 240-volt lamp with a blackened bulb, is ludicrously out of proportion to the light given out by the gas burner, and yet the actual cost of burning in the latter case is only about one-third of what it is in the former case. Another point where central station supply engineers fail is in keeping the pressure of their supply constant. It is easy for the consumer to regulate the pressure of the gas supply by the tap, but at

present there is no economical method of regulating the electric pressure at the lamp. The consumers near one central station in London are supplied at a pressure of 255 volts during the time of full load; those further away get only about 240, which is the normal pressure of supply. The Board of Trade regulations state that 250 volts is the maximum permissible pressure of supply at a consumer's terminals, and that a variation of only 2 per cent. from the mean is admissible. These regulations are interpreted most liberally by electricians, and we often wonder how patiently consumers put up with 10 and even 15 per cent. fluctuations of pressure. When it is remembered that a variation of pressure of 10 per cent. means a variation of 50 per cent. in the light given out, it will be seen how important a constant pressure supply is to the consumer.

The East River Cable Footbridge, New York.

A NOVEL auxiliary to bridge construction is to be found in the temporary footbridge built for the purpose of erecting the great cables of the new East River Bridge, between New York and Brooklyn. It will be remembered that we gave in a recent note some details of these cables. They are larger than any previously made, and are suspended from towers higher than those in any existing bridge. Moreover, the towers are distinguished because they exemplify for the first time the employment of steel construction on a really large scale for such a purpose. Under these circumstances, it is not surprising to find that new methods of procedure should have been considered necessary. An illustrated contribution to the "Proceedings of the American Society of Civil Engineers" gives a very interesting account of the footbridge to which we now refer. During the construction of the Brooklyn and other suspension bridges, narrow footbridges were certainly used, but their object was merely to afford means of passage from one anchorage to the other. The wrapping of the strands and of the finished cable was performed by the aid of travelling cages hung from the main cables, and the adjustment of the wires was effected from cradles suspended at selected points along the line. As the engineers of the East River Bridge considered that these methods could be much improved upon, it was decided to construct a temporary working platform in the form of a footbridge, extending the full length of the cables to be built and erected, from which the cables could be reached at all points and at all times. The photographs reproduced in the paper mentioned give some very striking views of this structure, of which the following are the main features:—In the main span the footbridge is double-decked, consisting of eight continuous footways, four upper and four lower. The upper platforms are about 4 ft. below the line of the main cable strands during the time of spinning, and the four lower platforms are just below the line occupied when the strands were in their permanent position. All the footways are connected by cross-bridges at various points to afford easy communication from all parts of the structure. The side spans of the footbridge are directly below the line of the cables, and consist of four footways in a single deck. For the support of the platforms sixteen wire ropes were employed, assembled into four groups of three ropes

each, and a single rope hung above each group. The ropes are 2½-in. diameter, the ultimate strength of each being 208 tons, and the length sufficient to extend the entire distance, about 3,000 ft., from anchorage to anchorage, passing over the tops of the towers in saddles specially constructed for the purpose. From clamps serving to bind the cables together, at intervals of 5 ft., suspender rods were hung for the support of the single deck and the lower deck of the main span, and the upper deck was supported on posts resting directly upon the beams of the lower deck. Hand-rails were formed by stretching galvanised wire rope at each side of the footways, and the temporary bridge was stiffened by a cross-bracing of steel rods. The platform of the main span, 1,600 ft. in length, is supported for a distance of 400 ft. away from each tower by suspender rods, and the remaining 800 ft. is clamped directly to the cables. Four 2½-in. storm cables are suspended below the main span, while the side spans are held by guys secured to the trusses forming the end spans of the main bridge. It is said that the expectations of the engineers as to the usefulness of the footbridge have been fully realised. Much time was saved, the main cables were much better built than would otherwise have been possible, and the risk to life which is inseparable from the erection of such a structure as the East River Bridge was reduced to a minimum.

A Canal Problem.

SOME five or six weeks ago trouble began to be experienced on the Grand Junction Canal in the vicinity of Tring, owing to insufficiency of water supply. In passing the Chiltern Hills over a hundred locks are necessary, and the scarcity of water is chiefly found in this part of the system. At the present time it is reported that the engineers to the company are unable to do more, even with the help of a new pumping station, than to provide water for the passage of about ninety barges a week, or about two-thirds of the normal number. Of course, water must be delivered at the summit level in adequate volume, or traffic would become impossible, and it is at this point that the shortage is most pronounced. Two large storage reservoirs at Wilstone and Marsworth are running dry; a pumping station at Low Roast in communication with the lower chalk formation is giving a greatly reduced output; and if the new station had not been finally completed some two months ago it seems probable that navigation would have been completely suspended. In previous years scarcity of water has been encountered, necessitating the delivery of water from places at a distance, but no crisis so severe as that now experienced appears to have occurred. The primary causes of the trouble are to be found in the low rainfall of the present year, and in the fact that the hill reservoirs were by no means full at the commencement of the summer season. Scarcity of water is also noticed throughout the whole district. Shallow wells have dried up and deeper wells, that have hitherto yielded unlimited supplies, are now exhausted daily to supply the needs of the inhabitants. There are several deep borings in the district, and, whilst these afford adequate supplies, they naturally tend to aggravate the deficiency

of ordinary wells, especially at the higher levels. The possibility of a contingency such as the present has evidently not been entirely overlooked by the Canal Co., although its extent may have been underestimated. The lesson taught obviously is that the company must commence every year with a very ample store of water in the existing, and perhaps in additional, reservoirs, and must also be equipped with sufficient pumping plant to supplement supplies from the reservoirs under exceptional conditions.

IN his Report on the Sanitary Condition of the Hackney District, Dr. King Warry, the Medical Officer of Health, draws attention to the increasing state of pollution of the River Lea, giving a table of analyses of samples of water taken from it. We have not space to reprint this in detail, but under the head of "Remarks" we observe the statement that water taken from the stream adjoining the White Hart Public House "possessed a strong sewage odour, and contained a very foul black sediment, which rapidly subsided." The only thing said for it is the negative praise that it is "free from sulphuretted hydrogen," which is not much, however, to say for the water of a river flowing through a populous district. The Report adds: "The constitution of a new Lea Conservancy Board appeared to hold out prospects of some attempt to alter the condition of the river as it passes through Hackney, but up to the present no improvement has taken place."

MR. HENRY HOLIDAY has recently finished a stained glass window for Lincoln Cathedral. It was on view for a few days last week at the artist's studio, Oak Tree House, Hampstead, and will before long, we suppose, be seen in the position for which it is designed in the Cathedral. The glass is in memory of St. Hugh, of Lincoln, to commemorate the seventh centenary of his death. St. Hugh was a man of great qualities; incidents in his life—which was by no means dull one, although he emerged from the retirement of a French monastery with reluctance—are depicted in the three-light window which is to keep a memory alive; a memory of times when Church and State were often in violent opposition, and which brought to the front characters as fearless as St. Hugh in denouncing unrighteousness in high places. The drawing of the six pictures representing St. Hugh in various crises of his life show the skill of the historian as well as the artist in making persons and events of long ago alive again. There is in the window that which will give pleasure to all; a story that is as interesting to the twentieth century as it was important to the thirteenth; a most harmonious colour decoration, with here and there rare touches of colour from glass only made by the artist. The detailed arrangement and the drawing are scholarly and refined, and to those who have seen Mr. Holiday's work before there will be evident the same satisfying comprehensive scheme of design that characterises other and much more difficult works which he has carried out. The upper panel of the central light shows St. Hugh at work as a labourer upon the building of the cathedral.

It is not certain how far he is responsible for the thirteenth-century work at Lincoln; he most probably encouraged and directed it enough in those days to produce the finest that was possible at the time. It is also said that he was the first to use the pointed arch to any extent in this country.

A Building Site in Bloomsbury. The site is being cleared of a large number of houses on an area covering about 18,500 ft. superficial, and with frontages to Alfred-place, Store-street, and Tottenham Court-road, east side. The ground is to be let on building leases for eighty years by the Corporation of the City of London, and belongs to their "John Carpenter" estate, lying in the northern arm of the parish of St. Giles-in-the-Fields. The property was laid out for the Corporation in 1790-1814 by George Dance, R.A., who planned the highly effective grouping of the north and south crescents, and the wide street (Alfred-place) upon the axis through their two centres. In furtherance of a scheme drawn up by the Corporation, that distinctive and uncommon feature will unhappily be destroyed, as it is proposed to demolish the two crescents and to replace them with two new streets that will form curved extensions north and south of Alfred-place, and enter Tottenham Court-road at points opposite Tottenham and Windmill streets.

The "Execution Bell," St. Giles-in-the-Fields. ONE of the eight bells which constitute the peal of the church of St. Giles-in-the-Fields, that have recently been re-dedicated, is said to have been used for the same purpose as was in more recent times the bell at St. Sepulchre's, near Newgate Prison. In that case it must be an old piece of casting. The gallows were removed from the Elms in West Smithfield, in or about the year 1412, to St. Giles-in-the-Fields, thence to near what had been the site of the church of St. John at the Tyburn, where Marylebone-lane enters Oxford-street, and thence, it appears, to the locality commonly called "Tyburn," at the north-east corner of Hyde Park. Sir John Oldcastle, Lord Cobham, and his followers, the Lollards, suffered execution of sentence at the "new gallows" in St. Giles-in-the-Fields in 1414-6. Fuller says that "this instrument . . . was first set up" for the Lollards, who were tied by their necks to the beam over a fire, whence some derived the name "Tieburne." In our issue of June 13, 1891, we illustrated an authentic bird's-eye view made in about 1560 of the buildings and precincts of Queen Matilda's leazar hospital, the chapel of which Henry VIII. converted into the parish church of St. Giles-in-the-Fields. In that drawing the gallows are depicted as standing on a site, afterwards taken in 1656 for the parish pound, which remained until 1765, just outside of the northern wall of the hospital precincts and now forming part of the roadway at the junction of Oxford and New Oxford streets. Hatton records, 1708, that Tyburn-road extended "between St. Giles's Pound E. and the lane leading to the Gallows W., length 350 yards, and from Charing Cross north-westerly 1,100 yards;" so the east end of the "lane leading to the gallows" was in his time at the north end of the present Wardour-street. Many citations, including Holinshed's mention of the death in 1330

"at the common place of execution, called in those days the Elmes and now Tiborne," of Roger de Mortimer for high treason, could be given to show that "Tyburn" as a place-name and the name of a stream seems to have been either shifted eastwards from the Elms in Bayswater (now Gloucester-terrace), or repeated, as well as the gallows.

A CORRESPONDENT of the Times, two or three days ago, drew attention to a method of simplifying the question of motor-cars v. the public safety, which seems never to have occurred to any one here, but which has the merit of perfect simplicity, and appears to be practised in Canada with entire success. It merely consists in putting the onus of getting out of the way on the driver of the motor or bicycle (for the law is applied equally to bicycles), instead of on the pedestrian. In that sensible Colony the motor-car or the bicycle are not required to ring bells or blow horns to warn the passengers; they are not allowed to do so, as it would be regarded as a nuisance; they are simply bound to avoid running into any one, and are heavily fined if they do. In this country the accepted principle—at all events the accepted practice—seems to be that motor-cars, bicycles, and hansoms may drive as they please and the passenger must get out of their way; they are merely bound to make a noise to warn him. Really, in Shylock's phrase—"Is that the law?" If so, the Canadian law seems much simpler and also much more effective in its operation.

THE GUILD OF HANDICRAFT EXHIBITION.

A SMALL exhibition at the Woodbury Gallery, New Bond-street, of work done by the Guild of Handicraft, is accompanied by a pamphlet giving an account, with sketches, of the new locality occupied by the Guild workshops, which have been removed from Essex House, East London, to the small and picturesque town of Campden, in the Cotswold district. The place appears to be an almost untouched and unspoiled mediæval hamlet, with some charming old houses; and the Guild of Handicraft have got possession of an old silk mill (representing what was once the principal industry of the place) for their principal workshops. The removal of an important art industry into a quiet country place like this is an interesting event, and if it proves successful may lead to a similar exodus from London on the part of other industries. The gain to the health and happiness of the workers by transportation from London to a quiet and beautiful country place ought to be very great; and if it is practically proved that work can be carried on in such a locality under remunerative conditions, this may offer an example of one manner of meeting the difficulty of overcrowding in London. One reflection, however, we cannot but make. The Guild of Handicraft professes to carry out work in the spirit of the teachings of Ruskin and Morris. Every one will remember that Ruskin had a lifelong enmity to railways, and was constantly denouncing them as the ruin of the beauty of England. Yet it is quite certain that but for railways such a move as this which the Guild of Handicraft has made, in taking its workshops away from the greatest centre of purchase, would have been practically impossible, as it would have meant commercial suicide. The exhibition at the Woodbury Gallery illustrates both the strength and the weakness of the Guild of Handicraft work. Its strength lies in excellent and thorough workmanship. The oak sideboard and the writing-cabinet exhibited are admirable examples of this; everything is sound, solid, and well finished, without any character of showiness. On the other hand we see here, as we have seen in other quarters where it is professed to produce furniture of specially artistic character, that the reaction



High-street, Camptden.



A House in Camptden.



The Guild Workshops, Camptden.

against the pretentious character of furniture of the Victorian era has led to an exaggerated simplicity and squareness of form which is in itself an affectation of another kind. Furniture for the better class of house should display a certain sumptuousness of line and style, qualities which are perfectly compatible with artistic design. The oak sideboard exhibited is what we should call a cottage sideboard, not only in respect of its small size but in its squareness and want of flow of line. This is good design as far as it goes; it is all in good taste, but it is comparatively easy to avoid bad taste when you avoid any departure from the simplest lines. What one wants for the best class of furniture is richness of effect without departing from good taste; and that is a much more difficult problem. The inlaid pewter decoration at the back of this sideboard is a good example of the effect which may be got by the combination of metal with wood in this manner. In the writing cabinet before referred to the contrast of material is produced by ebony and holly. This is a richer piece of work than the sideboard, but even here we think the rough finish, so far as surface goes, of the metal work is at variance with the general character of the work, and to a certain extent spoils it. A great deal of the jewellery and silver work is very good; and one notices that while the furniture shows an exaggeration in the direction of squareness and simplicity of line, the jewellery rather tends to err in the opposite direction, being too full of twists and curves of unsymmetrical character, with some little of the trail of "l'art nouveau" over it. However, there is much in this part of the work that one can frankly admire. The prices of things seem very high; but where there is good workmanship this may be expected. One of the things the public has to learn is that good workmanship cannot be done at a cheap rate.

We give above reduced reproductions of three of the sketches by Mr. New, in the pamphlet handed to visitors to the exhibition; showing the High-street, Camptden; an interesting Late Gothic house in the town; and the old mill which now contains the workshops of the Guild.

TRURO CATHEDRAL.—Truro Cathedral Building Committee met on the 9th inst. The report of the architect and contractors was that they were perfectly satisfied with the progress and condition of the building, and saw no necessity for the removal of the fractured bases of the nave pillars, reported on some time ago by Sir Thomas Drew. The nave will in all probability be completed by May; next. The central tower will, it is expected, be finished about next October, but it was not thought desirable to postpone the opening of the nave until such a late period of the year.

SCHOOLS, DARLINGTON.—On the 10th inst. the new Rise Carr Board Schools were opened at Darlington. The schools are from the design of Mr. G. Gordon Hoskins, J.P., architect, of Darlington. They will cost over 8,000.

THE ARCHITECTURAL ASSOCIATION.

The opening meeting of the Architectural Association School of Design (elementary and advanced) was held on Tuesday evening in the Meeting Room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, W., the President of the Association, Mr. H. T. Hare, presiding.

The Chairman, in opening the proceedings, said it was a great pleasure to see so many students present, but he regretted to announce that Mr. E. S. Prior and Mr. E. W. Mountford, who were expected to be present to address them, were unable to do so. He was glad to say, however, that Mr. Leonard Stokes had kindly consented, at very short notice, to take their place, and from him and Mr. Guy Dawber, the students would no doubt derive a great deal of very serviceable knowledge, as they would also from the study of their work.

Mr. E. Guy Dawber then read the following short paper:—

"I have been asked to speak to you to-night upon the subject of 'Design,' and to try and suggest a few thoughts that may be of use in your studies during the coming session. I must confess to a certain amount of diffidence in doing so, for, in our profession, we are all students together, and any advice that I can offer you, I know quite well, applies with equal force to myself.

The subject of design is so wide, and embodies almost everything dealing with form and colour, that it is quite impossible to treat of more than the mere essentials that enter into an architect's everyday work. Broadly speaking, design depends a great deal on its environment and on its suitability to its purpose, and what may be admirable under certain conditions will be wrong and out of place in others.

As illustrating this fact, you have only to think of the town house, with merely a front, and blank walls on either side, planted down in the middle of a country field. As a house, it doubtless contains the necessary accommodation, but regarded as a design it is wrong, and shows at once that every building must be dealt with in strict relation to its particular surroundings.

The same thing applies with regard to decoration, for here, more almost than anywhere else, there should be a continuity of style and idea, and one range of thought should dominate the whole scheme. You know, only too well, that any excess of ornament and decoration should be avoided, and that it should only be used where it helps to complete your design. Our President was so right the other night when he urged the use of indiarubber, for it is only by going over your designs again and again, finding each time what you can leave out, that you will produce a satisfactory result.

It is a recognised fact amongst painters that selection of line expressing form is essential to good drawing, and perhaps our admirable

black and white artist, Mr. Phil May, is an instance of this, for after making careful and detailed studies his invariable practice is to eliminate everything that is not absolutely essential to the expressing of the form and action he wishes to convey, and that is one reason why the directness and straightforwardness of his work appeals to everybody. And it is the same in our work, where profusion of detail and ornament confuse the eye and take away all feeling of restraint and repose, and also the idea of strength that every good building should possess. Remember that the object of all decoration is to ornament and to adorn, and not merely to show off the skill of the designer and decorator, and unless placed in the right positions and where it helps your design, it is not only worse than useless, but detrimental in every way.

Of course, in discussing the question of design, it is impossible to reduce it to a science, or lay down any hard and fast rules to be followed, for in all ages the question of what is beautiful, or the reverse, either in architecture, painting, or sculpture, has been one upon which men have never entirely agreed. Design depends necessarily upon the individuality and temperament of the designer—for where one will look at a thing and judge it as a whole, another will instinctively in his mind's eye deal with it in detail, and think more of each separate fact than of the complete work, which these facts go to make up.

There is much difference of opinion as to how far an architect's work should be influenced by tradition. Some will urge you to go straight to Nature for your ideas, and not trouble about the works of man, which must be inferior to those of his Maker. This is a fascinating theory, but to my mind, in practice it does not seem feasible—for think of it, architecture is essentially utilitarian—in other arts you may go straight to Nature and borrow first-hand—the painter, his colours from the sunset; the musician, his song from the birds—but neither the ant nor the bee would give us any practical suggestions in the solution of difficulties—nor would the contemplation of any number of leafy avenues ever help us to design a church or cathedral.

You should study the works and buildings of our best living men, as well as those long since dead and forgotten—it is a mistake, as many students do, to neglect the prosaic present for the picturesque past. If you see a beautiful building, and one that gives you lasting pleasure, try and analyse it—dissect it piece by piece—get right down to its dry bones, so to speak, and find out what it is, in its composition and construction that produces this result. The cultivations of this habit of analysing every thing you see, of dealing with actual existent facts, will help you to design, far more than studying endless books and illustrations, and making dozens of pretty sketches. It is a good thing to think; the more thought we put into our work the better it will be.

done. Work of all kinds becomes exalted, ennobled, refined, and produces good lasting effects just in proportion as we put thought into it.

Beauty in architecture, as you well know, does not result from richness of material and profusion of ornament, but from elegance of form and proportion, harmony of colour and perfection of practical execution—and also in great measure from the intelligent application of material to its uses, and it is well you should always bear this in mind. Remember that all materials have their limitations and uses, and think over the suitability of the forms you decide upon, and then confine your design strictly within that margin.

If any special building or feature of it particularly claims your attention, you will find that the proper and legitimate use of material has much to do with its charm and pleasing effect, and this is the point that I want to emphasise to-night. Do not, of course, be led away into thinking that mere perfection of material and workmanship will atone for feebleness of design and composition, for they never can, but materials and the way they are used have a very large influence upon the final result of your work, and in your designs you should always bear this in mind.

I see amongst the subjects of the work of the session, summer-houses and bay-windows in wood and stone, a cottage, market-hall, and railway-station and font and so on, all of which require individual treatment with regard to materials of which you propose to construct them. In dealing with any one of these subjects, make up your mind beforehand, almost before you have crystallised your ideas on to paper, of what they shall be built—in stone, then whether of rough rubble or finely-finished ashlar; whether the roofs shall be slate or tile—all of which require differently treating, and which should affect the character of your design. If your building is in brick, arrange your construction for this material, and confine your details within the sizes that bricks are made, and do not attempt to get out of one material the effect that belongs properly to another.

If you are dealing with plaster, and your house is in rough cast, remember that this is a material that requires broad and simple surfaces. We have only to look around us even to-day to see the numerous instances to which this material particularly has been degraded. Can anything be more false in construction and design than the imitation in plaster of half-timbered work painted to imitate wood?

Guard against being carried away by the love of the pretty and picturesque, and, above all things, avoid any sham or imitation in your work. Wherever possible, study the way in which all materials are used, whether in old or new work—you will find much to learn and much to avoid.

In some of the designs exhibited in this room at the opening meeting the construction was drawn showing that the student had not thought out properly the material in which he was working, and which in actual building would be impracticable. It should be your aim always thoroughly to understand how you intend to use the materials shown in your designs, and this you can only get by continually observing work, both old and new.

Try and convey your meaning in as clear and straightforward a way as possible, avoiding all tricks and mannerisms, and remember that the essence of good architectural drawing is to make your design intelligible to the workman who may be called upon to carry it out.

It is an admirable plan to try and picture in your mind's eye the finished work—try and see it as a whole and complete, and also every portion of it in detail. Think over your building from all possible points, and adapt it to its site and surroundings.

If you train your mind to do this, you will be surprised to find how helpful the practice is, and in how short a time you will be able to accomplish it—it will enable you to see the plan and superstructure together; for, as you know, one is inseparable from the other, and both should be thought and worked out at the same time. Then after thinking out the mass, study it in detail and thrash out every part of it, for nothing is too small for your care, and no part must be left to chance.

Detail makes perfection, and you should endeavour to make your work as perfect as possible in every way.

And above all things, remember that eccentricity is not synonymous with genius, and in

order to produce a beautiful work it is not necessary to be bizarre or grotesque.

In architecture, decoration, and furniture there is a strong movement permeating the country not only to treat material sensibly, but with freedom from the fetters of bygone schools of design. The mere copying of old forms and traditions, if unaccompanied with fresh thought and feeling, should not be tolerated; for servile imitation is a sure sign of decadence and the admission of a lack of creative force.

We need a revival of the old simple expression of individual feeling, expressed with the enlightenment and knowledge of to-day. But equally I would warn you against falling to the other extreme, and in your efforts after so-called 'originality' getting into the slough of the 'new art.' Abroad, as many of you know, this has developed into a mania, and the 'crawling line' now supplies the motive for roofs and doorways, chairs, tables, and jewellery—the designers treating wood and stone as if they were copper wire, losing all sense of proportion and fitness in a mere delirium of meaningless lines.

You know that ornament must follow good construction, and that this again must be based on the proper use of material, and though the tendency of the time is to try to be original, to produce something fresh and striking, yet I venture to think that much of what we now see around us is only ephemeral, and will not hold its place in years to come as representative of our architecture to-day.

Many of those who condemn our modern architecture, and make slighting comparisons with the old, overlook entirely the fact that none of those who constructed the old buildings we all so much admire had a tithe of the difficulties to contend with that we have to-day—the multiplicity of modern requirements; the advances made in science, in electricity, heating, drainage, and so on; the varied materials; the use of iron and steel; and the limitations and rules, at any rate, in towns—within which our buildings have to be confined.

Of course I know that all these things will not affect your work in the coming session; but you should think over them and ponder upon their meaning, so that when you enter upon your struggle in the race of life you will not be handicapped at the outset by ignorance of the difficulties and changed conditions you will have to contend with.

In the consideration of your own individual designs try and think them out for yourselves on sound and logical principles, and remember that it is only by honest endeavours to adapt our art to every-day requirements that we can make it a real benefit to present day architecture.

Mr. Leonard Stokes said his remarks would be rather general, for he was not asked to take the place of Mr. Prior and Mr. Mountford until twelve o'clock that day, and since then he had had to go a little distance into the country; the consequence was that he had only been able to prepare a few notes in the train. He was sorry that Mr. Prior was not present that evening, though he thought he might possibly be able to tell them briefly what Mr. Prior's theory was—it was that it was impossible to teach out design. Well, this conclusion might be arrived at, but, at the same time, a great deal could be learnt about design. Mr. Prior's theory, he believed, was that design should grow spontaneously. Well, there were very few things that grew spontaneously; most things required some sort of cultivation. Wild flowers were very beautiful, but after cultivation they might produce more glorious effects. Wild fruit trees, again, required to be trained, pruned, and grafted before they gave the best fruit. More or less, the young students he saw before him might be considered to represent, say, young crab-apple trees on to which it was proposed to graft some knowledge from the gnarled old tree. The vigour of the young crab-apple tree, when it had this knowledge, so to speak, grafted on to its stem, would lead to improved results, and the fruit it would bear would, he hoped, be abundant. If those he saw before him were all going to join the classes of design, those classes would be a most magnificent success this session; but from his knowledge of the past he was afraid they would not all do so. The object of the classes was to assist students in the study of design, and when put in that way he thought Mr. Prior's objections were met, for if design could not be taught, students could be assisted to acquire a know-

ledge of design, which was absolutely necessary to them. He was rather afraid to say what he was going to say on the subject of examinations, but he thought there was too much tendency to cram for their everlasting examinations. He did not know that the classes of design had as their object in any way whatever the leading up to the examinations except indirectly, and he could not help thinking that students would do themselves much more justice if they did not think quite so much about qualifying for some particular examination in some particular month. Students should take things more quietly, and learn thoroughly what they wanted to know, and not cram it into themselves in such a way that it left them in a few days or weeks; for after all they were preparing themselves for their future career—they were not preparing for a future examination. He hoped he was not flogging a dead horse, but he would urge upon them the advisability of preparing themselves for their own future careers, and not of preparing for any particular examination. Their futures as a whole were much more important than passing an examination by a particular time.

Mr. Dawber had said so ably almost all that need be said that it seemed almost unnecessary to go on. If they had taken in half that Mr. Dawber had said, and would go away and practise it, they would become very good architects. He (the speaker) would emphasise one or two points, however.

Proportion was one of the principal things in design. If they got the proportions of a building correct—by correct he did not necessarily mean according to any particular rule—but so that they would satisfy a well-trained eye, as a well-proportioned building would always do. Nor did he advocate much detail which was too often a mass of crudeness, for a building well thought out and in good proportion did not require much detail. One of the great things was to know how much to leave out of a design, and not to put in all that could be thought of; but to eliminate a great deal of the unnecessary and superabundant detail which Mr. Dawber had referred to.

He did not think the remarks of the President, in his recent address, as to indiarubber were quite fair to the original author of the condemnation of the use of indiarubber, who was speaking more in regard to sketching. If they wished to produce show sketches they should try to do without indiarubber; for if they did without it they would make a much better sketch than if they produced their sketch after rubbing out two or three times. There would no doubt be a loss of accuracy at first, but if they were to make sketches which would be pleasing to look at they must do without the use of indiarubber. Of course indiarubber was most valuable, and he did not know how architects would get on if they did not frequently rub out some of their ideas.

As to measured drawings, he thought that students would do well in their young days to confine themselves to measuring what they saw, for if they did that carefully they learnt so much. The student did not measure for the sake of making pretty drawings, but when he saw a piece of work he admired, he proceeded, or should do so, to measure it and put it on paper. He should say to himself, "That piece of work up there, when drawn to an inch scale, produces an effect like this; the next time I want to produce something of that nature I know that if I get an effect on paper like this the result will be something like that"—so that one worked backwards to work forward. They saw the work they admired, and they put it on paper. Then when some one commissioned them to design something; they had to begin by putting their design on paper, and then, with the knowledge they had gained by representing bricks and mortar on paper, they were able to produce a satisfactory result when building in bricks and mortar from paper.

Mr. Dawber had spoken about new work. They might think it obvious—but it was not—that good new work would teach them very nearly as much as old work, for if they confined their studies to old work half the problems met with in modern life were absent in that old work. New buildings must be studied and examined, or the young architect would have to fight out all the problems of modern building for himself, and it was possible he would not grasp them well the first or even the second time. These modern problems could be understood by studying modern

buildings, and the solution of them was easier and quicker in that way to most students than if the student worked them out for himself.

He was glad to hear Mr. Dawber's remarks about materials. It seemed so unfortunate that some architects should jump about from the use of one material to another. Occasionally they got a design that might have looked all right if it had been worked out, or thought out, carefully in proper materials, but instead of that the architect used some red brick here, a piece of white stone there—because carving was wanted—or they got a very nicely-proportioned window with stone dressings which had to be bonded into the brickwork surrounding it, which resulted in irregular bonders all round the window. The zig-zag effect of the bonders, which was often puzzling, was often more noticeable than the delicate mouldings which formed the jambs or the arch of the window. If they had to design a brick or stone building, they must from the first limit themselves to some form of brick and stone treatment which would not produce a lot of irritating lines where the brick and stone joined, for these joinings had the effect of marring the design.

Simplicity was a very important matter, and he was afraid they did not run much risk of being too simple in their work. The Class of Design was an excellent institution for more reasons than one, though they might not agree with what he was going to say; it enabled students to throw out a good deal of crudeness of design that was latent in them, and competitions were useful in the same way. Some designs, in the school and in competitions, looked as though their author had had a bad attack of measles, judging from the rash thrown out.

In studying old work, they should not do so in such small fragments that the work they did was of little use to them when they wanted to refer to it afterwards. He had known students make a study of a door or window. They measured the external jamb and arch, and they stopped there; they did not go inside and show how it looked there. That sort of thing was sometimes seen in the Class of Design; the idea had been copied from something sketched by the designer, and made a very nice design from the outside, but no consideration was shown for the door seen from the inside. That was a small illustration of what he would venture to call want of thoroughness. When they studied a thing, they should study it thoroughly—not in a scrappy or unreasonable manner. They should take the thing as a whole, and if they could not measure it, they should sketch it, but they must not omit to put dimensions on the sketch. Dimensions would not do any harm to the sketch and they would be found invaluable afterwards. To know that a doorway was so many feet wide was invaluable afterwards. The size of a thing was very important—the real size of a thing. He remembered that a friend of his once let fall a remark that he always designed to one-eighth scale. Now that was a fatal thing to do; they should design full size and think of a thing full size. If they could not think of a thing full size, they should take out their measure and measure it; they did not want to have anything to do with pettifoggish one-eighth scale. Of course, they had to do so in order to get a contract or in dealing with the Building Act, but they did not, or ought not to, design to one-eighth scale. They should design inwardly much larger, and then, by necessity, reduce it; "but do not design to one-eighth scale. Think of your building as a whole and never mind little pieces of detail. If you get a good building, a good mass, a good general effect, then the detail (if you have any knowledge in you whatever) will more or less grow spontaneously." The first thing was to know what they were going to build, and having decided on the general treatment, the detail could wait. They should design their building and think of it in bulk, and then by degrees they came down to the details.

He was glad Mr. Dawber had criticised the "new art." He thought they were well advised not to have anything to do with it. It might be very original, but they did not want to strive after a type of originality of that kind. Their own individuality would be enough if they digested and studied the work done before them by others on more or less recognised lines. Their own individuality, if they studied carefully, would give their buildings quite as much originality as was really wanted.

Another most valuable avenue to knowledge

was the study of works in progress. If they were in offices designing to one-eighth scale or tracing quarter full size they would never get on particularly well. They must get out on the building in progress and see things going on; and think, and make a mental note of what to avoid and what to do when it came to their turn to erect buildings.

The Chairman said they were much obliged to Messrs. Dawber and Stokes for the good advice they had given, and he desired to propose a very hearty vote of thanks to them. Advice given in that way must be, of necessity, more or less in the nature of truisms, yet the more such advice was repeated the more it was impressed on one's mind. The most important thing that had been spoken about was as to simplicity in design. He did not think that could be repeated too often, for the greatest difficulty in design was to keep their work simple. If they studied some of the best old work, they would see how very simple it was when put on paper. For instance, the garden front of St. John's College, Cambridge, was one of the most charming pieces of design, but on paper there was absolutely nothing in it at all, and that showed the importance of keeping things extremely simple. The same remarks applied to Trinity College Library, Cambridge. He quite agreed with what Mr. Stokes had said about preparing for examination. But, at the same time, he was sure Mr. Stokes did not wish to say it was not a good thing to have an object in front in their study. And although they might be crammed, a great deal learnt in that way remained, and was of use to a man. It was quite impossible to teach design; it could not be taught unless it was in a man, but a great deal of useful help could be given as to what had been done in the past—what had been successful and what unsuccessful. It was hopeless to think of designing if they had no material of that kind to work upon, so that the more study they gave to that sort of thing the more they would have to draw upon in working out their own designs.

Mr. H. H. Statham said he should like to second the vote of thanks. He quite agreed with Mr. Stokes in saying that Mr. Dawber was right in all he had said, except in one passing remark which was not essential to the subject. Mr. Dawber remarked about the music of the birds and the music of nature. As something of a musician he (the speaker) wished to say that the music of nature had no more to do with the art of music than the trees had to do with Gothic vaulting. Music was an artificial art entirely. As to what Mr. Stokes had said about examinations, he agreed that one should not think only of passing the examinations. This was an over-examined age in every walk of life, and a man could not be examined in design, or in art. Architecture, however, had this peculiarity in comparison with other arts: it was mixed up with questions of practical construction. He thought it was a desirable thing that architects should have established some sort of examination which would afford the public the satisfaction of knowing that the architect they went to could be trusted with the construction of a building. As to design, the matter was very different. A man must find his own level, and people who knew anything about such things would find out whether an architect were an artist or not. But he thought that examination in construction was a good thing, because it gave a point to work up to. That side of architecture was to many men the least interesting, but it could not be overlooked. As to another of Mr. Stokes' remarks as to originality and that the thing they had to think of was the design of buildings, students should try to keep out of their head the idea of any particular thing they wished to imitate, something that they were fond of: they should not try to make their building convey that, but should endeavour to think from the first what shape their building should take in order to fulfil its practical requirements. A great deal was misused by young architects in their habit of trying to design something in memory of something else they had admired very much, and then getting the building to fit it afterwards. If they always thought of the practical problem of the building, they might get an original form and decorate it in their own way afterwards. As to the study of detail to one-eighth inch scale, that was excellent advice when circumstances rendered it possible to act on it; but they did not always. But with the study of full-size detail should go the study of the general eleva-

tion, of whatever scale it is. Very often the client would not let them do that—he was in a hurry to get the contract signed; but when they got a client with common sense who cared for architecture for its own sake, they should tell him that it would be better to wait and give more time for the preparation of the drawings. When they got a client to agree to that, they should sketch out the full-size details *pari passu* with the one-eighth scale or quarter-scale elevation; and if they did that they would be better able to see their relation to the whole. When they were not able to do that, they often found that they wanted afterwards to do something for which there was not space or which would not fit in with the general design.

The vote of thanks having been heartily agreed to, the meeting terminated.

MANCHESTER SOCIETY OF ARCHITECTS.

THE following is the address delivered by the President, Mr. Alfred Darbyshire, at the opening meeting of the new session of the Manchester Society of Architects, on Thursday, the 9th inst.:

"On entering the second year of office as President I must express to you my high appreciation of the honour you have conferred upon me by re-election. I trust I may be able to steer through the difficulties and responsibilities which, of necessity, are associated with such an office; and that at the close of the term we shall not have lost in dignity and respect as an important provincial institution in alliance with the Royal Institute of British Architects.

It seems desirable that in this address I should allude to several important matters which concern the welfare of our art in a large community like this, but it is also desirable that I should review the present condition of architecture, and indulge in some speculation as to its future history and practice.

The efforts of our Society in connexion with the official control of architecture in this city have been attended with satisfactory results and by the appointment of a City Architect. The duties of the office have been carefully defined by the Corporation authorities, and the appointment has fallen on a gentleman fully qualified to perform those duties and who is a member of the Royal Institute of British Architects.

In my former address I alluded to the proposed establishment of a chair of Architecture at the Owens College. I had to chronicle the failure of our efforts to induce the Corporation of the city to join in the establishment of this University chair of Architecture; and I also stated that our efforts would not cease till every means at our disposal was exhausted. The paramount question we have to deal with is that of endowment, so as to make the Professorship worth the acceptance of a man in whom the profession would have confidence, and whose opinion on all points of artistic value should be sought and respected. It must be admitted that such a tribunal of appeal is required in dealing with artistic matters in such a city as Manchester. We are surrounded with evidences of this want of advice and control; witness the architectural settings of our public statues and the artistic horrors and heraldic blunders made in the decoration efforts of public buildings (including the civic hall) at a Coronation time or on other occasions of public rejoicing. There are many ways in which the knowledge and culture of a Professor of Architecture at the University would be of great value, and without in any way conflicting with the official control of the City Architect.

As I have said, the question of endowment had to be faced. It was a serious consideration with the College and our Society on account of our failure to induce the Corporation to join in the effort, or to provide any portion of the funds. Our fellow member, Mr. Stannus, was doing what the Corporation needed in connexion with the Municipal School of Art. Now that he has resigned his office (and this he felt he must do for reasons which, perhaps, do not concern the public), the Corporation has joined the movement, and, with the assistance of funds promised by gentlemen interested in our art, I feel that we are now approaching a consummation which will add honour and dignity to architecture and its practice. When my term of office closes with

the present session, I hope to vacate this chair with the knowledge that the Chair of Architecture at Owens College is an accomplished fact.

I alluded on a former occasion to the important question of architectural competition, and to the need for proper and efficient assessment. This matter has been much under discussion during the last year, and things have gone so far as the establishment of a society, which, I believe, desires to advise the Royal Institute, in connexion with this question of assessorship. I think it will be found that the Institute has adopted and arrived at resolutions which will cover the situation and meet all requirements. When an assessor is appointed (no matter by whom) he should be chosen with a view to his knowledge on the particular class of work upon which he has to adjudicate. I may say here (by way of parenthesis) that I have no sympathy with those public authorities who place assessorship in competition, and who, I fear, appoint the lowest bidder for the office, independent of his ability to adjudicate on the particular matter offered for his consideration. Having chosen an assessor on the right lines, it is essential that his decision should be final and binding in his clients, the promoters. In this way, and in this way only, will the country secure the best architectural results, and justice be done to the profession. The only excuse for departing from this rule would be some serious and insuperable objection to the author of the selected solution of a competition problem. Let us hope that such a condition will never be possible.

As before remarked, it appears desirable that on an occasion like this we should review the present condition of our art and indulge in some speculation as to its future. I confess that the latter consideration constitutes a formidable task, and one in which imagination and surmise must play the chief parts. Let us, however, indulge in a brief review of architecture as we find it at the present time.

We, who have done much of our work during the Victorian era, may pause and wonder at the present development and practice of architecture, and speculate on the probable condition of the art during the first quarter of the twentieth century. It seems to me that a fit and proper motto for the present condition of civilisation and movement is the one word, 'Speed.' At such a rate does science move in the application of its principles and discoveries to the needs of humanity and progress, the architect is bewildered, and his greatest energies are needed to keep pace with this hurried onward movement. In the architecture of our cities architects have, and will have, the hardest tasks to perform in the application of their art to the present and to the probable conditions of the future. This unseemly speed and competition has engendered a utilitarian spirit, which dominates all city architecture. If a beautiful and refined façade is produced, its lines and its architectural beauties are ruined and destroyed by huge signboards in the form of cut-out flaring gilt letters stuck on the elevation, often without the least respect for the lines of architecture, and to the complete destruction of what often is a costly artistic effort. Speaking of science, just consider what electricity is doing in the way of destruction of city architecture. Holdfasts for overhead wires are driven into and fixed on architectural façades without the slightest consideration for their artistic value. It is a matter of no consequence as to whether the buildings are public or private, and perhaps no greater instance of the hasty application of scientific requirements, to the spoliation of architecture, can be found than the present aspect of Albert-square in this city. It is a mass of electrical network; the fine elevations of the atherhouse are completely cut to pieces, and their beautiful lines destroyed. The speed at which we are travelling in scientific and other developments does not allow of time to consider the result of existing conditions, hence the architects of this new century find themselves on a new platform of practice. It is said that on the occasion of one of Ruskin's Oxford students returning from Italy he said to the great master, 'The moment I entered the Florentine gallery I knew why you have given to Botticelli such supremacy' (or words to that effect). 'Indeed,' said Ruskin, 'you saw this in an instant; and, only to think, it took me twenty years to find it out. What will be the end of our civilisation if we go at this speed?'

This is not the occasion for a dissertation on

ancient or modern history; but there are some points in connexion with our art that are worth alluding to, and some curious and interesting lessons to be learned from the history of the last two hundred years. Over a hundred years ago Englishmen, through Hanoverian obstinacy, quarrelled with their brethren settled in the western world. The result of this quarrel was the building up of a new civilisation. As a matter of necessity, this was done in a hurry to meet the demands of the new life and independent administration. The rapid and wonderful completion of this new civilisation was well described by Tennyson, who so beautifully described America as

'Gigantic daughter of the West.'

The modern historian, who writes the chronicle of our own time will have to recognise a topsy-turvydom unknown in the world's history. England, after its past centuries of consolidation in art, literature, and intellectuality, is now going at the speed which characterised the building up of the new western world; whereas America is now consolidating in the realms of art, literature, and intellectual culture. The value of our own art is fully recognised; and, although the old speed has not quite disappeared, there is a strong and growing disposition to acknowledge the power of beauty in architecture. On this side the Atlantic we do not hesitate to spoil our art with the hideous application of scientific necessities; there is little respect for existing beauty; we even go to such lengths as painting white marble statues (and, I regret to say it, in our own City, too), although they are recognised as the works of great sculptors of bygone days. Public boards are congratulated on their ability to dispense with the services of an architect, owing to the amateur cleverness of officials. Competitions in architecture are mismanaged, and are often valueless from an honourable standpoint. Briefly, the architect of this new century has a condition of things to grapple with which will militate against the principles of beauty in architecture; and without beauty architecture becomes mere building and only the exponent of science.

It may reasonably be asked, if such a gloomy and despondent view is to be taken of our beautiful art, can nothing be done to save its destruction, and to perpetuate and maintain some of the past traditions upon which it has been based since the days of its perfection on the classic plains of Attica? I am convinced that the only reply to this interrogation is—let the architects of the present, and all future time, study the art of the past, whether Pagan or Christian; from such study will be evolved the fact that, whilst all past architecture was the outcome of certain eras of civilisation under climatic conditions, it never lost sight of the beautiful. A study of our art in the past will also reveal the fact that it was truthful to the requirements of the time. This is an important point, and should never be lost sight of; then Christian places of worship will no longer be copies of Grecian temples, factory and workshop buildings will not violate Italian art by the use of its beautiful turrets for chimney stacks; but the evolution of our art in the future will be truthful to the requirements of the time, and not the result of eccentric efforts at originality or merely reproductions of past examples. A new style on the instant is impossible; it is, and ever will be, the growth and requirement of time.

Whilst attending the banquet at the Walker Art Gallery, given by the Liverpool Society of Architects, and speaking as the representative of our Society, I took occasion to tell the company that I once heard the late Lord Leighton say in their own great St. George's Hall, that he had devoted much study (in the original Greek of Thucydides) to that wonderful oration spoken by Pericles over the victims of the first Peloponnesian war. A remarkable discovery was made by Leighton. About the middle of the oration, Pericles, in an interrogatory diction, asked how it was that the Greeks were supreme in the standard of nationality and culture? His answer was, 'Because we love the beautiful.' This is surely one of the most wonderful utterances on record. It is not for me on this occasion to follow the train of thought begotten by such an utterance. It may be said, however, that as far as the Greeks were concerned, it was absolute truth. How does such a truth affect the greatness of England and her Empire? I will venture to say that when England loses her sense of the beautiful, her downfall in the scale of nations may be expected, and our own

beautiful art will pass into the shadows of the unknown.

It is a matter for serious consideration as to how our architects are to face this new condition of English civilisation. The struggle between the commercial and the beautiful will be fierce, and its issue doubtful; we can only hope that under whatever new conditions and requirements architects may have to work, they will, like the grand old Greeks, still love the beautiful, and so help to maintain through the coming ages the prestige of our great Empire."

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A HOME Counties meeting of the members of the Association of Municipal and County Engineers was held at Aldershot on Saturday, October 11. The members assembled for the business meeting in the Institute, where they were received and welcomed by Mr. T. Jeffries, Chairman of the District Council. Mr. W. Weaver (Kensington), Vice-President, occupied the chair (the President not arriving until later in the day), and there were present Messrs. J. P. Barber (Islington), T. Cole (Westminster), N. Scorgie (London), W. P. Norrington (London), A. H. Campbell (East Ham), J. Lemon (Southampton), A. D. Greatorex (West Bromwich), E. P. Hooley (Nottingham), R. J. Thomas (Aylesbury), Nelson Dennis (Aldershot), and many others.

Mr. T. Jeffries, in welcoming the members, said they at Aldershot were pleased to have the honour of receiving the Association.

The Vice-President, in acknowledgment, said it was instructive to the members to visit different districts to inspect the work of their colleagues. It was the opinion of the Association that the mutual interchange of criticisms and views upon each other's works led to benefit, both to the people criticising and the person criticised.

Mr. R. J. Thomas (Aylesbury), County Surveyor of Buckingham, was unanimously re-elected Honorary Secretary for the Home Counties district.

Mr. Nelson F. Dennis, Engineer and Surveyor to the Council, presented a paper on some municipal works at Aldershot. He said Aldershot was constituted a Local Government district in 1858, as the outcome of the establishment of the camp in 1853-4. The camp, originally a collection of wooden huts, now consisted of fine blocks of brick and stone buildings and well-made roads and paths, named after various Generals of note. Thought and attention had been given, in the laying-out of the camp, to the provision of the many things calculated to make the life of the soldier cheerful as well as useful. There were provided for him reading-rooms, libraries, recreation-rooms, gymnasiums, swimming bath, recreation-grounds, and various institutions where he could improve his general knowledge of things. The married quarters were arranged on the tenement principle, of which there were some very good blocks. The area of the Aldershot Urban District was 4,177 acres; and, as an index of the rapid growth of the town, he mentioned that the rateable value had advanced from 79,000l. in 1898 to 130,000l. in 1902. The average death rate for the ten years 1891-1900 was 16.9 per 1,000. The water supply was under the control of the Aldershot Gas and Water Co. The supply was derived from wells sunk into the chalk, and was ample in quantity and good in quality. The water was somewhat hard, being 16.8 deg. on Clarke's scale. The water charges are based upon the rental, 6 per cent. under 50l., 5 per cent. for 50l. to 100l., and 5 per cent. above 100l. The gas was 28. 10d. per 1,000 cubic ft. Aldershot was a fully "water-closeted" town, and now that the "contour sewer" was completed, provided with sewers for all parts of the district. The contour sewer was laid in 1901 for the purpose of encouraging the opening up of the land for building purposes on the southern slope of the district, also to receive the drainage of a portion of the west end, then drained to two of Shone's ejectors. The latter were becoming insufficient to cope with the sewage due to increased building operations. The area of the district provided for by the contour sewer was 430 acres. The sewer was constructed of Hassell's single-lined pipe, and a short length of double-lined, varying in diameter, commencing at the sewage works with 18-in. pipes, and continuing for 530 ft. at a gradient

of 1 in 410; 2,000 ft. of that length was laid in tunnel at a depth of from 25 ft. to 43 ft. below the surface. Shafts were sunk at every 150 ft., which were afterwards bricked up, circular on plan, for manholes. The remaining 3,470 ft. was of 12-in. pipes, and the gradient 1 in 73. The cost of the sewer was about 6,800*l.*, towards which the owners of land abutting on the line of sewer contributed 889*l.*, and free wayleave was granted where the sewer passed through private land for a length of nearly half a mile. The rain-water from yards and the back portions of the roofs of houses flowed into the sewers, but the front roof water and street water was collected on the "separate" system, which had been laid down in nearly every road in the district. The main surface drainage was discharged at two outfalls, one near the Government siding in the northern part of the district and the other at Ash Bridge, near the sewage works in the southern part of Aldershot. It had always been the desire of the Council that the sewers should be made as perfect as possible, and he was pleased to be able to state that all the suggestions he had made for their improvement had been adopted by the Council. During 1899 a sum of 700*l.* was expended out of loan for the purpose of obtaining a better ventilation for the sewers. Prior to that year there were twenty-one ventilators fixed at the sides of houses. Since then forty-seven steel columns had been erected on the line of kerb. The columns were supplied by the Blackwall Galvanised Iron Co., and were 8 in. in diameter for the lower half, and the upper half was 6 in. in diameter. The shafts were 30 ft. in height. Tests were made as to the efficiency of the ventilators, with satisfactory results. The high standard of purity of the sewage effluent demanded by the Thames Conservancy (not to exceed 1 albuminoid ammonia and 1.0 oxygen absorbed in four hours) required careful attention to be given to the treatment, and although prior to the introduction of the bacteria system, when the sewage was being treated with chemicals and then passed over land, complaints were at times received that the effluent was not of the required standard, since the introduction of the bacteria system and the abandonment of the chemicals the effluent had given no cause for anxiety. The experimental period, usual when the bacteria system was under consideration, was terminated about four years ago, and it was determined to adopt the contact beds for the treatment of the Aldershot sewage. Since then sufficient primary beds, and half the area of secondary beds, had been constructed for the treatment of the whole of the ordinary flow of sewage. The works had been built by the direct aid of the rates, and not by loan. It had been found that the quality of the effluent was impaired by the compliance with the Local Government Board's requirement to pass it over land before discharging into the Blackwater. The land at the town disposal works was not what might be termed good, it being flat, the level very little above that of the River Blackwater, and the subsoil water at times being within 2 ft. of the surface for a considerable area. Rye grass, for which there was little demand, was the only crop grown. The sewage (the dry weather flow being about 600,000 gallons per day) was raised from the pump well a height of 18 ft., by means of centrifugal pumps, to a detritus chamber 24 ft. long by 10 ft. wide; and, without further treatment or screening, the sewage was conveyed along a carrier of brickwork, lined with Condy's vitrified buff bricks and supported on arches, to the series of primary beds, from which it was passed after due contact, varying from two to three hours according to the strength of the sewage, on to and through the secondary beds with continuous flow. The effluent then entered a carrier dug in the earth 6 ft. wide, along which it travelled for a distance of 600 yards to the outfall. The average rate of charging the primary beds with sewage was two and a quarter times per day. There were thirteen primary beds, three of which were each 138 ft. long, 24 ft. 6 in. wide, and 5 ft. 3 in. deep, and ten each of the average dimensions of 57 ft. by 35 ft. by 4 ft. 6 in. deep, a total area of 3,344 sq. ft. The beds were enclosed with brick walls, 14 in. thick, with buttresses. The bottoms were of Portland cement concrete. The sewage was admitted to each of these beds by penstocks fitted in the middle of the long side, and fell over some large clinker lumps into the filter. Neither

distributors nor sprinklers were employed, as he considered their use unnecessary. The filter medium consisted of furnace clinkers graded from large lumps at the bottom, affording good drainage, to fine ashes at the top about 1 ft. 3 in. thick. The outlet valves, fixed at the opposite side to the inlets, were of the ordinary 6-in. screw-down type, and upon being opened permitted the primary effluent to flow into the low level secondary bed-carrier. The primary effluent could be controlled in this carrier by penstocks, so as to flow into any of the secondary beds, of which there were four at present constructed—two each 100 ft. by 57 ft. by 2 ft. deep (four more of this size were to be constructed), and two 105 ft. by 1 ft. 9 in. deep. The filling of the secondary beds consisted of a layer of coarse clinker at the bottom, and the top 1 ft. 2 in. of fine ashes. Neither difficulty nor trouble had been experienced in the working of the beds, and the permanent diminution in the holding capacity was not appreciable, even in the bed that had been in continuous work for three years. For this satisfactory result every credit was due to Mr. Edwards, the works manager, who had devoted throughout his untiring energy to the ensuring of the success of the scheme, to accomplish which so much depended on management. He had come to the conclusion that the disposal of a town's sewage on the contact method of biological treatment, could not be left to the automatic machine, neither could it be entrusted to the inexperienced labourer. Elaborate arrangement of valves, feeding troughs, &c., were not essential to a successful result. The surface depth to about 10 in. of the primary beds, was delved over once a fortnight, and the deposit on the top near the inlet was raked off and burnt in the destructor. The total accumulation thus removed amounted to an average of five barrows per day for the whole of the primary beds. The secondary beds were harrowed once a week. The labour required for this necessary work was two men constantly employed. The effluent had been good at all times and under varying temperatures. The cost of the primary beds, inclusive of carriers, but exclusive of the large tanks, had averaged 150*l.* each complete, and the secondary beds 220*l.* each. The value of the clinker and ashes was taken at 2s. per cubic yard. During wet weather, owing to the diluted state of the sewage, the holding-up in the primary beds was reduced to about one and a half hours and the excess flow passed into the storm-water tank, the overflow being treated on a storm-water filter.

Mr. W. Weaver (Kensington) moved a vote of thanks to Mr. Dennis, and congratulated him upon the care and attention he had bestowed upon the preparation of the paper.

Mr. J. Lemon (Southampton) in seconding, expressed his surprise that the Water Company had not taken some steps to soften the water. It was not a desirable thing to supply water with 168 deg. of hardness. As to the bacteria beds, he regarded Mr. Dennis's statement that the permanent diminution in the holding capacity was not appreciable even in the bed that had been in continuous work for three years, as somewhat misleading. Mr. Dennis further on gave the explanation when he said the surface depth to about 10 in. was delved over once a fortnight, and the deposit on the top raked off and burnt in the destructor. It was only a question when the beds would silt up if some means were not taken to arrest the matter in suspension. That would have happened in Aldershot if steps were not taken to constantly remove the deposit from the beds. As the cost of doing it was at least 100*l.* a year, it represented a capital outlay of 2,000*l.* He suggested that the money could be more profitably employed in constructing tanks to arrest the matter in suspension, and thus give the beds a fair chance.

Mr. A. D. Greatorex (West Bromwich) said they could construct detritus tanks to deal with more than half the flow for 2,000*l.* He felt certain, after his experience, that beds constructed like those at Aldershot would silt up. Although the top deposit was raked off, a good deal of mineral matter got down to the beds, which were losing in capacity.

Professor Henry Robinson (Westminster) spoke of the importance of intercepting inorganic matter in treating sewage biologically. He had a great deal to do with this class of work, and he found, in spite of all they could do in intercepting detritus, there was a certain amount of inorganic matter, fibrous and other fluffy substances, which got into the

beds. It was therefore important in designing bacteria beds to take pains to remove whatever could not be dealt with by the bacteria.

Councillor Robertson (Aldershot) claimed that Aldershot was the pioneer in bacteriological treatment of sewage, and said their earliest experiments in this direction were made in a barrel.

Lieutenant-Colonel Jones, V.C., gave some particulars of the work done upon the military sewage farm, of which he has engineering charge, and Mr. Brooke (Strood), Mr. W. Harpur (Cardiff), Mr. A. H. Campbell (East Ham), and others contributed to an interesting discussion.

The round of visits included the bacteria beds, the military sewage farm, and the abattoir, swimming bath, and electric lighting station at the military camp. The members were entertained to luncheon and, on return to Aldershot, to tea.

AN ARCHITECTURAL EXHIBITION IN NEW YORK.

We have received a letter from Mr. Laurel Harris, Vice-President of the Architectural League in New York, in reference to an exhibition of photographs of religious art which it is proposed to hold in New York. The best assistance we can give in the matter is to print a part of his letter, which explains itself.

"The Architectural League of New York was organised February 18, 1881, for the advancement of architecture and the allied fine arts. The members must be engaged in practising some one of the arts as a profession. In the last five years organisations similar to the Architectural League of New York have been formed in all the largest cities of the United States, and in Toronto, Canada. These organisations have come together under the name of the Architectural League of America, and have established a circuit exhibition of photographs, which goes from city to city, and is shown in conjunction with the annual exhibition of the local clubs. This year I am chairman of the circuit committee. The Directors of the Architectural League of America have decided to make a feature this year of a collection of photographs of religious art. It is for this exhibition I wish to get photographs.

As our annual exhibition here in New York is of a miscellaneous character, it has been thought wise to hold a special exhibition of such photographs as my committee is able to obtain. This exhibition will be in the Fine Arts Building, 215, West Fifty-seventh-street. It will open with a grand banquet, attended by distinguished prelates, and members of various artistic societies. The date set for receiving photographs is on or before October 25. Exhibits should be directed to the Architectural League, 215, West Fifty-seventh-street, New York City, to the care of Wm. L. Harris. From the time the exhibits are received in Fifty-seventh-street all expenses are paid by the League."

It is to be regretted that the communication did not reach us earlier, as there is hardly time now for photographs to be delivered by the date named; but if any English church architects or artists in church decoration like to send photographs, we should think that under the circumstances they would be received after date.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir J. McDougall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Southwark Borough Council 7000*l.* for paving works; Wandsworth Borough Council, 19,000*l.* for paving works; Greenwich Guardians, 40,000*l.* for erection of schools. Sanction was also given to a loan of 8,145*l.* for paving works to the Paddington Borough Council; 18,356*l.* for electric lighting works to the Islington Borough Council; and 14,589*l.* for paving works to the Westminster City Council.

Jobbing Works.—The Finance Committee reported as follows, the recommendation being agreed to:—

"On July 16, 1901, the Council, on our recommendation, adopted a revised schedule of prices for engineering jobbing works, as from April 1, 1901.

and we stated in our report at the time that it was proposed that the schedule should continue in force for one year, at the expiration of which period it could be reviewed. The Works Committee now inform us that the Engineer and the Manager of Works are of opinion that the schedule in question would remain in force for a further period of one year from April 1, 1903, and we therefore recommended that the revised schedule for engineering and building works, adopted by the Council on July 10, 1901, do remain in force for a further period of one year from April 1, 1903.

Site for New Offices.—The adjourned Report of the Special Committee on New Offices gave rise to a long discussion. The Report detailed the previous actions of the Council in reference to the question and showed the great need which exists for better accommodation. The Special Committee reported that after consideration of various sites, they now proposed to acquire a site in connexion with the Adelphi. The Report proceeded:—

"The site, which contains an area of 3·35 acres, is bounded on the north by William-street, the Tivoli Music Hall, and Adam-street; on the south by the Embankment-gardens; on the east by the Hotel Cecil; and on the west by York-buildings. The development could be confined to that portion of the site lying between the Embankment-gardens and John-street, and would probably necessitate (1) the widening of John-street from 38 ft. to 50 ft., and (2) the widening of the street known as York-buildings from about 28 ft. to 40 ft.; in both cases the setting back being on the side of the road next the building; (3) the closing of the street of Adam-street; (4) the closing of Adelphi-terrace, and (5) the closing of Robert-street.

A central entrance might be made in John-street, the principal floor being about 7 ft. above the general level of that street. On this floor there would be ample and suitable space for the Council-chamber, lobbies, committee-rooms, members'-rooms, and the rooms of the Chairman, Vice-Chairman, and Deputy-Chairman of the Council, and those officers in immediate connexion with the administrative work of the Council. Below the principal floor would be two floors of offices, and above the principal floor two floors of offices.

It is desirable to keep the principal floor of the new offices at a uniform level throughout the buildings, for as this is necessarily of a greater height than the other floors, any change in its level would disturb the horizontal lines of the elevation and necessitate steps in the corridor. If the principal floor is kept at slightly above the Strand level throughout it would be about 30 ft. above the embankment. This would admit of a projection containing two stories of offices, and could be so treated as to form a terrace along the entire south side of the building, and afford an important means of approach from the Embankment-gardens. The County Hall could thus be approached on the north from the Strand by way of Adam-street and John-street and from Villiers-street by Duke-street and York-buildings, and on the south from the Embankment-gardens.

These buildings would provide accommodation for about 700 officials on a basis of 150 square feet of clear office floor space per officer. In addition the present buildings upon the portion of land lying between John-street and the northern boundary of the property could be used as offices, and would accommodate about 150 officials, thus making 850 in all. This latter property would be available for further extension of the County Hall if found necessary.

The value of the Council estimates the cost of compulsorily acquiring the freehold with possession of the whole of the properties, as shown by red colour on the plan submitted, at 900,000. This may appear to be a large sum, but considering the advantages of the site and its position, we think the council would be justified in incurring the expenditure. We may add that, compared with other sites which have been considered, the cost would be extremely moderate, and such a favourable opportunity as now presents itself is not likely to occur again.

We have not deemed it necessary to deal with the question of cost of erection, as that would be approximately the same whatever site were adopted.

In the first place we would point out that the site possesses many advantages architecturally, inasmuch as it will be bounded by three open sides, and will be capable of simple and convenient planning. It would, moreover, have a frontage towards an unobstructed open space under the control of the Council and opening upon the river. As regards the extent of the river frontage to the building it may be stated that it would be equal in length to the portion of Carlton House-terrace between the present central offices and the Duke of York's Column.

In the second place the site is a central one, easily accessible, and extremely quiet, and has a most desirable aspect. Objection has been made to placing the County Hall in, so to speak, a back street, and we think the objection is a strong one. It does not, however, apply to the present scheme. It would apply to the scheme in the case of a purchaser other than the Council, as the frontages

would then be behind the Strand, but inasmuch as the Council is able to secure, not only adequate approaches from the Strand, but would also be able to use the important frontage openings upon the Embankment-gardens and the river, this objection is no longer valid. Thus the site is of greater utility to the Council than to any one else.

There is also an important fact which bears upon this point. During recent years the School Board, the Asylums Board, the Thames Conservancy Board, and the Metropolitan Police have located themselves on the Embankment. The selection of the proposed site for a County Hall would still further identify the Embankment as the recognised quarter for public buildings, while the existence of Somerset House and the Houses of Parliament on the same frontage adds further importance to this significant characteristic. We may add that this is the last opportunity of obtaining a central site of this dimension facing the river.

The site we now propose would afford sufficient area for a County Hall which would meet the requirements of the Council and be worthy of the central municipal authority of London.

We recommend—(a) That the standing orders of the Council dealing with applications to Parliament be suspended in order to allow the following recommendation to be considered:—(b) That the Council do apply to Parliament for power to acquire compulsorily for the purposes of new offices the properties bounded on the north by William-street, the Tivoli Music Hall, and Adam-street, on the south by the Embankment-gardens, on the east by the Hotel Cecil, and on the west by York-buildings, and as shown by red colour on the plan now submitted.

Dr. Cooper moved and Mr. Austin seconded the following amendment, which, after discussion, was rejected on a division, the figures being 29 for, 78 against:—

"That in view of the heavy rates now being levied in all the eastern and southern Metropolitan boroughs, it is inadvisable to apply to Parliament for sanction to raise the large sums of money which the adoption of this scheme must necessitate until Parliament has given to London some new source or sources of income."

The debate was then adjourned.

Resignation of an Architect.—The Establishment Committee reported that Mr. W. Bevan, who was appointed on July 22 last as an assistant in the Housing Section of the Architect's Department, had resigned his position under the Council. Mr. Bevan has been appointed "Government Architect to the Transvaal."

Tramways: Electric Station at Deptford.—The Highways Committee recommended as follows:—

"That the estimate of 17,000l. submitted by the Finance Committee be approved; and that the Highways Committee be authorised to expend a sum not exceeding that amount in the provision of a temporary station at Deptford for the electrical working of portions of the London County Council Tramways; and also for this purpose to enter into an agreement on behalf of the Council with the London Electric Supply Corporation for the temporary use by the Council of a part of the Company's premises at Deptford, and for the supply of steam from the Company's boilers for the working of electricity-generating plant to be placed there by the Council."

"That the Highways Committee be authorised to insert in the contract for the roadwork in connexion with the reconstruction, for electrical traction, of the New Cross and Greenwich sections of the London County Council Tramways, a provision that the penalty to be imposed upon the contractors for non-completion of the work within the period specified in the contract shall be at the rate of 1,000l. per week for the extra time coupled, and that should the work be completed within less than the specified time, a bonus at the same rate shall be paid to the contractors, in respect of the time saved."

Sewers, Wood Green.—The Housing of the Working Classes Committee reported as follows:—

"On July 29, 1902, the Council voted a sum of 4,900l. in respect of the construction of sewers and the formation of roads with temporary surfaces and footways with rough finishings on Section A of the White Hart-lane Estate, Wood Green. At the same time the Council decided that, if the Works Committee were prepared to carry out the work at the amount of the Architect's estimate of 4,450l., the work should be carried out without the intervention of a contractor. In the event of Works Committee not being so prepared the Council gave authority for tenders to be invited for the work. During the recess the Works Committee intimated that they were not prepared to undertake the work at the amount of the Architect's estimate, and an advertisement was accordingly issued inviting tenders for the work. The tenders, which were opened by our

Chairman in pursuance of authority also given him in that behalf by the Council, are as follows:—

Mr. R. Ballard, Ltd.	3,304	0	d.
" F. J. Coxhead	3,573	0	0
Messrs. Wilson, Border, & Co.	3,581	3	0
Mr. W. Manders	3,046	0	0
" Chas. Bloomfield	3,771	16	9
Messrs. J. & E. Bloomfield	3,788	7	8
Mr. W. H. Wheeler	3,805	3	0
" C. Ford	3,878	0	0
Messrs. Grounds & Newton	3,924	12	7
Mr. D. R. Paterson	4,153	16	7
Messrs. E. Rogers & Co.	4,768	0	0
" C. W. Killingback & Co.	4,430	12	9
Mr. A. T. Catley	4,680	8	11
" J. Macklin	4,692	0	0
" T. Adams	4,753	15	1
" G. Bell	4,835	9	7
" J. A. Dunmore	5,118	3	0
" E. H. Jackson	6,163	1	7

The result of the usual inquiries made by the Solicitor in the case of Mr. R. Ballard is satisfactory, and we accordingly recommend that the tender of Mr. R. Ballard, Limited, amounting to 3,304l., for the construction of sewers and the formation of roads with temporary surfaces and footways with rough finishings on Section A of the White Hart-lane Estate, Wood Green, be accepted."

The recommendation was agreed to. Mr. H. P. Harris called attention to the facts mentioned in the report, *i.e.*, that the Works Department refused the work, as they were not prepared to undertake it at the Architect's estimate, and yet twelve contractors had undertaken to do it for less than the estimate (and presumably would make a profit) and one had undertaken to carry it out for more than 1,000l. less. This was certainly significant, and looked as though the Works Department pick and choose what work they should undertake.

Claim for Compensation.—The Main Drainage Committee recommended, and it was agreed, that

"That the estimate of 2,750l. submitted by the Finance Committee in respect of the settlement of the claim of Mr. W. C. B. Williams for loss sustained by reason of the construction of the Hackney Wick to Abbey Mills relief sewer be approved, and that the Solicitor be instructed to complete the matter in accordance with the umpire's award."

Mr. Daniel Watney was the umpire.

Theatres, &c.—The Theatres and Music Halls Committee reported that the following plans had been approved:—

Battersea Palace of Varieties.—Rearrangement of seating, submitted by Mr. J. Norman. Bishopsgate Institute.—Seating, &c., submitted by Mr. F. G. Fitch.

London Pavilion.—Alterations to pit, lavatory, and bars, submitted by Messrs. Wylson & Long.

Royal Hotel, Eltham.—Various alterations, submitted by Messrs. Batchelor & Batchelor.

Surrey Theatre.—Alterations, submitted by Mr. F. Matcham.

List of Rates of Wages and Hours of Labour.—The Works Committee reported as follows:—

"The Council's list of rates of wages and hours of labour requires revision as regards the rate of pay for overtime for wood sawyers and wood-working machinists, so as to make it agree with the overtime rates included in the revised working rules for those trades agreed to by the London Master Builders' Association and the Amalgamated Society of Mill Sawyers and Wood Cutting Machinists. Our attention has also been directed to the fact that in the list are set out the names of the various wood-working machines, although the rate of pay for machinists (8d. to 1s. per hour) applies to all varieties of machines. There is no agreement in force as regards this classification, and, with view to simplification, we propose that the names of the various machines should be struck out and the trade specified as 'mill sawyers and wood-cutting machinists.' We recommend that the Council's list of rates of wages and hours of labour be amended by the substitution of the words 'mill sawyers and wood-cutting machinists' for the words at present defining the wood-working machinists, and that the rate of pay for overtime for wood sawyers and wood-working machinists inserted in the list be as follows:—From leaving-off time to 6 p.m., ordinary rate; from 6 p.m. to 10 p.m., time and a quarter; after 10 p.m., double time; Saturdays, noon to 4 p.m., time and a half; Saturdays, after 4 p.m., and Sundays, double time."

The recommendation was agreed to, and the Council adjourned shortly afterwards.

NEW THEATRE, COLCHESTER.—A new theatre, to seat 1,100 persons, is to be built at Colchester, on a site in the High-street. Mr. J. W. Start, of Colchester, is the architect.

Illustrations.

A SKETCH DESIGN FOR A MODERN ANGLICAN CATHEDRAL.

WE give this week the side elevation, plan, and sections of the sketch design for a modern Anglican cathedral by Professor Beresford Pite, which formed No. 53 in the drawings submitted for the Liverpool Cathedral competition.

In the review in our issue of July 26, when the names of the authors were not disclosed, we pointed out this as a design the author of which ought to have a place in the final competition.

The following is a reprint of most of Professor Pite's Report explaining the motives of the design:—

"With regard to the sketch-design submitted herewith, I would indicate the following motives in its preparation:—

1. Congregational planning by the obtaining of a great area of unobstructed vision.
2. A central and dignified position for the conduct of public worship, the choir, or clerks, being placed technically architecturally in the middle of the church, and the lectern immediately upon the axis of the plan. The holy table occupies a position in front of the whole congregation, and though enclosed by the chancel, is visible to all in the church.
3. The cathedral is planned as the centre of the organisation of the ministry. The presbytery is spacious enough for the whole clerical body of the diocese, with the Bishop's cathedra at the head.
4. Access and egress. The comfort of great congregations, and the enlarged usefulness of the cathedral buildings have indicated the use of a great narthex with entrances on all sides.
5. Two side chapels, which are moderate sized churches, are provided one on each side of the nave and with vestries for the purposes of home and diocesan services and foreign mission services.
6. The baptistery is placed in the great attached entrance tower, in which is provided a total immersion font, with the required vestries, the position corresponding with early Christian usage.
7. The chancellors and diocesan secretaries, chambers and the societies' offices are placed on each side of the atrium and form separate suites opening from the cathedral porches.
8. Staircases lead to the galleries of the cathedral from the narthex, into which all the foregoing open.
9. In the upper story of the narthex are situated at opposite ends the consistory court, communicating with the suite of chambers over the chancery; and
10. The conference hall for diocesan meetings and mission gatherings in connexion with the suite of rooms over the offices below.
11. The central block over the narthex, occupying the length of the end of the cathedral, being the diocesan library and reading-room. This is a large top and side lighted gallery.
12. The lavatories, which modern comfort demands, are placed near and opening to the narthex, but outside the cathedral proper.
13. At the presbytery end of the cathedral are placed on the right the sacristy and vestries and strong rooms over.
14. Communicating with the choir school and music-room.
15. On the left of the presbytery is the chapter house for the capitular meetings, with vestries and private rooms over.
16. The organs of the cathedral are placed in the two angles of the nave piers of the dome, close to the choir and central to the whole congregation.
17. Beyond the presbytery is the clergy cloister court containing:
18. The cathedral choristers' school.
19. The theological college.
20. The episcopal residence.
21. And such extensions for canons' and precentors' residences as may be required.

Architectural Treatment.

The style of the design has arisen wholly from the plan which attempts to reflect, as the Church of England, the whole history of the Christian age. I feel that it would be untrue to its purpose to found it wholly on an archaeological basis or upon a narrow view of Mediæval religious art, the requirements of the present being developments in unity with the past. From this view has arisen the problem of proportioning heights and supports to enclose the plan without needless intermediary supports designed only as architectural fancies. The modern knowledge and use of concrete domed construction, exemplified in many buildings, and specially in the new Roman Cathedral at Westminster, I feel cannot be put aside in a rational architecture, and, therefore, have employed large vaults and domes.

The dome, naturally proportioned to internal requirements and emphasised externally by the buttresses and piers, has been used. Towers have been grouped to accentuate the manifold parts and interests of the building around the central mass of the dome and along its flanks combining the adjacent subordinate buildings. The great tower, the chiefest in the diocese and city, marks the character of the building and rises in and from the group with freedom owing its detachment on the plan.

The architectural detail is spared from any reproduction of mere antiquarian forms—wherever meaning is associated with detail as in carved capitals, bases, and string courses it is freely used. Decoration is thus set free from the insufferable bondage of the dark ages of figure design and drawing. Simple directness of expression with perfect drawing, I am persuaded, can be accomplished to-day when passing fashion is put aside and the finest work of the best artists only desired. Mosaic inlay and in marble sculpture, in simple painting or in stone and wood carved with individual power, such as the revived craftsmanship of our generation is producing, provides a decoration illustrative of our age and its powers.

I shall cherish the hope that this great new cathedral of our time will establish a school of powerful English art concentrated and guided to unity of effect, yet free from the limits of an imitative revivalism alien alike to the genius of the people and to the highest meanings of religious buildings, and I trust that to such an ideal as this the unequalled opportunity that presents itself may be earnestly devoted."

DESIGN FOR A FRIEZE: THE CANTERBURY PILGRIMS.

This design, by Mr. W. A. Chase, received deservedly a silver medal in this year's National Competition at South Kensington, and we are glad to add that it has been executed as an interior decoration for the entrance-hall of a vicarage in Camden Town.

As a reduction of the personages of Chaucer's poem to a decorative picture it is very meritorious, and shows that the author has bestowed a good deal of thought on the endeavour to realise and distinguish the personages as described by the poet. We do not, however, quite like the figure of the Squire, who was a fop, but a gentlemanly fop—

"Curteis he was, lowly, and servisable,"

whereas in the drawing he looks rather concealed and impertinent. It was a good idea to distinguish the manners of the Prioresse and the Wife of Bath by representing the one seated sideways on her horse, the other riding astride in stirrups—the manner in which women usually rode at that period, before the era of side-saddles; but one may imagine that a lady so refined and gentle as the Prioresse might have been an exception in that respect—a lady in advance of her time. We congratulate the artist on a very clever production.

ARCHITECTURAL SOCIETIES.

ARCHITECTURAL ASSOCIATION OF IRELAND.

The first general meeting of this Association for the present session was held on the 7th inst. in the Grosvenor Hotel, Dublin. Mr. F. G. Hicks, President, occupied the chair. The annual report was read by Mr. Beckett, one of the hon. secretaries, and briefly recounted the work of last session and the various lectures delivered by prominent members of the profession. The report recorded regretfully that the attendance at the classes last year was not all that could have been desired. In membership and finance the Association was in a flourishing condition.—Mr. Holloway moved the adoption of the report. Mr. Allberry, in seconding the motion, suggested that another secretary should be appointed to take charge of the reports for the technical and daily papers. He also thought it would be a good thing to try and get the Irish Institute of Architects to hold examinations. They could then draft a syllabus which pupils would be ready to take up in order to be examined in Ireland on Irish lines. The report was adopted. Prizes won during the past session were then distributed, the following being the successful competitors:—

Architects' Institute Prize.—Mr. John Knox Vinycomb.

The Doolin Prize.—Mr. John Knox Vinycomb.

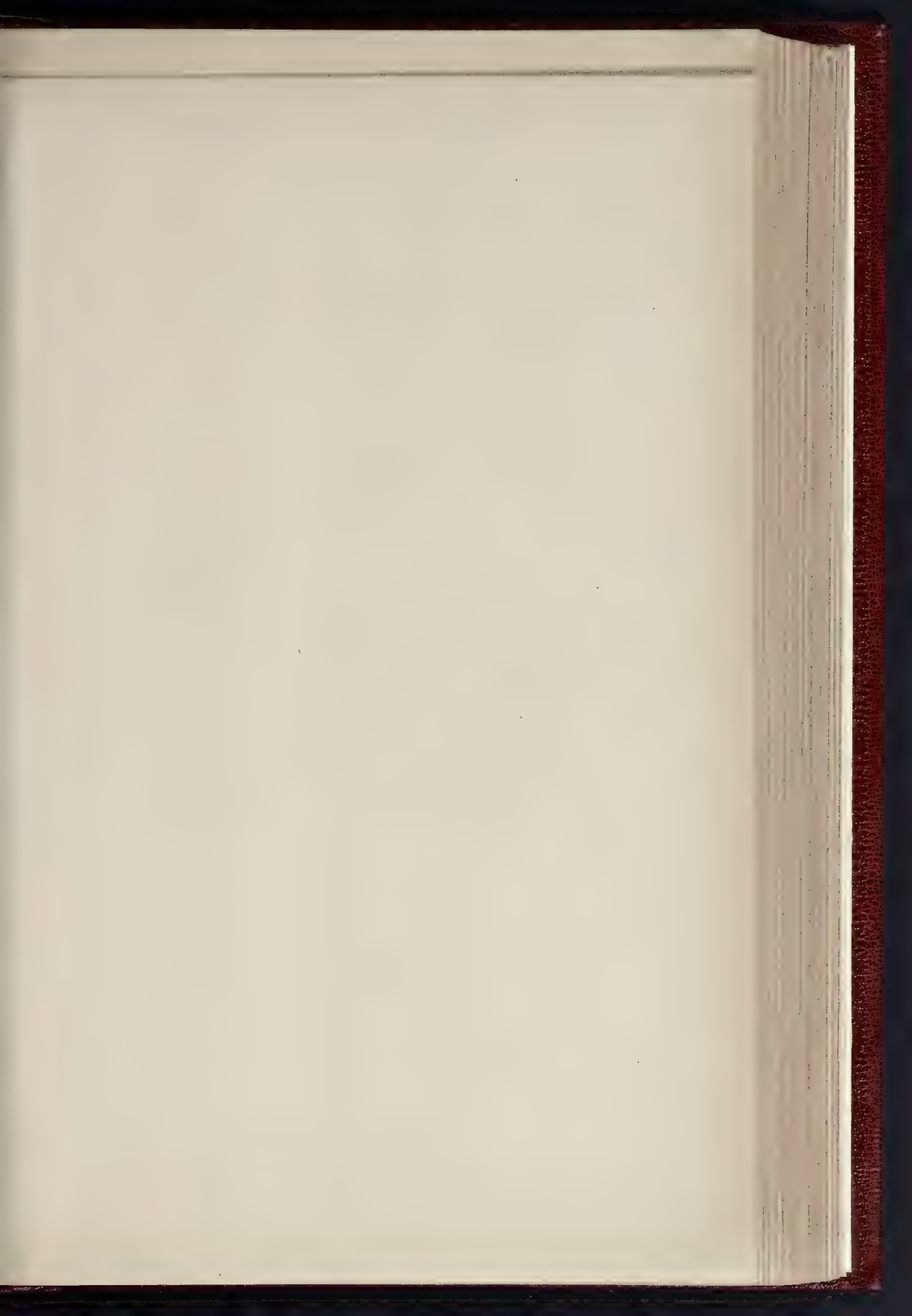
The Beckett Prize.—Mr. F. H. Tallan.

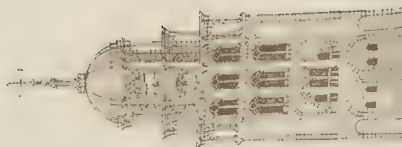
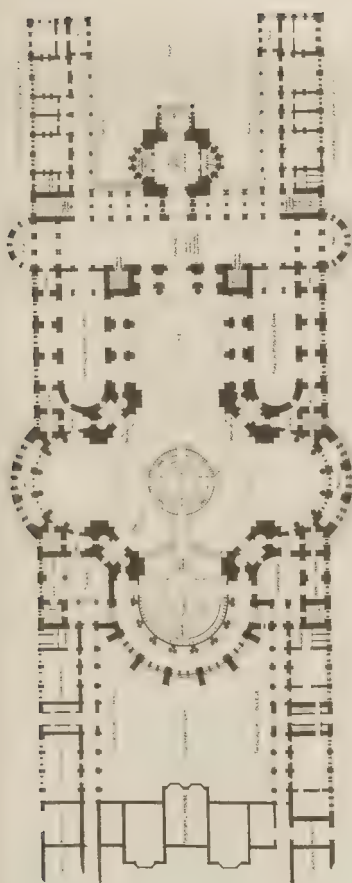
First Prize: Class of Design.—Mr. F. H. Tallan.

Second Prize: Class of Design.—Mr. G. Hamilton Barlee.

The President then delivered his inaugural address, which contained many valuable suggestions for the improvement of the profession. In the course of his remarks the President said he was not going to bring forward any very new or startling ideas. He proposed to talk of themselves, and address his remarks chiefly to the younger members of the Association. The education of students in the past had been practically nil, and even now it was of a more or less haphazard and imperfect description, and the chief object of the Association was to promote and afford facilities for the study of architecture, which was a very comprehensive word. It took the London Association fifty years to discover that their educational system was not all that could be desired, and a revolution resulted in their present apparently complete and up-to-date system. They should profit by that experience, and look for defects as they went along and supply the necessary improvements if possible. They had difficulties here to contend with of which they knew nothing in London. Their little roll of 131 members, compared with that of London of 1,400, seemed ridiculously small, and any falling-off in classes or meetings was at once apparent. From their very scarcity of members it behoved each one to do his utmost to make their teaching a credit to Dublin in particular and Ireland in general. One of the chief defects of their system, so far as he could see, was that it was practically aimless. They commenced each session with exactly the same kind of subjects, advanced a certain distance, and then stopped. All this, to his mind, was wrong. A student, perhaps serving his four years' articles, could not possibly learn all there was to know about a subject in one session, and yet they could not expect him, however necessary it might be, to go over the same ground year after year. He thought if they were to be of any real benefit as an educational body they should formulate a proper curriculum of study, spreading over two or three sessions, commencing with elementary subjects and concluding with those more advanced, and at the end there be a test as to what the man had learned. Mr. Hicks also drew attention to the necessity of accurate drawing and draughtsmanship, and laid special stress on the value of sketching to the architect.

LIVERPOOL ARCHITECTURAL ASSOCIATION.—The first ordinary meeting of the Liverpool Architectural Society's fifty-fifth session was held on the 6th inst. the new President (Mr. John Woodfall) presiding. In his opening address he referred to the incorporation of the Society last year with the Royal Institute of British Architects, an event which would, he maintained, be far-reaching and important both to the members individually and the Society. "Another bright event has also occurred which adds honour to our Society. His Gracious Majesty King Edward VII. has conferred the Coronation honour of knighthood on the past-President of the Royal Institute of British Architects—a testimonial to the personal worth of Sir William Emerson, and an honourable tribute to our profession." A notable function during the coming year would be the holding of the annual conference of the Royal Institute of Public Health in Liverpool next July. The proceedings would be of the utmost interest to architects, and he trusted that among the subjects discussed would be that of the prevention of smoke in great cities. This problem must be faced by the municipal councils in the same determined manner, and with like results, as that of drainage, removal of refuse, pure water supply, artisans' dwellings, &c., for the public benefit and health. That this black cloud should be hanging about destroying health and everything else it touched could not be tolerated much longer. It was a filthy and dangerous nuisance. If remedial measures could be accomplished he believed it would beneficially influence architecture to a very great extent, and possibly coloured studies of permanent decorative materials would then partially supersede the columns, &c., of the present stone construction. The public improvements which were now being so vigorously proceeded with in Liverpool were providing opportunities for our architects to beautify and enrich the city, and he thought they were proving





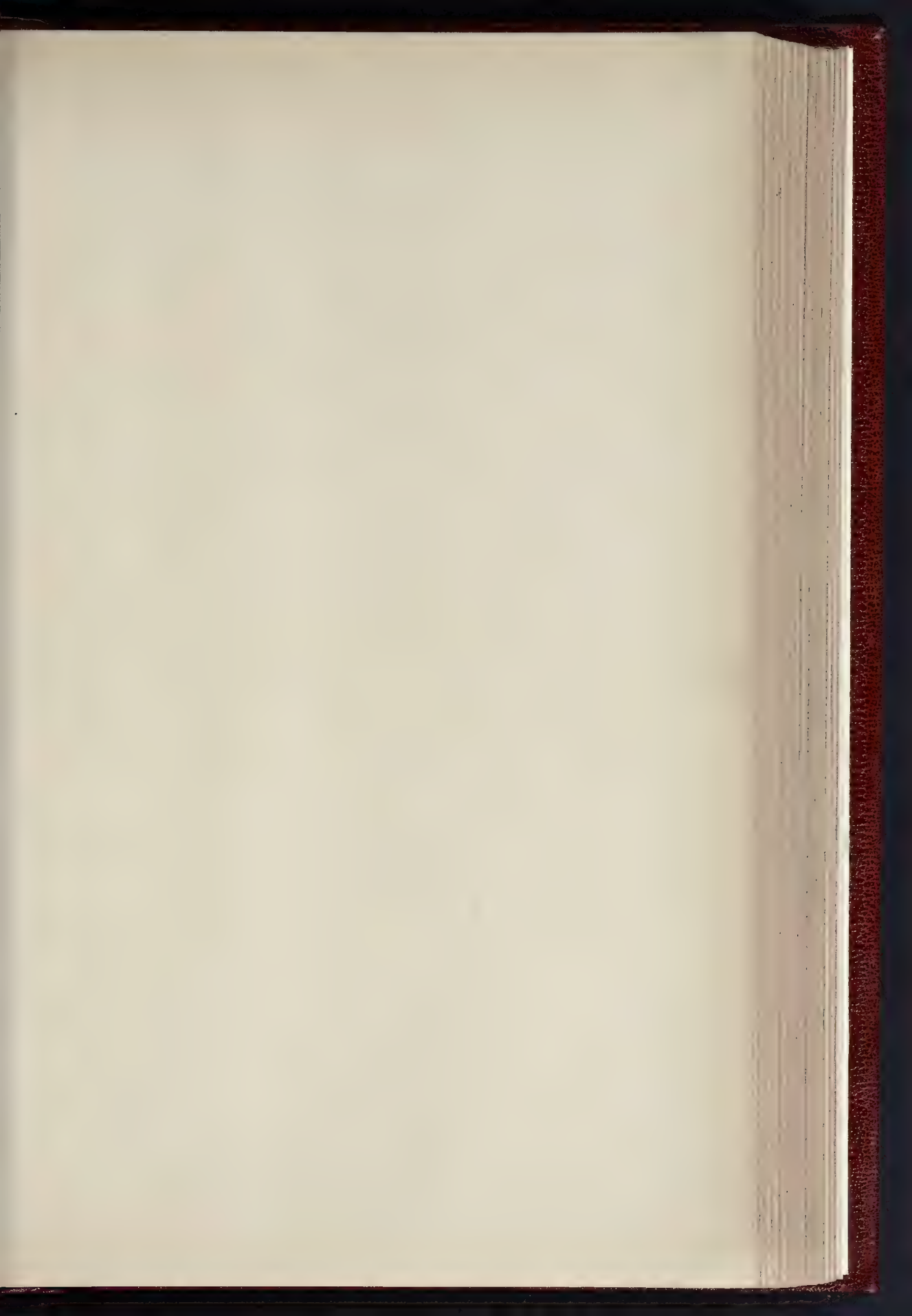


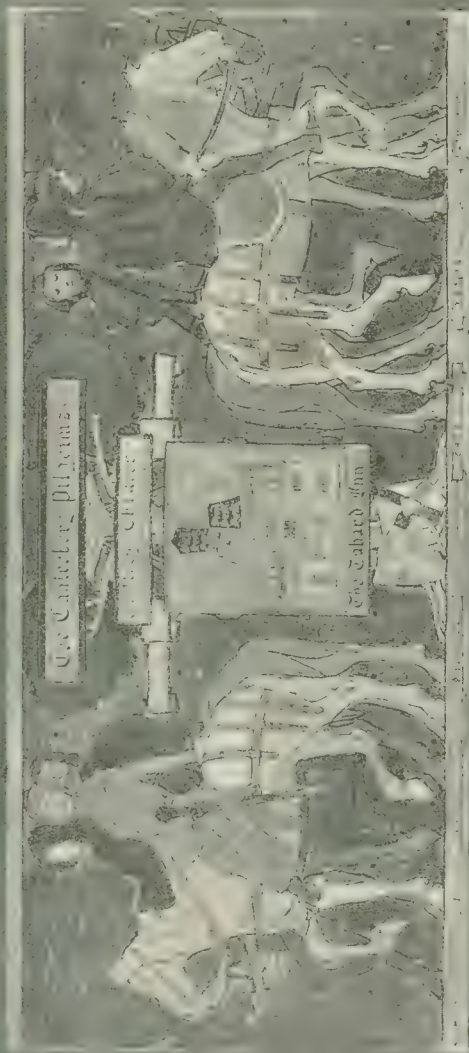
SIDE ELEVATION

BERNARD DYE
ROYAL COLLEGE OF ARTS
LONDON E.C.4

SCALE 1" = 10' 0"

A SKETCH DESIGN FOR A CATHEDRAL IN LIVERPOOL (COMPLETION)

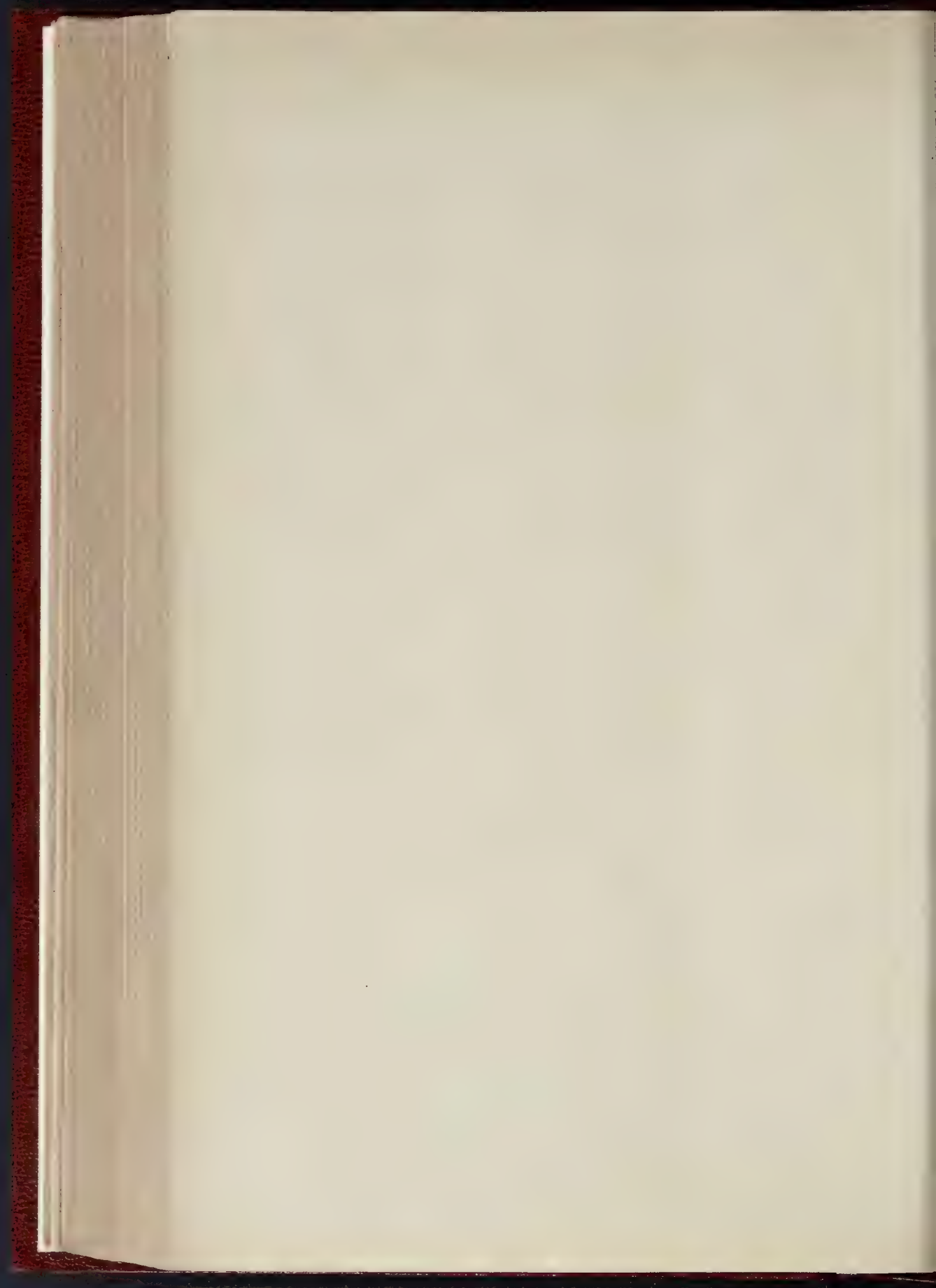


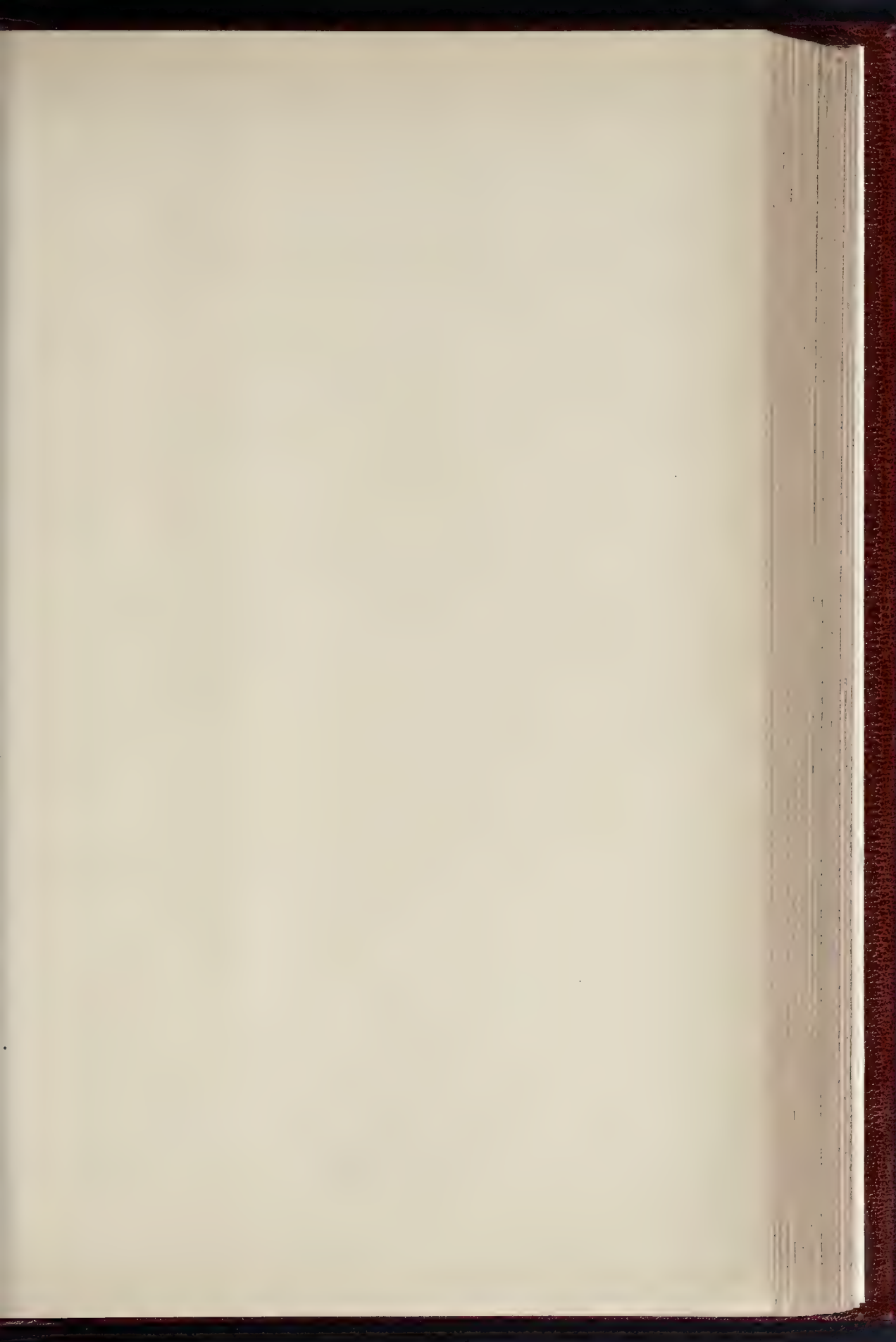




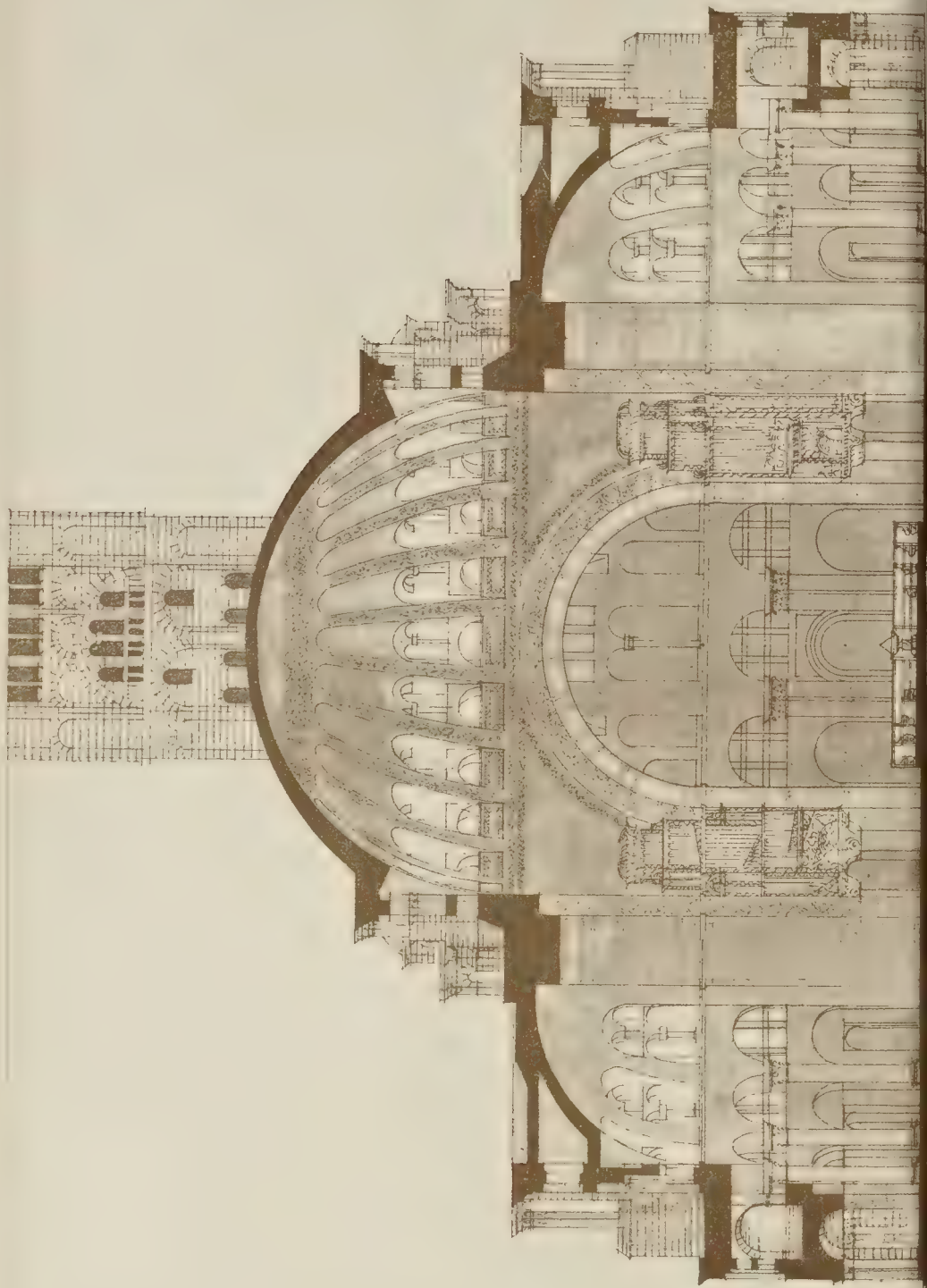
DESIGN FOR A FRIEZE "THE CANTERBURY PILGRIMS" BY MR. W. A. CHASE

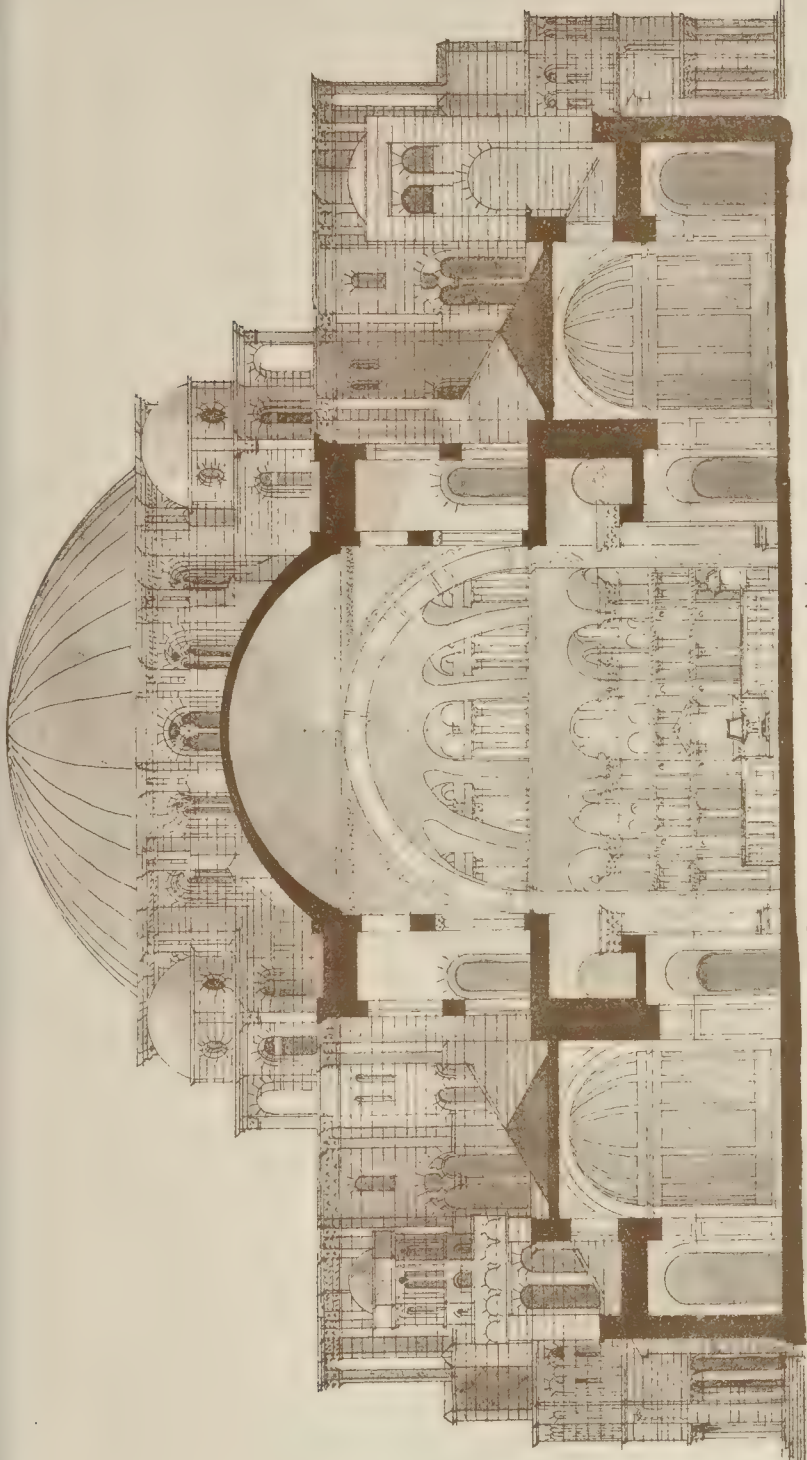
Silver Medal, National Competition, 1902



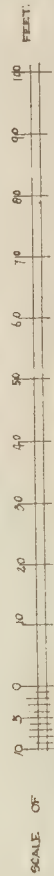


THE BUILDER, OCTOBER 18, 1902





SECTION THROUGH NAVE
AND CHAPELS



AND PHOTO ARCHITECTS 44, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

A SKETCH DESIGN FOR A MODERN ANGLICAN CATHEDRAL (No 53 IN THE LIVERPOOL CATHEDRAL COMPETITION)
BY PROFESSOR BERESFORD PITE, F.R.I.B.A.



oneselves well worthy of the opportunities, along with the cathedral question, Mr. Goodall expressed delight that the city had decided to have a cathedral worthy of its position as one of the great cities of the kingdom. This effort, he remarked, will be one of the greatest modern monuments that has been attempted since the Reformation, and will in time to come be a realised certainty. "You may probably remember that the Society opposed the site now adopted, but our proposal was over-ruled on the plea of expense. The St. James's site is now settled, and preliminary competition has also been decided, and the names of the competitors selected, and it is a matter for congratulation at our county town (Lancaster) has a firm of architects who have been chosen, and that one of the members of our own Society has won the honour of being highly commended for his scheme. May the final result be worthy of the position, its beauty a glory to our city; may it enable the public to possess one of the finest religious edifices in the world, the most perfect example of the most perfect period of art, being best fitted for the Christian worship of the present day. May all of us see the happy day when the foundation-stone of such a temple is laid, and may some of the present generation see it realised. In concluding, I hope our Society will maintain—nay, increase—its high position, and tend to promote good fellowship amongst its members, a help to those that may require same, as well as to rejoice with those that achieve success; and, further, that its members will enrich our city with a collection of beautiful buildings, the outcome of the genius of the members of this Society." On the motion of Professor Simpson, a hearty vote of thanks was tendered to the President for his address. Subsequently a revised schedule of charges was submitted for discussion and approval.

ENGINEERING SOCIETIES.

INSTITUTION OF CIVIL ENGINEERS.—The Council of the Institution of Civil Engineers have, in addition to the medals and prizes given for communications discussed at the meetings of the Institution in the last session, made the following awards in respect of other papers dealt with in 1901-1902:—A Telford gold medal to Mr. J. Macfarlane Gray (London); a George Stephenson gold medal to Mr. R. Price-Williams (London); a Watt gold medal to Mr. W. Bell Dawson, M.A., D.Sc. (Ottawa). Telford premiums to Mr. W. R. Cooper, M.A., B.Sc. (London); Mr. E. M. De Burgh (Sydney, N.S.W.); Mr. George Wilson, D.Sc. (Manchester); Mr. Frank Oswell, B.A. (Buenos Ayres); Mr. A. W. Brightmore, D.Sc. (London). A Crampton prize to Mr. C. D. H. Braine (Mowbray, Cape Colony); and the Manby premium to Mr. B. W. Ritso (Cape Town). For students' papers the awards are:—A Miller scholarship (tenable for three years) and the James Forrest medal to Mr. H. F. Lloyd (Birmingham). Miller prizes to Mr. J. C. Dollett and Mr. W. H. C. Clay (London); Mr. A. C. M. Austen (London); Mr. A. M. Arter (London); Mr. Robert Bruce (Manchester); Mr. L. F. Wells, B.Sc. (Manchester); Mr. W. H. McLean (Glasgow).

COMPETITIONS.

MUNICIPAL BUILDINGS, DEPTFORD.—Mr. John Belcher, A.R.A., the assessor appointed by the Metropolitan Borough Council of Deptford to adjudicate upon the designs submitted in the competition for the new town hall and municipal buildings, has made the following award:—First (Design No. 3), Messrs. Lancaster, Stewart, & Rickards, 1, Vernon-place, Bloomsbury-square, W.C.; second (Design No. 32), Messrs. S. B. Russell and D. E. Mallows, 11, Gray's Inn-square, W.C.; and third (Design No. 27), Mr. A. J. Gale, 4, Serjeant's-inn, Fleet-street, E.C. The drawings will be exhibited on Friday, the 17th inst., from 10 a.m. to 5 p.m., at Sayes Court Hall, Evelyn-street, Deptford.

GRAVESEND SCHOOL BOARD.—The result of a limited competition for a new school in Northcote-road, Gravesend, to accommodate 1,000 children, was announced last week. The professional assessor, Mr. Bond, of Rochester, placed first design No. 3, which proved to be that of Mr. J. J. Robson, of Suffolk House, E.C., and Gravesend. We understand that it has been decided to exhibit the competitive

designs at an early date in the Gravesend Town Hall.

COTTAGE HOMES FOR NURSES, GRANTHAM.—We are informed that, in response to the advertisement of the Committee appointed to carry out the Memorial to her late Majesty Queen Victoria, seventy-seven designs for the Nurses' Home, to be erected in Castlegate, were submitted, out of which the designs of the following gentlemen were selected:—Mr. R. J. Girling, Buckminster; Mr. H. L. Fedden, 11, Hart-street, Bloomsbury, London, W.C.; Messrs. Ashton & Gibbs, 39, Poland-street, Oxford-street, London, W.; Mr. E. Winter, 19, Britannia-road, Liscard, Liverpool; Mr. W. J. Dunham, 16, The Walk, Norwich; and Mr. J. A. Metham, Grantham. The final choice eventually fell upon Mr. Girling's design.

LONDON TOPOGRAPHICAL SOCIETY.

LORD ROSEBERY presided on Wednesday evening at the Rooms of the Society of Antiquaries, Burlington House, over the fourth annual meeting of this society.

Mr. Bernard Gomme (Hon. Secretary) submitted the annual report which stated that the membership, which continued slowly to increase, was now 130. The total number of institutions in the United Kingdom—including public libraries, Government departments, local governing bodies, and learned societies—that had joined the society was twenty-eight, and to these had to be added five American bodies. A matter accomplished in the past year had been the successful production and issue of the first number of the society's official organ, "The Annual Record." Here the need for increased resources was greatly felt. As a register of topographical changes in the period dealt with, its inadequacy was only too apparent. However, the little effort was in the right direction, and it was welcomed with warm appreciation, not only by their own members, but also by the press, several reviews dwelling on the usefulness of this feature of the society's work and urging the enlargement of its scope. If the society could supply a complete and authoritative yearly record of the demolitions and changes in London, there would, indeed, be little doubt that the work would be highly and widely esteemed; but for such a result both money and workers alike were needed. In the second issue of "The Annual Record" some account would be given of the demolition of Christ's Hospital and of Newgate Prison, and, if possible, the index entries relating to other demolitions and changes will be more complete. But before this department of the society's work could be at all equal to the occasion, at least 200 more subscribers were needed. Of other publications for the present year, which were nearly ready and which will shortly be issued, it must be said that a further instalment of the sheets of the Kensington Turnpike plans would be welcomed by subscribers, while the map by Hollar, showing the western-central district of London as it was in the days of Charles I., would, on account of its elaboration and detail, prove to be one of the most interesting issues yet made by the society.

Among the matters left over for decision by the new Council was the offer of a miscellaneous collection of London illustrations, of no particular value, but the fact of its being forwarded for acceptance by this Society was an interesting indication of the advantages of a centre to which such things must gravitate instead of being frittered away or lost. A similar instance was the offer of a collection of lantern-slide pictures of London at about the period of the 1862 Exhibition which they have likewise received. It was significant of the rapid change of modern London that such pictures were distinctly of historical interest. Mr. J. P. Emslie had also presented to the Society a proof of his etching from his own drawing of the statue of James II., as it appeared in its original site in White-hall-place. The Council had also received the donation of a book of special interest in connexion with the Society's reproduction of the Kensington Turnpike Trust plans, viz., "The Memorials of Knightsbridge," by the late H. G. Davis, edited by Mr. Charles Davis, a member of the Society. This might serve to revive the idea of a library of London books for circulation in the Society. Several books were presented to the old Society, which would be available if a library were formed, and members possessing duplicate copies or

books they no longer required might be glad to present them to the Society if invited to do so. In this way a small lending library of real usefulness might easily be added to the privileges of members of the London Topographical Society. The subject was recommended to the best attention of the new Council.

Mr. Lawrence Gomme, F.S.A., in moving the adoption of the report, said he thought the Society hardly took sufficient credit for what it had done and what it was doing. There were also various ways in which the Society might work. For instance, there were in London many maps, some of which were exceedingly rare, and it was the object of the Society to reprint these maps so that they might be bound in one portfolio. There were also the manor maps and the tithe maps of London which might be reprinted. With regard to the discoveries of Roman relics, they knew that they were scattered about in all directions, and it would be a good thing if there was one place where the whole of these things might be put together and a map of Roman London compiled. It would also be a good thing if the Society could compile an index of London matters dealt with in old records.

Lord Belhaven and Stenton seconded the motion, and pointed out that the reason why they could not do the things mentioned by Mr. Gomme was the want of money.

The report was adopted.

Mr. Jackson Barron, F.S.A., in moving a vote of thanks to the Council, congratulated the Society on the issue of the Kensington Turnpike plans, and said he recollected as a child being taken by coach to Kensington, and after dinner at one o'clock the servant was sent out to book two seats by the six o'clock stage coach for the return journey.

Mr. Walter L. Spiers, A.R.I.B.A., seconded the motion, which was carried. Sir J. McDougall proposed the re-election of the Earl of Rosebery as President of the Society.

Mr. H. A. Harben, F.S.A., seconded the motion, and remarked that while it was difficult to allow sentiment to stand in the way of public improvements, yet they were all shocked at the way in which, in numerous instances, records of the past had been swept away thoughtlessly and uselessly.

The motion having been agreed to,

Lord Rosebery, in expressing his thanks for his re-election, said he had not been able to give the time he should have liked to the work of the Society. Sir J. McDougall had alluded to his connexion with the London County Council, and he noted that there were four gentlemen present that night who had filled the office of Chairman of that body, which showed that the London County Council recognised how important might be the effect of such a society as theirs. Mr. Gomme had lamented that the Council of the Society had not done more, and had not aimed at more. That was hard upon the Council, because that body had evidently in its deliberations had the homely proverb before it of cutting their coat according to their cloth, and it was quite obvious if the public did not supply enough cloth for a waistcoat, they could not aim at rigging themselves out in a coronation robe. So far as he could judge of the letters he received, the principal occupation of one half of the human race was the urging of the claims of their particular hobbies to the other half, but in urging the claims of the London Topographical Society, he could say it was no more his hobby than the hobby of any one of the inhabitants of London. He should have thought there would have been thousands and thousands of persons in London interested in the past history of that great capital, but he thought that the society did not sufficiently advertise itself, and success without advertisement in these days was a hopeless achievement. Were the Metropolitan Borough Councils subscribers to their society in their corporate capacity? At that moment, owing to the beneficent action of a Scotch-American millionaire, there were libraries springing up all over Great Britain as "armed men springing from the dragon's teeth," but with more beneficent effect. How many of these libraries were subscribing their guinea? There were about a dozen, and what was that amongst so many. Yet in one year they had received the support of no less than five American libraries, whose sympathies had reached across the Atlantic to the capital home of their race. He did think those facts were only to be known for many persons to sub-

scribe. After all, London was changing before their eyes. It had been changing during the past quarter of a century with inconceivable rapidity, and that rapidity had been doubled and triplicated since the advent of the L.C.C. What ancient streets it was going to cut through for the great avenue for which they could not find a name; what were the demolitions entailed by that immense crescent which all the sagacity of their municipal legislators had failed to christen, he dared not reckon. But he did not doubt that in the minds of the three Chairmen of the L.C.C. at that moment there must be a guilty feeling that the march of utility was going to stamp out some venerable dwellings in several districts which the dwellers in London would gladly have spared had it been possible. Surely, then, the least they could do was to preserve for their descendants an exact picture of what was. He did not profess to be an expert, but he never came across the print of an old house, such as Bedford House in Bloomsbury-square, with its political associations, or the old Whitehall Palace, without feeling inclined to preserve it, and so to give to this Victorian and Edwardian London which they inhabited some flavour and aroma of the historical London of the past, without which, after all, so much of our political history is unintelligible. Then, with regard to the old maps, in some cases only one or two copies existed, and therefore it was desirable that copies should be made in the interests of the public, in case by sudden accident or fire the original maps might be destroyed. It was a public-spirited work, which deserved the encouragement of the people of London.

Another thing they should aim at was the culling from various volumes, such as the publications of the Master of the Rolls, such passages as had reference to London, and which only extreme and diligent exploration would enable the student to find for himself. There ought to be a London library—he meant a library of books relating to London; reprints of scarce volumes, and excerpts from massive volumes which do not altogether relate to London—which a Society like that might bring into being. It had been the great spiritual function of the London County Council, apart from its material efforts, to make them feel the unity, splendour, and historic association of London as a whole. Well, in their humble way, although they had not the power and the dignity of the London County Council, they might do much to advance that work, and it was for that reason he was proud to accept the offer they had made him to remain, inefficient as he was, President of the London Topographical Society.

Col. W. F. Prideaux, C.S.I., moved:—"That this Society strongly urges upon the London County Council systematically to preserve objects and places of historic interest to Londoners under the powers conferred by the Acts of 1899 and 1900, and in particular expresses the hope that the new street from Holborn to the Strand may not be proceeded with until efficient steps are taken to preserve relics and objects of interest and to put on record the particulars of their locality." He said that with regard to the first part of the resolution the Council did not require much urging. As regarded the new street from Holborn to the Strand there were not many objects of historical interest in danger, but in the Arch-row, Lincoln's Inn Fields, they had work of Inigo Jones. Some architects wished to place grand new buildings on the sites of old historic buildings, and such would undoubtedly be the case if Lindsey House were allowed to be destroyed.

Mr. H. B. Wheatley, F.S.A., seconded the resolution, and said the whole of Arch-row was designed by Inigo Jones, and a few of the houses as he designed them were still there. The two greatest architects they ever had were Inigo Jones and Wren, and they had many works of Wren. Besides the houses in Arch-row, there were two houses in Great Queen-street which he would be sorry to see pulled down, as they were the finest bits of street architecture in London. If the houses in front could be taken down and the old houses restored, it would be a grand work.

The resolution was carried.

In moving a vote of thanks to the Chairman, Mr. W. H. Dickinson said that the changes in London at present going on were more extensive than they had been since the great fire, and it was most important that in every way

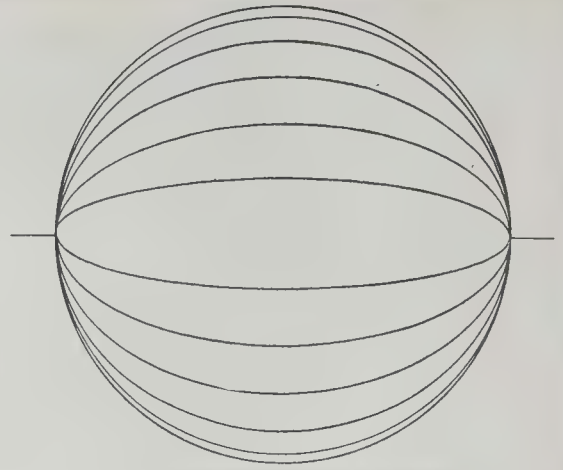


Diagram of Ellipses Drawn by the Aid of String.

possible a picture of what had been should be preserved.

Mr. C. Foster Hayward seconded the motion, which was carried.

Lord Rosbery, in reply, suggested that the Society might have field days like the archaeological societies, and visit places which were about to be changed.

Correspondence.

DRAWING AN ELLIPSE.

SIR,—I have just set out the enclosed, and hope it may be of some interest. The figure, excepting the enclosing circle, was entirely formed with a piece of string [see diagram on this page].

No extraordinary care was expended upon it, and it seems to me that it is quite possible to draw an ellipse of any reasonable size by this means.

R. RAMM.

* * * Messrs. Knox & Wells, contractors, of Cardiff, write to ask how the name of their firm came to be at the end of the letter which started the correspondence on this subject. The signature was not that of any firm, but merely an assumed one, and it appears to have been an accidental coincidence between the assumed name and a real one.—Ed.

A NOISY FLOOR.

SIR,—A ground floor of a schoolroom laid in the ordinary way—sleeper-walls, sleepers, joists, and floor-boards—is some 3ft. 6 in. above the ground, and this large hollow creates great noise. Could any of your readers kindly tell me if they know of a cheap scheme to overcome the annoyance? The cost of taking up the boarding, filling the space, and laying block flooring is prohibitive. Would a layer of thick felt suspended over the surface, by being nailed to undersides of joists, be any prevention?

LEON.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Line of Frontage and Projections.

Lewisham.—A theatre building on the site of Nos. 211 and 213, High-street, Lewisham, to abut upon Hither Green-lane (Mr. H. M. Wakley for Mr. Gilbert).—Consent.

Strand.—An iron and stone balcony at the first-floor level in front of No. 7, St. James's-street, St. James's (Messrs. J. Kinnimont & Sons for Messrs. Glasier).—Consent.

Lewisham.—Four houses on the east side of Shell-road, Lewisham, northward of No. 11 (Messrs. Hodson & Whitehead for Messrs. Hodson Bros.).—Consent.

Lewisham.—A temporary greenhouse on the south-west side of London-road, Lewisham, west-

ward of the shops known as "Imperial Buildings" (Messrs. Furness Bros.).—Refused.

Width of Way and Line of Frontage.

Kensington, South.—Buildings, with bay windows, on the west side of The Grove, Old Brompton-road, Kensington (Mr. P. Hoffman for Mr. T. W. Brown).—Consent.

Space at Rear.

Poplar.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of three houses on the site of Nos. 72 and 74, High-street, Poplar, with irregular open spaces at the rear (Mr. J. Clarke).—Consent.

Line of Frontage and Space at Rear.

St. George, Hanover-square.—An additional story, with projecting bay window, upon the existing one-story building at the rear of No. 13, Park-street, St. George, Hanover-square, abutting upon Aldford-street (Mr. W. D. Carve for Mr. A. Thorne).—Consent.

Line of Frontage and Construction of Building.

Hackney, South.—Retention of a wood and canvas shelter of a temporary character on a portion of the forecourt of No. 19, Lea Bridge-road, Hackney (Mr. J. Perloff).—Refused.

Deviation from Certified Plans.

Bethnal Green, South-West.—Deviations from the plans certified by the District Surveyor under Section 43 of the Act, so far as relates to the proposed erection of two buildings on the site of Nos. 32 and 34, Artillery-street, Bethnal Green (Mr. L. G. Hasluck for Mr. R. Sonenfeld).—Consent.

Formation of Streets.

Battersea.—That an order be issued to Messrs. Crossman, Prichard, & Co. sanctioning the formation or laying-out of a new street, for foot traffic only, to lead from Henry-street to Home-road, Battersea (Messrs. Mann, Crossman, & Paulin, Ltd.).—Consent.

Woolwich.—That the Council, at the request of Mr. F. Bethell for the Royal Arsenal Co-operative Society, Ltd., do approve a deviation from the scheme sanctioned for the formation of streets on the Suffolk Place Farm and Bostall Farm, Abbey Wood, so far as relates to an increase in the width of Basilidon-road at its southern end.—Consent.

Means of Escape from Top of High Buildings.

City.—Means of escape in case of fire, proposed to be provided, in pursuance of Section 63 of the Act, on the fifth story of Moorgate Station Chambers, Moorfields, City (Mr. G. Sherrin for Messrs. J. Allen & Sons, Ltd.).—Consent.

Kensington, South.—Means of escape in the case of fire on the sixth and seventh stories of blocks Nos. 2, 3, 4, 5, and 6, and the eighth story of block No. 2, Iverna-court, Wright's-lane, Kensington (Messrs. Metcalf & Greig).—Consent.

Working-class Dwellings.

Bermondsey.—Blocks of dwelling-houses, to be inhabited by persons of the working class and proposed to be erected not abutting upon a street on a

on the south side of Abbey-street, Bermondsey
sars. Humphreys-Davies & Co. for the South-
ern Railway Co.)—Consent.

* The recommendation marked † is contrary
to views of the Local Authority.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

SOLDERS AND SOLDERING—LEAD BURN- ING—FUSIBLE ALLOYS.

SOLDER is an alloy used for joining
together detached pieces of metal,
and must be of such composition that
melting point is lower than that of the metal
to be soldered. The molten solder forms a fresh
joint with the metal with which it is brought
contact. Soft solders fuse at very low tem-
peratures, while hard solders melt only at a red
it. The more closely the solder approaches
its properties to the metal to be soldered the
stronger will be the joint. Pieces of brass
filled with soft solder are more easily torn
than when united with spelter solder
(brass). The surfaces of the metal to be
soldered must be free from any film of oxide or
carbonate, and should be coated with a suitable
flux.

Wiped Joints for Lead.—Lead pipes are
joined together by having molten solder
run around the ends to be united, the excess
solder being wiped off with a suitable cloth.
The ends of the lead pipe before being treated
the solder are carefully cleaned and smeared
with tallow to prevent oxidation, and a mixture
of lampblack and size is smeared around the
joints at a short distance from the ends to be
joined in order to prevent the molten solder
from adhering in a position in which it would
be useless.

Soldering Sheet Zinc or Tinned Iron.—Pieces
of thin sheet zinc, copper, or tinned iron, may
be soldered by sprinkling the cleaned surfaces
with powdered rosin or other suitable flux,
placing a heated tinned copper bolt or
soldering-iron "to the surfaces to be united,"
and, at the same time, holding the end of a
stick of solder against the soldering-iron, so
that molten solder drops upon the hot ends of
the metal to be soldered. The best flux for
zinc is zinc chloride, prepared by dissolving as
much scrap zinc in hydrochloric acid (spirits
salt) as possible, and this solution is some-
times known as *soldering fluid*.

Brazing.—Pieces of brass, copper, iron, or
steel may be united by brazing with either spelter
solder or silver solder. The cleaned surfaces
of the ends to be united are covered with a
mixture of borax and granulated solder, and
placed in the heat of a furnace or open fire.
The borax fuses and acts as a flux, and the
solder also melts, becomes alloyed with the
metal upon which it is spread, and when
cooled to cool forms a tight joint. When
silver solder is used, the surfaces to be soldered
are first covered with a strong solution of
borax, or with powdered borax, and small
pieces of silver solder are then placed upon the
surfaces, so that when the solder is fused it
reads over the metal, becomes alloyed with
it and forms a perfect joint. The brazing of
rail work, such as the brazing of a seam in
iron steam-pipe, is now usually performed
by means of a gas blowpipe.

Composition of Solders.—The alloys capable
of being used for soldering are innumerable,
and the following tables show the composition
of some of those most extensively employed:—

Hard Solders.	Per cent. Zinc	Per cent. Copper	Per cent. Brass	Per cent. Silver	Per cent. Copper
Spelter solder	50	50	—	—	—
Lead solder	40	60	—	—	—
Soft solder	—	—	33	67	—
—	—	—	—	75	25

Soft Solders which contain more tin than
lead are known as *fine solders*, while those
which contain more lead than tin are termed
coarse solders. Fine solders melt at a lower
temperature than coarse solders.

The fluxes placed on the different metals
before soldering or brazing are usually the
following:—

Metal.	Flux.
Iron or steel.	Borax or sal-ammoniac (ammonium chloride).

Metal.	Flux.
Brass and other copper alloys.	Chloride of zinc or ammonium.
Tinned iron.	Rosin or zinc chloride.
Zinc.	Zinc chloride.
Lead.	Tallow or rosin.

Lead Burning.—The process of welding the
edges of lead sheets to form acid chambers or
water cisterns is usually termed "lead burn-
ing," and is performed by applying a small
flame to the edges of the metal until the
adjacent edges unite by fusion. It was at one
time believed that lead burning could only be
satisfactorily performed by means of a hydrogen
flame, but it has since been found possible to
accomplish the work equally well with coal
gas, and coal gas is now commonly employed.
A very fine blowpipe jet must be used, and a
comparatively heavy air-pressure must be
obtained by means of a small foot-blower. The
air-pressure can be obtained by means of a
bellows worked by the arm, but this arrange-
ment is less satisfactory than a foot-bellows
worked by a foot while the lead burner con-
centrates his attention on the fusion of the lead.
For light work in lead, such as joining lattice
work in leaded windows, the heat of a solder-
ing iron is sufficient to accomplish the required
fusion. A soldering-iron maintained at a con-
stant temperature by means of a gas flame fed
through a flexible tube is specially manufac-
tured for leaded window makers.

Fusible Alloys.—Alloys having a low melting
point are used for fusible plugs in boilers, and
also for "fuses" in circuits conveying electric
currents, so that if overheating occurs the alloy
may melt and the current be broken. Fusible
alloys are also sometimes used for small cast-
ings. Bismuth is a common constituent of
fusible alloys. Bismuth is a brittle reddish-
white metal which does not oxidise in the
atmosphere under normal conditions. The
following table shows the composition of some
of the most fusible alloys:—

Melting Point.	Composition.
	Bismuth 38.4 per cent.
75 deg. C.	Tin 15.4 "
	Lead 30.8 "
	Cadmium 15.4 "
	Bismuth 50 "
92 deg. C.	Tin 25 "
	Lead 25 "
	Bismuth 50 "
95 deg. C.	Tin 19 "
	Lead 31 "
	Bismuth 33.3 "
123 deg. C.	Tin 33.3 "
	Lead 33.3 "
171 deg. C.	Tin 66.7 "
	Lead 33.3 "
198 deg. C.	Tin 33 "
	Lead 77 "

It should be noted that the fusing points of
these alloys are much lower than the fusing
point of any one of the components, the fusing
points of the individual metals being as
follows:—

Metal.	Melting Point.
Tin	235 deg. C.
Bismuth	270 "
Cadmium	320 "
Lead	330 "

OBITUARY.

MR. C. FRANCE.—We have to announce the
death on October 8, at his residence, Oliver Hill,
Outwood-lane, Horsforth, near Leeds, in his sixty-
ninth year, of Mr. Charles France, partner of the
firm of Messrs. Milnes & France, of Bradford,
architects, surveyors and valuers. Mr. France was
elected a Fellow of the Royal Institute of British
Architects in 1868. In 1863 he entered into part-
nership with the late Mr. E. Milnes, of Bradford,
who died on December 7, 1890, aged sixty-nine, and
whose son, Mr. Charles C. Milnes, together with
Mr. A. A. France, were admitted as members of the
firm in 1888. Mr. Charles France prepared the
plans and designs for an extensive enlargement of
the electrical works and generating station in
Whitehall-road, over an area of 5,700 square
yards, for the Corporation of Leeds, for which
the several accepted tenders amounted to an
aggregate of 73,000. Of the various archi-
tectural works carried out by the firm, we
may mention the following in Bradford:—The
Royal Victoria Nurses' Home, Beckett's Bank, and
the Swan Arcade, all of which are illustrated in the
Builder of February 19, 1898, No. XIII. of our series
"The Architecture of our Large Provincial
Towns"; many local improvements for the Corpora-
tion, several large business premises and ware-
houses, including those of Messrs. A. & S. Henry
and the Bradford District Bank, warehouses in

Peckover-street and in Water-lane, and the recent
alterations and enlargement of the Royal In-
firm. The firm were architects of the engine-
chimney at Liversedge, Yorkshire; the rebuilding
of the Station Hotel at Keighley for the Midland Rail-
way Company; buildings for the extension of the
chemical works at Dewsbury and of the mills at
Levenshorth, near Bradford; a warehouse for
Messrs. J. Bean & Co. at Oak Mills, Clayton, York-
shire; the enlargement and alteration of Westfield,
at Ilkley; and various residences at Harrogate,
Horsforth, and other places in the county.

GENERAL BUILDING NEWS

CHURCH, WADSLEY, SHEFFIELD.—On the 9th
inst. part of the scheme of church extension for
Hillsbro' and Wadsley was completed. The new
church, built on the site of the old iron structure,
contains chancel 27 ft. 6 in. by 20 ft., nave 61 ft. by
26 ft., with small north transept, organ-chamber,
and vestry. The entrance is by a porch on the
south side. At the south-west corner is a bell-
turret. The outer walls are of stone; Bath-stone
has been employed for the interior generally. The
east window has five lights, with tracery head.
There is an open timber roof of pitch-pine, and the
church is seated with pitch-pine benches and a few
chairs. There is accommodation for 230. The
heating is by hot water, and incandescent gas sup-
plies the lighting. The architects have been Messrs.
Ellis Bros., of Sheffield. The total cost of the
scheme has been 3,200.

ST. MICHAEL'S CHURCH, BATH.—This building
has been resited with English oak, the new
benches affording accommodation for 500 wor-
shippers. Each of the standards, at the ends of the
various seats (seventy-six in all) is carved, all of
varied design; whilst the backs and fronts of the
benches have linen-panels carved upon them, sur-
mounted by embattled moulds. The whole of the
seating is untouched by polish, varnish, oil, wax, or
sandpaper. All the work is joined together by oak
dowels, metal nails and screws being eschewed.
The work has been carried out from the designs
and under the superintendence of Messrs. Gill &
Morris, architects, of Bath, by Messrs. Harry Hems
& Sons, of Exeter. The cost of the new works has
been about 1,000.

CHURCH, WYCHE, WORCESTER.—The founda-
tion-stone has just been laid of a church which is to
be erected, as an off-shoot of the Malvern Priory
Church, to meet the needs of the Wyche district.
The church will consist of a nave 73 ft. long and
28 ft. wide, and a small apse separated from the
nave by a chancel arch of 18 ft. span. The chief
porch is at the south-west corner, while a
second porch is near the north-east angle of the
nave. Owing to the great eastward fall of the
ground, the considerable space under the eastern
portion of the building will be made use of for a
vestry-room, heating apparatus, &c. The principal
feature of the design is that the buttresses project
into the interior of the church, and are arched over
at a height of 12 ft. The side windows of the nave,
with one exception, are plain lancets. The window
at the west end will be a three-light lancet. The
apse will have three lancet windows. Externally,
the apse will be a marked feature, especially as seen
from the road below. The whole seating accommo-
dation will be 250, including the choir. The latter
will occupy the eastern bay of the nave, the floor
here being raised two steps above the general level
of the church. The architects are Messrs. Nevison
& Newton, and the builder Mr. W. Porter, both of
Malvern.

**REPAIRS, &C., BONNETHILL U.F. CHURCH,
DUNDEE.**—This church has been repaired and re-
pointed. Two three-light windows filled with
leaded cathedral glass have been made in the north
and south walls to give more light under the
galleries. The heating system has been extended
to the gallery. The suite of halls for church work
have also been altered to provide ante-room and
lavatory accommodation. The alterations and
decoration have been under the direction and to
the drawings of Mr. Leslie Ower, while the con-
tractors were:—For mason work, John Nicoll;
joiner, William Steele; plasterer, A. M'Ritchie;
plumber, Andrew Findlay; heating, G. H. Nicoll
& Co.; glaziers, Donald & Smith; upholsterers,
R. Buist & Sons; wireworker, J. A. Dickie; painter,
W. Norwell.

CHURCH, EASTNEY, HANTS.—The founda-
tion-stone of the new permanent church for the district
of St. Margaret's, Eastney, was laid recently by the
Bishop of Guildford. The new church will be built
by Mr. Henry Jones, and the architect is Mr. J. T.
Lee, of London. The first part of it will cost about
3,000, and when this has been paid for the building
will be completed, bringing the total cost up to
about 7,000. The chancel will be 35 ft. 6 in. long
and 20 ft. wide, the height to the ridge being 42 ft.
The bell turret will be at the north of the church,
and vestry accommodation and an organ loft are
provided. There will be a wide ambulatory round
the chancel. The side chapel will be 28 ft. by 14 ft.
The chancel arch is 28 ft. wide and 33 ft. high to
the apex. There will be a double arcade of six
arches in the nave. The chancel will be lighted on
each side with twelve lancet windows, under arches
recessed 5 ft. from the inner walls. The chancel
will be terminated by a canopy 30 ft. high of

solid masonry, over the altar, on a base of seven steps above the nave, enclosing a domed subject of a "Majesty," with suitable ornamentation beneath. The nave and aisles will be 85 ft. long, 30 ft. wide, and 43 ft. 6 in. high. There are to be two entrances in Highland-road, and two porches at the western end of the church, where the baptistry will be. The arches of the nave arcade are carried above the three-light lancets. The clearstory and subsidiary arches are placed on a lower level in the same series, opening into the aisles. The main feature of the exterior will be the main end facing the Highland-road, which is a gable in three divisions, about 64 ft. high to the apex, with panels for statuary, the whole enclosing at the end of the nave a two-light traceried window in the central division, and a single-light window on each side. The style of the church is an adaptation of Early English architecture to the requirements of a modern church. The materials to be used are brick with stone dressings, Fareham brick being used externally. The total seating accommodation will be for 800.—*Hampshire Telegraph.*

PRIMITIVE METHODIST CHURCH, LEEDS.—A new Primitive Methodist church, situated in Lady Pitt-lane, Beeston Hill, Leeds, was opened on the 4th inst. The new chapel and school were built at a cost of 3,657l. Mr. W. G. Smithson was the architect of the new building, which is in the Classical style, adapted to the situation. The chapel has accommodation for 650 people, and the school will seat between 400 and 500.

CHURCH RESTORATION, LLANDEFGAN, ANGLESEY.—The ancient parish church of Llandefgan, situated midway between Beaumaris and Bangor Bridge, was reopened after restoration on the 6th inst. The architect was Mr. P. Shearson Gregory, Bangor; the contract being carried out by Messrs. J. & R. Jones, builders.

TRINITY UNITED FREE CHURCH, AYR.—This new church is situated at the angle of Midtown-road and Carrick Park. Facing the angle is the end gable of the church, rising 60 ft. to the apex, and flanked with buttresses of considerable projection. Across the whole portico is a moulded arcading, in which are three groups of three light windows. Over this is a large five-light window, with a traceried head under a deeply-moulded arch. At the flanks of the gable are moulded panels with projecting gargoyles, and at the apex a niche over a carved corbel, and surmounted by a floriated cross. At the right of the gable is an octagonal turret containing the stair to the end gallery, and the entrance is by a projecting porch at the side of this turret and facing Midtown-road. The turret rises to a height of 90 ft.; the lower portion carried up in plain masonry to the wall head line, and the upper stages treated with sunk panelling and moulded and gabled belfry openings. The turret terminates with a steep conical roof in red tiles, with a crocketed finial in copper and wrought iron. The entrance porch has a deeply-moulded archway, enriched with carving, and leading into a stone-lined porch, from which inner doors open into the church. The church is designed with a lofty nave and low side aisles, each bay of side aisles having pairs of single lights divided by broad buttresses. The clearstory walls are divided into bays by broad wall piers, and in each bay is a four-light window, with four-centred arched head, and filled with tracery of varied designs. The ridge line is carried unbroken for the full length of 100 yards, but at the chancel end the nave is narrowed, and the wall head raised and finished with a parapet, which is enriched with moulded and capped panelling. At this end is the Church Hall, with entrance and end gable facing Midtown-road. The church is planned with nave, side aisles, and chancel. The seating is arranged with centre and side passages, and a small gallery at the end only. The nave is divided from the aisles by stone columns, over which a series of moulded arches carry the clearstory walls. From the main columns engaged shafts are carried up to the wall-head, and on the caps of those are carried the principal roof timbers. The roof is of hammer beam construction, divided into five bays by moulded main couples, which are filled at the angles with perforated tracery. The main timbers are all exposed, and the ceilings lined with wood stained a dark oak colour. The chancel bay is a continuation of the church, and is divided by a moulded stone arch on clustered piers, with carved caps. The pulpit is placed at the side of the opening, and the choir, elders' seats, and Communion table within the chancel. The organ chambers are placed on each side with arched openings into both church and chancel, and in the end gable is a five-light window with traceried head. The church is arranged for the present seating of 566 persons, but a congregation of 700 could be accommodated. The accessory rooms include vestry, session-house, ladies'-room, kitchen, lavatories, &c. Ballochmyle red stone has been used for all the walling, internal arches, &c., green slates and red tiling for roofing, pitch pine for all internal woodwork of roofs, linings and seatings. The total cost, inclusive of site, will be almost 8,000l. The architect is Mr. John B. Wilson, Glasgow. The clerk of works is Mr. William Scott. The following were the contractors:—Mason and joiner, Mr. D. Kirkland, Ayr; plumber and slater, Messrs.

W. Auld & Sons, Ayr; plasterer, Mr. Wm. Vass, Ayr; glaziers, Messrs. Meikle & Sons, Glasgow; painter, Mr. J. H. Fulton, Ayr; gates and railings, Mr. J. Crichton, Ayr; Leatting, Messrs. McKenzie & Moncur, Edinburgh; electric fittings, Messrs. Milne & Son, Edinburgh; wiring and fitting up, Messrs. Reid & Co., Ayr; sculptor, Mr. Vickers, Glasgow.

ST. EDMUND'S CHURCH, NORTHAMPTON.—The celebration of the jubilee of the consecration of the church of St. Edmund, Northampton, commenced recently, when the church was reopened after renovation, and the new pulpit, choir stalls, stained glass window, &c., were dedicated by the Right Rev. the Lord Bishop of Leicester. The memorial window was executed by Mr. H. A. Hyman, of Chelsea. The main contractor for the general works was Mr. Henry Martin, of Northampton. The decorative works to the walls and roofs was executed by Messrs. Campbell, Smith, & Co., London. The electric installation has been carried out by Mr. W. Mansell, of Northampton; and the architect, as for the previous works, to the church, was Mr. M. H. Holding, Northampton.

PAROCHIAL BUILDINGS, ALL SAINTS' CHURCH, NEWCASTLE.—New buildings connected with All Saints' Church, Newcastle, were opened a few days ago. The new buildings comprise a mission-hall, clergy-house, gymnasium, &c. The cost of the scheme, including site, has been about 5,255l. Messrs. Hicks & Charlewood, of Newcastle, were the architects, and the contract was let to Mr. W. C. Tyrre for 3,261l. 9s. 10d. The mission-hall will seat over 200 persons. On the ground floor is a gymnasium, and the building also contains five club-rooms, two having partitions which may be taken down on occasions when extra accommodation is required. At the top of the building, which is of three stories, are rooms for the caretaker. The mission-hall is built of red brick, with red tiles, and faces Pilgrim-street, the rear of the premises being in the churchyard. Divided only by a passage from the mission-hall is the clergy-house, also of red brick.

CHURCH, DALTON-IN-FURNESS.—On the 11th inst. the foundation-stone of St. Margaret's Church, Dalton-in-Furness, was laid. The building will be of stone, and will accommodate 600 worshippers. The architect is Mr. R. B. Preston, of Manchester. The cost of the new church is estimated at about 4,000l.

ROMAN CATHOLIC CHURCH, SELLY OAK.—The new Roman Catholic Church, Selly Oak, Birmingham, was opened on the 13th inst. It is dedicated to St. Edward, and is situated at the junction of Bournbrook and Elmdon roads. The new building (the architect of which is Mr. H. T. Sandy) provides seating accommodation for about 500, and when fully completed will consist of a nave, 32 ft. long and 30 ft. wide, two side aisles, each 12 ft. wide, and an apsidal-ended chancel. At the east ends of the north and south aisles respectively will be the Lady and Sacred Heart chapels, and at the west end of the nave a vestibule, over which will be the choir and gallery. At the west end of the north aisle it is intended to build a tower, surmounted by a spire. The sides of the nave and the chancel contain a single-light window, and the west gable is filled with a traceried window. The building (which has been erected by Mr. W. Bishop) is mainly of brick, with Bath stone dressings, and faced internally with plaster.

ASYLUM, BURLEY-IN-WHAARFEDALE.—That part of the new asylum which the West Riding County Council have built at Burley-in-Wharfedale, was opened on the 9th inst. Having purchased the Scaleboro Park Estate the Council launched a scheme embracing five blocks of buildings. The completed portion consists of three blocks, involving a total outlay of about 130,000l. The site of the institution is on the southern slope of the Wharfe Valley, within walking distance of Burley station. It is intended to add the remaining two blocks when occasion should arise, and in course of time to provide villa residences within the grounds for such patients as are prepared to pay for their upkeep. The accommodation at present available is for 210 patients. The whole of the work has been carried out under the supervision of the West Riding Surveyor (Mr. J. Vickers Edwards). The principal contractor has been Mr. Isaac Gould, of Leeds.

MUNICIPAL BUILDINGS, JARROW.—The foundation-stone of the new municipal buildings and County Court at Jarrow has just been laid. The new premises are to be erected on the corner of Grange-road and Wylam-street, and upon the site of the old Council Chamber and Corporation offices. In addition to the Council Chamber and the various public offices, the new block of property will provide accommodation for the holding of a County Court, the first to be established in the borough. The principal entrance to the municipal portion of the premises will be in Grange-road, and the County Court will be reached from a door in Wylam-street. A tower is to be erected over the Corporation entrance, and a smaller one over that of the County Court. On the ground floor, entering by Grange-road, offices will be provided for the Town Clerk, Borough Surveyor, Sanitary Inspectors, and Rate Collectors, and above the site will be the Council Chamber, two committee-rooms, Mayor's parlour, and other apartments. In the

Council Chamber there will be a public gallery with accommodation for fifty persons. From this side entrance in Wylam-street, there will be offices for the County-court Registrar, and on the first floor there will be the County-court, together with solicitors', witnesses', and jury rooms. There will also be the judges' room. The caretaker's rooms will be on the second floor. The main staircase, leading to the County Chamber will be separated on both ground and first floors by the surrounding corridors by arcades, and will have decorated ceiling and domed light. The fittings of the building, the council chamber, reception and committee rooms will be of dull polished oak wainscot. There will be electric light throughout the building, and ventilation in all the rooms will be secured by means of extract air ventilators driven by electricity. The premises are heated throughout with low pressure hot water pipes, but in each room a fireplace will be provided. The building has been arranged and designed by Mr. Fred Renoldson, architect, South Shields, and the contract, amounting to 8,955l., was placed in the hands of Mr. James C. Nichol, of South Shields.

TEMPORARY CELLS, NEWCASTLE.—In reference to these constructions, briefly referred to in our last issue, the Fireproof Partition Syndicate have sent us the following further details:—Accommodation has been provided in the female wing for fifteen prisoners, with officers' quarters and usual conveniences, and in the male wing for seventy prisoners, officers' quarters, conveniences, &c. The whole is lighted by electricity, and heated throughout by hot water. The male wing is a building of two stories, with outside walls of 3 in. to 4 in. thick, while the inside walls are 2 in. only. They are formed of double corrugated sheeting. When this sheeting is fixed to the floor and ceiling, a T iron is fixed across the ceiling; from this H iron standards are fixed at suitable distances, through which the sheets are brought to the floor level, where channel iron shoes keep them rigid and in position. In the wall, a wall-channel is placed to receive one end of the sheet, the other being held in position by the H iron standards, and give this the desired level and exact standard, and this process is continued until the last sheet is secured in the opposite wall-channel at the other end of the partition, which is then ready to receive a plastic material, which may be applied to both sides of the sheets at the same time. The partition, when finished, is from 2 in. thick, and may be required and is intended to be fireproof as well as sound, damp, and vermin proof. Should it be desired that wood skirting be fixed to one or both sides of the partition, it can be nailed direct to the partition, or wood fillets are placed in a few of the dovetail corrugations before plastering, and to these the skirting is fixed by screws or nails. For fireproof floors the ends of the corrugated sheets are fixed on the inside of the lower flange of the steel floor joists, and may be bent or arched to admit of air space between the concrete floor and the ceiling below, or placed straight from joist to joist. When a suspended ceiling is required, sheets are fixed into H iron bars secured to the floor joists by a patent clip screw, and give a perfect key for plastering, which acts as a protection to the bottom flanges of the floor joists. Where an air space is not required the sheets are carried from joist to joist, forming a centering for concrete, and are plastered underneath to form the ceiling, which also acts as a protection to the lower flanges of the joists.

MUNICIPAL OFFICES, WOOLWICH.—Mr. Brumwell Thomas has been appointed architect for the erection of a block of municipal buildings on the sites of about twenty houses in Wellington-street and Upper and Lower Market streets Woolwich. On Thursday last week the Borough Council accepted a tender of nearly 51,000l. from Messrs. Johnson & Sons, of Leicester, contractors. The Council rejected a proposal to add a town hall to the buildings, which, it was estimated, would cost some 9,000l. more.

MISSION HALL, SHEFFIELD.—On the 11th inst. the foundation stone of All Saints' Mission Hall, Sheffield, was laid. The upper floor will be in one room, 50 ft. long, and 32 ft. wide, in which 300 people may be seated for concerts, lectures, and entertainments. This will be divisible by means of moving partitions, into three rooms for Sunday school classes. The lower floor will have a room for a young men's club, and there will also be a kitchen and store rooms. The building will be of brick. Mr. Joseph Norton, of Norton Woodseats, is the architect, and Mr. George Carr, the contractor.

RESTORATION OF ST. MARY'S, WEST KENSINGTON.—St. Mary's Church, West Kensington, has recently been decorated and improved. The architect, from whose design and under whose superintendence the work has been executed, is Mr. G. Hamilton-Briggs, of Crowthorpe-road, South Norwood, S.E. The work was designed by Mr. Hamilton-Briggs. Three years ago a design by Messrs. Douglas & Minshall, of Chester, was accepted for a building at Hawarden, in the Gothic style, capable of accommodating both books and students, as a memorial to the late Mr. Gladstone. This building, when complete, will consist of two wings connected by a central block. In the west wing it was proposed to house the library. In the central part the building were the rooms for the warden, and other

ments; the remaining wing forms the hostel. The central portion and the library have now been completed. The library consists of two rooms, each 20 ft. in height, and surrounded by a gallery. The books are arranged in alcoves. The fittings are of mahogany.

INSTITUTE, BURSCOUGH, LANCASHIRE.—On the 1st inst. the opening of the new Stanley Institute at Burcoough by Lord Derby took place. The building, which has been erected by Messrs. Irving & Co., Southport, from designs prepared by Mr. J. A. Southport, is Elizabethan in style, situated on the Liverpool and Preston high road, and the building provision is made for large and all meetings, social gatherings, the usual necessities of a club, and for the catering and entertaining of parties. Outside, a portion of the grounds is being laid out for a bowling green.

LIBRARY, DUNDEE.—A meeting of the Dundee District Libraries Committee, to which the subject of the erection of district libraries in the city with funds provided by Mr. Andrew Carnegie, LL.D., was remitted, was held on the 1st inst. Mr. W. Alexander submitted plans of the first of the libraries to be erected at Arthurstone-terrace, and estimated that the cost of erection would be £5,000. The plans were approved of, and the architect was instructed to procure tenders for the work forthwith. The library will be erected at the corner of Arthurstone-terrace and Maitland-street, and close to Albert-street. The entrance is from the south, and on the one side of the hall is a ladies' reading-room, about 35 ft. by 20 ft., with isolated lavatories, and on the other side a reading library, 50 ft. by 15 ft., with a ladies' room, communication, and a subsidiary stair giving access to the basement floor, where there is a large book store, 40 ft. by 30 ft. On the first floor are a gentlemen's reading-room, 50 ft. by 30 ft., and one for juveniles, 45 ft. by 18 ft., with lavatories' room and lavatories.

PARISH HALL, LISCAR.—A new parish hall has been erected in Manor-lane, Lisca, near Waterford. The building is of the church, and consists of an assembly-room with a gallery at the east end, which together give sitting accommodation to 550 persons; two classrooms at the west end, each having teaching accommodation for forty-two children; and a kitchen on the north side, which can also be used for a classroom. The two large classrooms are arranged in connection with the kitchen to serve as retiring-rooms, or can be turned into one large room for lectures or small meetings. There are two principal entrances at the west end through a vestibule, having separate cloak-rooms, &c.; another from the south side from which the gallery is approached; and a fourth entrance through the kitchen. The whole building is to be lighted by electricity. The architect was Mr. J. J. O'Brien, and the contract for the whole of the builder's work was undertaken by Mr. T. F. Cooke, new Brighton, for £1,820.

NAVAL TRAINING SCHOOL, ELMHAM, NORFOLK.—The building known as the County School, standing on the Blinley Hills, near Elmham, has been converted into an institution for the training of lads for the Navy. The accommodation is for 400 boys, and there is an isolation hospital for cases of sickness. The grounds are about 26 acres in extent. In the basement floor there are washing-rooms, baths for the boys, a bathroom for the staff, and a bathing apartment fitted by Messrs. Barnard & Bishop, of Norwich. On the ground floor there is a central hall with corridors and classrooms adjoining. This hall is about 60 ft. by 35 ft. and is fitted with galleries. On the right there are four reception-rooms, and on the left is the schoolroom, about 50 ft. by 30 ft. The central hall and the schoolrooms can be converted into one large room by means of sliding doors. On the first floor in the south division there are washing-rooms, baths, dormitories, &c. On the second floor is a dining-hall, about 75 ft. long by 30 ft. wide, and along the galleries there are accommodation lockers for the boys. In the attic there are dormitories and other conveniences. On the summit of the building provision has been made for a water supply for flushing, &c. In connection with this there is an iron staircase leading from the attic and on each floor by the windows down to the ground. The master's apartments are on the ground floor, and like the rest of the building, are fitted with electric light and electric bells. On the first floor are a number of guest chambers for the use of visitors. The kitchen and service-rooms connected with the dining-room are situated on the north side. Messrs. Jarvis & Sons, London, have made the structural alterations under the supervision of Mr. Hill, architect, of London. The cost of the alterations will be about 9,000, or 10,000.

ROYAL VETERINARY COLLEGE, DUBLIN.—The new Royal Veterinary College, Dublin, was opened the 1st inst. The building is situated between the Melbourne-road and the Pembroke-road, Ballsbridge. The main entrance is from the Shelbourne-road. Its erection was commenced in February, 1901. The buildings as they stand at present are arranged along the three sides of a quadrangle, and it is hoped that after some time has elapsed the quadrangle will be completed by the erection of a fourth block. The architect was Mr. L. A. Donnell, of Dublin, who was guided by the suggestions of Professor Mettam. The erection of the buildings was entrusted to Mr. James Beckett, and

they were constructed under the supervision of Mr. R. Wilson, clerk of works, Professor Mettam superintending the details so far as they particularly concerned the requirements of a veterinary college. The sanitary work was entrusted to Mr. G. J. Crampton. The internal plumbing was done from the establishment of Alderman Dowd, who was also entrusted with the fitting of the water mains, fire hydrants, and fire extinguisher. Running around the college is a 3-in. main with hydrants at intervals. The buildings are fitted with electric light throughout. The electric light fittings were put up by Messrs. Egan & Tatlow, Dublin. The buildings are in the English Renaissance style. These are constructed of red brick, with cut stone dressings of Dumfries red sandstone. The cut stone carving at the entrance gate and throughout the buildings is the work of Mr. Charles Harrison.

WESLEYAN SUNDAY SCHOOL, ROTHERHAM.—New Wesleyan schoolrooms were opened at Eastwood, Rotherham, recently. The new premises are situated on a site adjoining the chapel, to which they are connected by a covered way. The scheme includes an assembly-hall, 65 ft. by 30 ft., with end gallery, infants' room, church parlour, classrooms, &c. The accommodation is for 650 scholars. The front is in rock-faced York stone, with ashlar dressings, the sides and rear being of brick. A feature is the front gable, which has a triple window, flanked by buttresses carried up and finished with octagonal pinnacles. Under the central window six round-headed windows have been placed to supply light to the classrooms and lobbies. The main entrances are on the right and left of the front, and have porches. Light cast-iron columns support the roof on the clearstory principle, and between these and the outer walls additional classrooms can be provided when required. Heating is by low-pressure hot water. Mr. John Willis, of Derby, was the architect; Mr. Richard Snell, of Rotherham, has had the building contract; and Messrs. Wright Bros., of Sheffield, have been the heating engineers.

CATTLE MARKET, BRAINTREE.—The new cattle market at Braintree has just been opened. The architect was Mr. Frank Whitmore, of Chelmsford, and the contractor was Mr. Ernest West, of Chelmsford.

WEST END CHURCH AND SCHOOLS, HAMMER-SMITH.—These buildings were opened on the 2nd inst., after having been entirely redecorated and electric light and heating apparatus installed. The apse end of the church has been remodelled, and a new pulpit, marble baptistry, choir seats, and organ have been put in; also new lead-lights have been placed in main windows. The contract was let to Messrs. W. O. Collingwood & Co., Great Tower-street, E.C., the amount for the same being £1,158. 15s. The work has been carried out from the designs and under the superintendence of Messrs. George Baines and R. Palmer Baines, architects.

CHURCH ENLARGEMENT SCHEME, MUNDESLAY, NORFOLK.—The scheme for the proposed enlargement of the picturesque old parish church at Mundesley is making progress. The architect (Mr. Lacey) has been taking levels and final measurements at the old church, and the actual work will shortly be commenced. "An extended scheme has been resolved upon," says the Parish Magazine. "At first it was thought best to retain the old roof, and merely add to it. This would have meant having a ceiling throughout the whole of the roof. It is now resolved to put an entire new roof over the whole of the nave, and to roof and repair a small section of the old ruined chancel. Some interesting discoveries have been made. A considerable part of the tracery of one of the windows, in capital preservation, was dug up in the churchyard; also a stone, about 18 in. square and the same in height, carved at each side.

POOR LAW INSTITUTION, BLOOMSBURY.—A new receiving house for children and nurses' home for the parishes of St. Giles-in-the-Fields and St. George, Bloomsbury, was opened recently at Broad-street, Bloomsbury. On the ground floor of the receiving house is a dayroom for boys and girls, lavatories and cloakrooms, kitchen, scullery, and storerooms. On the first floor are dormitories for boys and girls, bathrooms and cloakrooms' apartments. On the second floor are dormitories for boys and girls, bathrooms, isolation wards, and servants' bedrooms. The third floor, which is reached by means of an emergency staircase at either end of the building, comprises apartments for the nurses employed in the workhouse, including a bedroom and sitting-room for the superintendent nurse, six bedrooms and a sitting-room for the nurses, and assistant nurses, and a bathroom. Mr. Alfred Bush, of Ridgmount-street, was the builder, and Mr. J. Grafton Izard, Bloomsbury-square, the architect.

HOTEL, HAMMERSMITH.—The Swan Hotel, in the Hammersmith Broadway, has just been rebuilt. The building, which has been designed in the Elizabethan style, has five stories, the material used in the exterior being red bricks and Monk's Bath stone. Mr. Tomes, of Hammersmith, having carried out the stonework. Polished Norwegian pilasters are placed round the building at different points, the pilasters being relieved with Portland carved stone caps, and with polished brass bands round them. The private apartments of the hotel are on

the top floors, and there is a means of exit to the roof. The first floor is taken up with the restaurant, kitchens, and cloakrooms for ladies and gentlemen. The dining-room is 30 ft. square. The electric light fittings in this room, as well as in other parts of the house, have been designed and executed by Messrs. Osler & Co., of Oxford-street. The dining-room is approached by a walnut staircase. The fittings of the interior of the building have been carried out in the Elizabethan style. From the King-street lobby entrance access can be obtained to the tea-room, which is shortly to be opened. This is about 57 ft. in length, decorated in the Japanese style. Mr. Charles G. Miller was the architect, under whose direction the work has been carried out by Mr. H. L. Holloway, of Deptford, Mr. Ackerman being general foreman. The lift and cellar hoists have been carried out by Messrs. Waygood & Co., the chimney-pieces by Messrs. Froy, the wrought-iron electric lamps outside the building have been provided by Messrs. Benham & Froud, and the polished granite by Messrs. Fenning & Co.

CEMETERY CHAPEL, WESTBURY-ON-TRYM.—A cemetery chapel is now in course of erection at Westbury, from the design of Messrs. La Trobe & Weston. It forms a part of the new cemetery scheme which the Barton Regis District Council is providing for Westbury parish. The walls are of pennant stone with Bath stone dressings, and the roof will be covered with Broseley tiles. The buildings comprise, in addition to the chapel, with its chancel, a vestry for the officiating minister, and a waiting-room for the public. The contractor for the work is Mr. Edwin Clark.

FOREIGN.

FRANCE.—It is announced that the Gustave Moreau Museum will be opened to the public on November 15. The exhibition, which is situated in the Rue de la Rochefoucauld, will be administered by a committee nominated by the Government, and which includes among its members M. Pascal, M. Bonnat, and M. Dubois. The inauguration of the monument to Jules Simon, on the Place de la Madeleine, will probably also take place in November. The Government has commissioned from M. Poilpot, the painter, two new decorative panels for the Sorbonne. They are intended for the vestibules of the Galleries of Letters and Sciences; one is a view of the St. Mark piazza, Venice; the other a view of the Place de la Concorde, with a perspective of the Rue Royale. The Ponts et Chaussées Department of the Côtes du Nord has demanded the demolition of the very ancient oratory of St. Kirech near Perros-Guirec. The proposal has aroused much protest and opposition. The President laid last Sunday, at Valence, the first stone of a bridge over the Rhone, to connect the Departments of Drôme and Ardèche. M. Max Raphaël, architect, of Nîmes, has been commissioned to carry out the building of the new museum at Nîmes. A ladies' college is to be built at Mans, at an estimated cost of \$6,000 fr.—At Grenoble the Arsenal Ste. Marie is to be demolished, and its place taken by a new covered market.

INDIA.—The first section of the Kelani Valley railway was opened on the 15th ult.—New buildings for the Bengal United Service Club are to be erected in Calcutta, and the site has already been purchased.—The Rangoon waterworks, known as the Hlaing scheme, are to be completed during 1904. The reservoir, which is to hold 13,950 millions of gallons, is to be constructed at a distance of sixteen miles from Rangoon. The estimated cost of the whole is 39 lakhs of rupees.—Water supply works, estimated to cost 11 lakhs of rupees, are to be executed in the Kolar goldfields district, Mysore.—The municipality of Allahabad are about to construct an electric tramway service. The route is the main thoroughfare of the city, from which branch off roads leading to all the principal offices and places of business.—A scheme proposed by the Sanitary Engineer, to supply Myingyan, Burma, with water is likely to be adopted. It provides for the storage of 464 million gallons in a reservoir some six miles from the town.—The new quarters for the Naval Commander-in-Chief, to be erected in the Wellington Lines, Bombay, is estimated to cost a lakh of rupees.—A dry dock is now in course of construction at Colombo, Ceylon, and it is proposed to make a large wet dock also at the same place.—Expenditure has been sanctioned for the erection of accommodation officers and subordinates at the dockyard, Kiddyore.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Messrs. Howgate & Keith, architects, of 70, Sackville-street, Piccadilly, have dissolved partnership. Mr. W. James Keith will continue his practice at the above address, and Mr. W. Church Howgate is opening new offices at Grosvenor Mansions, 82, Victoria-street, Westminster, S.W.

NEWCASTLE CORPORATION AND THE HOUSING QUESTION.—It is recommended by the Committee investigating the question of the housing of the poor in Newcastle that the Council approve of the erection on a site in each of the three suggested neighbourhoods, namely, the City-road, the Ouseburn,

and the Cattle Market, of a block of 100 single and pair room tenements, to accommodate about 400 persons, making a total in the three blocks of 300 tenements for 1,200 persons. It is suggested that the blocks should not exceed three stories in height, and that they should be built on the general lines of those at Dryden and Rachel streets, Liverpool, with such modifications and improvements as may be advisable to suit local circumstances; and it is proposed that the rents should be about 2s. per week for the single rooms and 4s. per week for the pair-room tenements. The Committee also ask the Council to authorise them to endeavour to obtain suitable sites in the neighbourhoods of the City-road, the Ouseburn, and the Cattle Market on which to erect the blocks of tenements, and to instruct the Property Surveyor to prepare plans and estimates, a further report on which will, in due course, be presented to the Council.—*Newcastle Journal*.

OPEN SPACES.—Miss Octavia Hill makes an appeal, which is supported by the National Trust, for the acquisition, at a cost of £200, of an area of nine acres on the summit of the Kymyn, near Monmouth, whence may be obtained a fine view of the Wye district and of, it is said, ten neighbouring counties. On the Kymyn, which rises to an altitude of 800 ft. above the sea-level, and until lately belonged to the Monmouthshire estates of the Duke of Beaufort, was erected in 1875, as a monument in honour of the British Navy and its commanders, and dedicated to Elizabeth Duchess of Beaufort, a daughter of Admiral Boscawen.—The Board of Agriculture have held a local inquiry in the matter of an application preferred by Lord Onslow, lord of the manor, for a provisional order in terms of the Commons Act of 1875, for the regulation of Merrow Downs, a space of 20 acres of open common land near Guildford. A provisional scheme has been formulated whereby the control of the downs would be given to a body of nine conservators, whilst the costs of the order and of improving the downs would be met by the sale of three acres of land. It appears that Lord Onslow desires that the digging of flints shall be discontinued, and that the Rural District Council are dissatisfied with that proposal.—It is stated that Mr. James Joicey, member of a firm of colliery proprietors, has offered to give sixteen acres in the Annfield Plain mining district of Lancashire, North Durham, provided that voluntary subscriptions for the laying-out of the park are forthcoming. The Stepney Borough Council have agreed to take over and to maintain the graveyard of St. Mary's Church, Whitechapel, which the Metropolitan Public Gardens Association had agreed to put in order. The Association have agreed to make offers in respect of the acquisition of three squares in Lambeth and a site at Putney, and to support Lord Balcarras's Land Dedication Bill for enabling landowners to set aside lands for the enjoyment of the public without necessarily a surrender of their interests in the freehold.

GLASGOW ARCHITECTURAL CRAFTSMEN'S SOCIETY.—The opening meeting of the season was held on Friday evening, 10th inst., when the presidential address was delivered by Mr. C. Ernest Monro. At the outset, reference was made to the progress and work of the Society since its institution, and thereafter Mr. Monro proceeded to read a paper entitled "Materials—Some Misuses and Limitations." The "lamp of truth" was strongly emphasised, and the importance of practical knowledge of the nature and capabilities of material with regard to their individual uses and adaptabilities for express purposes and treatment in construction. Attention was subsequently called to the conditions of the prize offered by Mr. P. Macgregor Chalmers for the best essay on the subject of "New Buildings in Glasgow, and their Methods of Construction."

THE CHURCH CRAFTS LEAGUE.—During the Church Congress a meeting of the league was held at St. Crispin's Hall, Northampton, when a good audience assembled to hear explained the objects and methods of this Society. The chair was taken by the Bishop of Rochester, referred briefly to the circumstances which had led to the formation of the Society, which had for its object the bringing together of the two great human professions—the clergy and the artists. The Rev. Percy Dearmer then spoke of the difficulties which beset any clergyman who wished to build or furnish a church that should be likely to satisfy the advanced tastes of future generations. If he turned to the ordinary trade catalogue, and procured ready-made fittings turned out by machinery, he filled his church with objects that might, perhaps, violate the fundamental principles of that branch of art which they caricatured. In the Church Crafts League they had a society which was supported entirely by the contributions of those who believed in its objects, and which existed in order to bring clergy into touch with artists and craftsmen who were willing to employ their talents in our churches. Mr. Stirling Lee, the next speaker, explained the point of view of the artist. He said that it was not difficult to understand why the clergy and the artists had drifted so far apart, when one considered that any art going into a church was bound to face the fact that in every part of the building in which he might reasonably have expected to be allowed to offer of his best gifts to the Giver, he had been passed over in favour of the commercial firms. The members of

the musical profession would naturally think but little of a type of worship which, when it might avail itself of their services, passed them over in favour of a mechanical barrel-organ, which always played certain conventional tunes in which all the fundamental laws of harmony were ignored. There were many gifted men who were willing to work in our churches, and the Church Crafts League had been established in order to bring these artists into touch with the clergy. During the Congress the League held a small exhibition (consisting chiefly of photographs and designs) at the Central Arcade. The exhibitors included Mr. Henry Holiday, Mr. Anning Bell, Mr. Alexander Fisher, Mr. W. S. Frith, and many other well-known artists.

BRITISH SCHOOL AT ATHENS.—The annual meeting of subscribers to the British School at Athens was held this week in the rooms of the Society of Antiquaries, and the chair was taken by Dr. Thomas Hodgkin. The report was read by the hon. secretary (Mr. William Loring), and stated that the work of the School had been carried on successfully under the direction of Mr. Bosanquet during the past session. The first student to arrive in Athens was Miss Lorimer, Classical tutor at Somerville College, Oxford, early in October. After some weeks spent in country travel, she devoted herself in Athens to a study of the red-figured vases of the latter half of the fifth century in the Central Museum. Archæologist, the Hon. Baroness E. Rosenheim-Lehn (University College, London), in the course of a long season at the School (from the beginning of November to the end of June) applied herself mainly to numismatic studies; making a special investigation of the representations of birds in ancient art, especially on coins. Two men students were Mr. M. N. Tod, scholar of St. John's College, Oxford ("Senior Student"), Mr. F. W. Hasluck, scholar of King's College, Cambridge ("School Student"), Mr. C. Heaton Comyn ("Architectural Student"), Mr. A. P. Oppé (late Exhibitor of New College, Oxford), and Mr. A. E. Henderson (architect). The committee were happy to report that the design sketched out last year by Sir R. Jebb for the endowment of a studentship for research had been realised by the appointment of Mr. M. N. Tod, the "Senior Student," for two years. Mr. Tod's special line of study being epigraphy, he spent much time in the Epigraphic Museum at Athens, under the general direction of Dr. Wilhelm Dittenberg, and, where necessary, preparing for publication a number of difficult fourth century inscriptions, which was shortly to appear in the *Journal of Hellenic Studies*. Mr. Hasluck arrived, with Mr. Bosanquet, at the beginning of November, and devoted the winter (1) to attendance at archaeological lectures and the acquisition of modern language; (2) to a comprehensive study, in Athens, of the history and antiquities of Cyzicus, in Asia Minor, with a view to an excavation which was to have been undertaken in the spring. The excavation, unfortunately, was necessarily abandoned, through no fault of Mr. Hasluck, who, however, was able to collect some thirty-five unpublished inscriptions and two pieces of archaic sculpture, one of which (a stela with relief of Herakles) was considered of sufficient value to be removed to the Imperial Museum at Constantinople. Mr. Comyn was appointed to an "architectural studentship" in connexion with the excavations in Crete. He occupied himself in the neighbourhood of Athens by making a complete house of fifteen rooms, the beautiful little Byzantine Church at Dauli, at the south end of Mount Pentelicos, to which Mr. Bosanquet had invited his attention. Mr. Oppé had worked steadily in the library of the school at the obscure subject of Greek Oracles. Mr. Henderson was readmitted as a student for the third time, for the special purpose of the Cyzicus survey. Of the preceding year's students, Mr. J. H. Marshall had been appointed Director-General of the Archaeological Survey of India; Mr. Hopkinson had become a Lecturer in Greek at the University of Birmingham; and Mr. Frost a lecturer in the Training College at Isleworth. Mr. Wells had settled down to the practice of his profession as an architect, and Mr. Penoyre had undertaken a course of Archaeological "Extension" lectures. Messrs. Fyfe and Mackenzie, formerly students of the school, had served once more as Mr. Evans's assistants at Knossos. Mr. Edgar, formerly a student of the school, and now on the staff of the Museum, Ghizeh, spent some time in Athens, working both on the catalogue of the Museum, and on the report of the excavations at Phylakopi. Passing to the work of the Director, the committee had to record the preliminary excavation of the early site at Palaio-kastro, on the eastern coast of Crete. The excavation was carried out under the supervision of the Director, with the assistance of the "Architectural Student" appointed for the purpose. The site appeared to have been almost untouched from Mycenaean times until the middle of the last century, and contained abundant remains of houses, large and small, of the Mycenaean period, together with numerous tombs and many hundred vases, both of that and of the earlier ("Kamars") epoch. The Director had been busy sorting and preparing for publication the last results of the important excavations at Phylakopi, in Melos. The finest specimens of pottery from

Phylakopi now adorned the Mycenaean room in the Central Museum at Athens, and a number of the plates had been brought home to England, by the courteous permission of the Greek Government, and would be divided between the Ashmolean, Fitzwilliam, and (probably) the British Museums.—The Chairman congratulated the meeting on the success of the School. In past times the zeal of archaeologists had been somewhat intermittent. Now, however, it was to be hoped that it would be continuous; that we should not fall behind other nations; that no Chancellor of the Exchequer would ever lay his hands on the little grant which had been made by the Government. He moved the adoption of the report, and the motion was seconded by Professor Lewis Campbell. Mr. Bosanquet, the Director, then gave a short account of last year's work.

INTERNATIONAL FIRE EXHIBITION, EARL'S COURT 1903.—At the Executive meeting of the British Fire Prevention Committee, held on Wednesday afternoon, the announcement was made that the Committee's preliminary arrangements for the International Fire Exhibition had been completed, and the general programme finally decided upon. The exhibition will include many interesting exhibits in the way of modern constructional and engineering work, and the latest fire appliances, as also in the form of paintings, engravings, and historical relics.

APPOINTMENT OF SANITARY OFFICERS.—The Local Government Board has sanctioned the appointment of the following sanitary officers:—Mr. H. W. Roberts, Medical Officer of Greenwich; Mr. J. Grimley, Sanitary Inspector in Hampstead; Mr. T. L. Birrell, Sanitary Inspector in Islington; Messrs. Goodfellow, King, and Fisher, Sanitary Inspectors in Southwark.

THE ARTS AND CRAFTS EXHIBITION SOCIETY.—The Arts and Crafts Exhibition Society have been awarded special honours at the Turin International Exhibition of Decorative Art. By unanimous vote of the International Jury a special diploma of honour was given to the Society. Their next exhibition of decorative design and handicraft in London will be held at the New Gallery, and will open in the middle of January. Owing to the limits of space the works shown will be those of artists and craftsmen of the United Kingdom. The receiving days will be the last three days in December.

HOUSING OF THE WORKING CLASSES.—On July 29 last the Parliamentary Committee of the London County Council submitted to the Council a report by the Clerk of the Council dealing in detail with the proceedings of the Joint Committee of the Council and the County Council, and the Joint Committee appointed to consider the question of the revision of Parliamentary Standing Orders in reference to rehousing persons of the working class displaced by the operations of companies and persons in pursuance of statutory powers. The Joint Committee have issued their Report, submitting joint draft standing orders and model clauses which they recommend in place of the present standing orders 30 and 111 (House of Lords) and 31 and 183A (House of Commons), and the model clauses usually inserted in private and local Bills and Provisional Order Confirmation Bills. The recommendations in the present practice involving alterations in the present practice with regard to rehousing persons of the working classes displaced under or in connexion with statutory powers are summarised as follows by the Parliamentary Committee of the County Council, in so far as they affect London:—(a) That the present limit of persons displaced, or elements allowed to be demolished in any one metropolitan borough without any obligation to rehouse be abolished, and that where any such dwellings are proposed to be acquired, it be left to the Home Secretary to determine after inquiry as to the number of persons to be rehoused, such number not to exceed the number of persons displaced; (b) That it be left wholly to the discretion of the Home Secretary to determine as to the area within which new dwellings should be provided under a rehousing scheme; (c) That in all cases where persons of the working classes are to be displaced under statutory powers, promoters of schemes be required on or before December 17 to deposit in Parliament and with the Home Secretary a statement in a statement of a statement in writing giving particulars of such displacements; (d) That within one month of acquiring lands upon which persons of the working class are residing or have been residing within the last preceding five years, the company or body acquiring such lands shall send to the Home Secretary, the London County Council, and the Local Authority concerned, a memorandum and plan describing the lands and houses, and giving, as far as possible, particulars of the present occupiers and the occupiers during the last preceding five years; (e) That the Home Secretary be required to keep a register containing particulars of the persons with regard to whom such displacements have arisen, and shall, if he decides that insufficient rehousing accommodation has been provided, require the company to submit and carry out a scheme for providing new dwellings; (f) That in determining as to the manner in which the company has fulfilled, or shall be required to fulfil, rehousing obligations, the Home Secretary may take into account the question of persons who have been entered in the register as occupying any houses described therein is greater than the number

mitted by law in the district in which the houses are situated; and also any financial assistance given by the company to any schemes of the London County Council or a Local Authority for the provision of working-class dwellings.

(b) That the Home Secretary be empowered to fix rents to be charged for new dwellings, and to attach to his approval of any scheme any conditions not being in excess of the conditions imposed by the London Building Act, 1894, or any other Act or by-law relating to buildings in London.

(c) That all buildings erected or provided under a housing scheme be subject to the provisions of the London Building Act, 1894, or any other Act relating to buildings in London.

(d) That with a view to obviating the necessity for inserting model clauses in all Bills to authorise the displacement of the working class such clauses be embodied in a public general Act of Parliament.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

12,208.—A COMBINED FLUSHING AND DISINFECTING APPARATUS: *L. Donl.*—Through the closed top of the chamber that holds the disinfectant, is fastened on to the side of the tank, is inserted an air tube, of which the valve is joined to the ordinary pull chain. At the base of the chamber an open cock. A small quantity of the disinfectant is delivered, and the valve is opened for the admission of air, at each discharge of the siphon for flushing purposes. In another adaptation, on a rocking-lever, attached to the cock and worked by the pull chain, is substituted for the valve in the air tube.

12,212.—AN IMPROVED WINCH FOR TRANSPORTING MACHINERY: *H. A. L. Barry.*—The inventor seeks to prevent freedom of rotation during a change from the one clutch to the other and to enable the drums to be driven at relatively different speeds; of the two drums, running loosely on the shaft, one is forced against the other with a spring which raises their clutch surfaces normally in contact, whilst a neck checks axial motion of the other; the former drum is kept always in engagement with either a disc or the latter drum by means of the engagement that is set up between a friction disc upon the shaft and the clutch surface of the former drum when the shaft is moved towards the left hand by levers and a link. A spur wheel maintains the latter drum constantly engaged with a pinion upon the engine shaft. (Confer also Nos. 10,600 of 1899 and 15,416 of 1900.)

12,272.—MOULDING OF ARTIFICIAL STONE SLABS, LISTS, &c., FOR PAVING AND OTHER USES: *F. P. Grisonwerk.*—On the piston of the hydraulic cylinder is mounted a die or stamp that will slide in a moulding-box supported by a lever; the upper end is mounted upon a slide which has a large receptacle or opening for a charge of body material, and a smaller opening, and is worked (together with the lever and the pressure and exhaust valves of the press) by cam grooves and surfaces of a drum. With the delivery of body material to the mould, the lesser receptacle takes a charge of facing material from a separate hopper, which is then raised to level with the mould by the die on the piston has fallen to its lowest position, then the upper die rises above the mould, and is raised by a lever into close contact with the die; the ascending piston presses the material into shape, with a slight opening of the exhaust valve the slide moved towards the right hand, and the fashioned article is extruded upwards out of the mould for its discharge by the next advance of the slide. The movements of the stamp or die, the slide, and other parts of the machine can be altered for differently sized slabs or blocks, since the surfaces and cam-ways may be easily taken off the drum.

12,277.—A PIVOT ADJUSTMENT FOR FANLIGHTS, WINDOWS, SCREENS, AND OTHER SWINGING APPLIANCES: *E. Townshend.*—A curved disc upon the curved portion of the pivot that runs against rollers upon a plate screwed on to the frame, sets up friction required. A washer is inserted between the disc and a plate put into a dovetailed recess, carried by a frame. A hole in the plate of the frame takes the round neck of a pin, to which the disc is bolted. For the curved disc may be applied a lenticular disc, consisting of discs curved in opposed directions.

12,283.—A MOUNTING FOR FRAME-SAWS: *W. H. Reynolds and P. Brauer.*—Two frame-saws, reciprocated with cranks and connecting-rods, are caused to work horizontally as they slide in guides upon the opposite sides of two pillars. Each of the saws is bolted to a slide and tension-rod, and joined to cross-heads from which are projections at work in guides, carried by slides which one lifts and lowers with screws that are turned at one and the same time by means of level gearing. A belt on the main crank shaft works the level gearing, which a crown train will either reverse or throw it out of action.

12,296.—FITTINGS, &c., FOR BATHS: *H. H. Holden.*—The bath having castors, whereby it can be moved outwards into the room, is arranged underneath the sink and turns about the outlet of the sink, the end of which is placed a boiler heated with a gas-burner. It is further contrived that the turning

outwards of the bath shall close the discharge-valve, which otherwise will remain closed.

12,301.—WATER SUPPLY (DOMESTIC): *I. G. Walzman.*—The supply is regulated with an electrical apparatus that may be duplicated for hot and cold water, the armatures of two electro-magnets having a common core are secured to a rod, upon the end of which is a slide-valve that regulates communication between the service and basin-supply pipes, a weight counterbalances the armatures, and the rod, and the coils are set in parallel whereby the valve will be closed when the lower coil is energised, and opened when the upper coil is energised. A float within a small tank connected to the basin will automatically shut the supply at a certain level, and is secured to a pivoted arm which will effect a shutting-off of the supply, by closing a circuit that includes the lower coil as soon as the float has attained the level mentioned.

12,357.—BRICKS FOR BUILDINGS, GARDEN WALLS, &c.: *F. W. Webb.*—In order that they may carry off moisture or rain-water, the bricks are fashioned with their upper and lower bearing or bedding surfaces inclined outwards. For laying the corners of buildings the bedding surfaces are made with a downward slope to the two outside faces.

12,385.—MOULDING OF BRICKS, &c.: *E. R. Sutcliffe.*—As the material is fed into the moulds by a hopper, in which rotates a feeding-shaft having blades and prongs, it is pressed by plungers worked by eccentrics and a crank upon the main shaft. The plungers are mounted upon a cross-head, to which the eccentrics are joined with rods; a cam and a rocking lever move the mould-box in its horizontal guides, and the plungers eject the moulded goods on to an endless band carrier. For perforated bricks or blocks the cores are screwed into one plunger, which has a perforated coverplate that obviates their working loosely, and so pass into the openings of a plate fastened upon the other plunger, and surplus material punched out by the cores escapes through recesses in the plunger into the hopper. The tapering of the cores and moulds in opposed directions facilitates the separation of the cores from the bricks.

12,408.—MACHINES FOR SWEEPING AND SCRAPING ROADS: *F. J. Scott.*—The scavenging machine comprises scrapers upon a frame mounted upon two driving-wheels worked with pedals, the stems of the forks that carry the two back steering-wheels are pivoted in sockets, and arms, a rod, and a toothed rod join them to a pinion upon the steering-handle. Arms clamped to fixed quadrants adjust the scrapers and turn the refuse into the main scraper for discharge to either side; in another form the refuse is turned by the adjustable scrapers to a rotary scraper or brush, or a combined brush and scraper, with a casing that opens into a container underneath an elevator which lifts it into a cart. On the brush hub of the axle of the side wheels is a toothed wheel, geared to a drum having teeth around its interior and a pin, forced with a spring, which normally engages with a hole in a disc at the side. A hand-wheel on a shaft lifts and lowers the brush. When the brush is lifted its turning is arrested with a lug upon the pin that engages with a stationary cam and is pulled away from the disc.

12,582.—IMPROVEMENTS IN LEVELS: *J. V. Ganin and N. T. Yolliffe.*—The middle part of an iron frame forms a recess, or cell, in which are embedded two glass plates, between which is poised a weighted needle. A screw and nut that engage with a yoke upon the scale ring, provide for a fine adjustment of the latter, or a screw in engagement with a nut upon the scale will serve for that purpose. The cell may be rendered liquid-tight, and be filled with oil, and an inner flange of the cylinder that constitutes the cell, may be graduated with the scale.

12,589.—ELECTRICAL INSULATORS, ELECTRODES, &c., OF "GLASS STONE": *L. A. Garhey.*—New instead of old glass is employed in the making of "glass stone" (for which see Nos. 5,772 of 1896, 2,003 of 1898, and 5,885 of 1900), with the addition, it may be, of argillaceous or calcareous sands. The moulds are deposited upon the rotary hearth of a devitrifying furnace or kiln. A hydraulic press gives the article the exact shape desired. The inventor claims for the material that it will take an electrical deposit of copper or other metal, and that the process is available for the making of electrical insulators, condensers, electrodes, and similar goods.

12,623.—POSTS FOR FENCING: *L. H. Barry.*—The hollow posts, made of burned clay or some such durable material, are pierced for the fastenings of the wires, some of the holes being disposed in a horizontal line for the fastenings of the vertical rails on to which the fencing is secured; the invention is available for wooden rail fencing.

12,636.—CONTRIVANCES FOR TRAVELLING CRANES: *Wellman Seaver Engineering Co.*—For travelling-cranes that are mounted side by side upon parallel rails, the inventor causes the trolley which carries portion of one crane to be lengthened, and to under-lap the path of the two cranes in common, and also a portion of the trolley which carries a part of the other crane, the former crane being sustained below its path and the latter crane above its path.

12,713.—A REGULATOR VALVE FOR FLUSHING-APPARATUS: *H. Welter.*—A double-piston valve is caused to slide within a cylinder in such a manner

that its upper face, in a normal state of rest, closes the inlet, since the water in the inner chamber derived from the main supply through a port presses against the under surface of the valve; at the bottom of the port or passage is a cock the turning of which opens a passage at the bottom of the chamber, and so relieves the pressure, whereupon the valve falls, and a flush ensues; the turning again of the cock causes a return of water into the inner chamber and the consequent pressure shuts the valve again.

12,714.—PREPARATION OF PLASTER OF PARIS: *J. Hindshaw.*—In order to make the plaster porous the inventor adds whitening, with alum or sulphuric acid in the water used for mixing it; the plaster will be lighter and form a better non-conductor of sound and heat, by reason of the presence of bubbles or cells of carbonic acid gas in the moulded plaster.

12,715.—SIPHONICAL DISCHARGE: *T. W. Woodhouse.*—A dish mounted upon legs is placed around the stand-pipe; the bottom of the bell, from which a flange projects inwards, is extended in order that it may fit over the dish; on the edge of the dish are projections that engage with pockets fashioned upon the bell as guides. For starting a flush the bell is lifted and then allowed to fall through the force of gravity; otherwise it may be drawn down from its normal upper position of rest.

12,749.—LAYING OF PARQUETRY FOR FLOORING: *O. Gutzwiller.*—Metallic tongues are employed for holding the parquet strips together; the tongues have cross-slots through which the nails for fastening the strips are driven.

MEETINGS.

FRIDAY, OCTOBER 17.

Architectural Association.—Mr. T. R. Spence on "Homer and Architecture." 7.30 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., on "Duties of a Sanitary Inspector." 11. 7 p.m.
Institution of Mechanical Engineers.—Captain C. C. Longridge on "Oil Motor Cars of 1902." 8 p.m.

SATURDAY, OCTOBER 18.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection of Disinfecting Apparatus and Model Steam Laundry, St. John's Wharf, Fulham. 2.30 p.m.
Incorporated Association of Municipal and County Engineers.—Eastern District meeting at King's Lynn.

MONDAY, OCTOBER 20.

Liverpool Architectural Society (Incorporated).—First members' meeting, to be held at the Free Public Library, William Brown-street. A selection of the chief architectural books, illustrating various new works, will be on view. 6 p.m.

TUESDAY, OCTOBER 21.

Royal Victoria Hall, Waterloo-road, S.E.—Rev. F. M. Higginson on "Palmyra and Baalbec." 8.30 p.m.
The Institution of Junior Engineers.—Visit to the London Bridge Widening Works. 2 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Dr. H. K. Kenwood on "Methods of Disinfection." 7 p.m.
Association of Soap Works, Silverton, 3 p.m.
Architectural Association of Ireland.—Mr. Arnold Mitchell on "Some Interests of Medieval Architecture," in the Grosvenor Hotel, Dublin. 8 p.m.

FRIDAY, OCTOBER 24.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. A. Harris on "Water: Composition, Pollution, and Purification." 7 p.m.

SATURDAY, OCTOBER 25.

The Craft School, Globe-road, E.—Mr. H. H. Cunningham, C.B., on "The Art of Enamelling," with practical experiments. 8.30 p.m.
Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at Southwark and Vauxhall Waterworks, Hampton. 2.30 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

October 3.—By ORCHARD, JOYCE, & MARSON (at Coventry).

Canley, &c., Warwick.—A freehold estate, comprising 163 a 3 r. 35 p. £5,000

October 6.—By L. FARMER & SONS.

Camberwell.—115, Paulet-rd., u.t. 65 yrs, g.r. 6d., w.r. 59l. 16s. 410

Kilburn.—6, Brondesbury Villas, u.t. 55l yrs, g.r. 9d., w.r. 60l. 585

By PESCIVAL HODSON.

Barnet, Herts.—t to 4, Lonsdale Cottages, f, w.r. 91l. 1,370

Singapore.—t to 5, Chassey-rd., f, w.r. 61l. 2s. 775

Willesden.—15, Shakespeare-av., u.t. 81 yrs, g.r. 5l, e.r. 30l. 265

Kentish Town.—14, Alma-st., u.t. 21l yrs, g.r. 5l, w.r. 28l. 255

Crouch End.—65 and 70, Barington-rd., u.t. 93 yrs, g.r. 13l, w.r. 32l. 815

By DANIEL WARNEY & SONS.

City of London.—at 8, Laurence Pountney-Inf. (offices), f, e.r. 250l. 7,010

October 7.—By C. W. DAVIES & SONS.

Highbury.—29, 32, and 34, Stavordale-rd., u.t. 74 yrs, g.r. 24l, w.r. 134l. 1,385

Barbary.—5, Richmond-rd., with workshops in rear, u.t. 39 yrs, g.r. 8l, e.r. 55l. 400

Holloway.—25 and 29, Eden-gt., u.t. 26 yrs, g.r. 2l, w.r. 95l. 351

2, Grove-st., f, w.r. 31l. 28l. 280

By DANIEL WARNEY & SONS.

Southall, Middx.—t to 6, Hambrough-villas, f, w.r. 174l. 1,790

By WOODS & SKENLING.

Sidcup, Kent.—Station-rd., West View, f, p. 650

Station-rd., Shirley, f, y.r. 45l. 64

By WAIPOFF & DIXONS.	
Teddington.—Park-rd., Norfolk Lodge and 12 a., f. y. 80l.	£1,350
Holloway.—9 and 11, Dalmeny-rd., u.t. 72 yrs, g.t. 21l, y. 140l.	660
By LEEDAM & HARRISON (at Burton-on-Trent).	
Scropton, Derby.—Scropton Farm, 114 a. or 29 p., f. y. 280l.	7,100
Hanbury, &c., Staffs.—Shirley Lodge Farm, 159 a. 2 p. 33 p., f. y. 300l.	3,400
October 7.—By G. LOVETT & SONS (at Coventry).	
Coventry, Warwick.—Warwick-rd., Fernieale, u.t. 75 yrs, g.t. 13l 5s 6d, p.	1,500
12, Warwick-rd., f. y. 310l.	740
14, 16, 18, and 20, Cope-st., f. y. 80l.	1,315
By FLEURET, SONS, & ADAMS (at Masons' Hall Tavern).	
Erith, Kent.—Crayford-rd., The Prince of Wales, freehold rental of 150l., reversion in 39 yrs.	4,500
Avenue-rd., f.g.t. 6l, reversion in 57 yrs.	150
Kennington.—363, Kennington-rd., with off-licence, f. y. 52l.	2,250
363a, Kennington-rd. (S), f. y. 145l 12s.	1,300
arleybone.—Devonshire-st., The Marquis of Anglesea, p.-b., u.t. 123 yrs, g.t. 21l y. 100l.	430
By WILLIAM ROLFE (at Masons' Hall Tavern).	
City of London.—Fenchurch-st., The Elephant, p.b., u.t. 44 yrs, g.t. 110l. with goodwill.	13,900
October 8.—By H. DONALDSON & SON.	
Clapton.—137, Powerscroft-rd., u.t. 73 yrs, g.t. 54l, e.t. 34l.	300
Dalston.—65 and 54, Mayfield-rd., u.t. 59 yrs, g.t. 104l, y. 64l.	685
Wood Green.—4, Terriack-rd., f. y. 30l.	385
By FORTESCUE & CO.	
Putney.—St. John's-rd., Thefield, u.t. 62 yrs, g.t. 8c, 182 14s, y. 110l.	1,325
Wandsworth.—131 and 133, Chatham-rd., f. w.t. 46l 16s.	430
Wimbledon.—82, Gladstone-rd., u.t. 73 yrs, g.t. 3l 10s, w.t. 31l 4s.	260
Clapham.—108, Victoria-rd., u.t. 78 yrs, g.t. 82l, e.t. 55l.	450
By HARRISON, SON & DAW.	
Kennington.—160 and 162, Upper Kennington-lane; also the Vauxhall Baptist Chapel, C, area 11,840 ft., y. 100l.	2,000
By FRANK JOLLY & CO.	
Hackney.—1, Darnley-rd., f. y. 65l.	1,000
Victoria Park.—4 and 5, Combs-rd., u.t. 57 yrs, g.t. 84l 8s, w.t. 44l 12s.	320
By J. H. MELLEFIELD.	
Shoreditch.—Curia-rd., f.g.t. 160l, reversion in 75 yrs.	4,200
By F. MILLER & REID.	
Holloway.—66, 68, and 70, Queensland-rd., u.t. 50 yrs, g.t. 12l 12s, w.t. 93l 12s.	450
By WOOTTON & GREEN.	
Hackney-rd.—108 to 110, Goldsmiths-row (S), u.t. 203 yrs, g.t. 84l, y. 80l.	500
6 to 10, Oakford-rd., u.t. 203 yrs, g.t. 21l, w.t. 163l 16s.	620
By WYATT & SON (at Chichester).	
Chichester.—42, Adelaide-rd., f. y. 124 10s.	185
By G. A. WILKINSON & SON (at Newport Pagnell).	
Newport Pagnell, Bucks.—Caldecote Farm (part of), 10 a. 2 p. 23 p., f. y. 115l 10s.	2,360
By BALCH & BALCH (at Camden).	
Kentish Town.—13 and 15, Gaisford-st., u.t. 40 yrs, g.t. 16l, y. 100l.	955
91 and 95, Palsbull-rd., u.t. 59 yrs, peppercorn g.t. y. 100l.	1,155
Holloway.—78, Tremlett-gr., u.t. 712 yrs, g.t. 74l 7s, y. 40l.	470
78 and 79, Huddleston-rd., u.t. 65 yrs, g.t. 14l, y. 94l.	1,085
Hampstead.—55, Ainger-rd., u.t. 59 yrs, g.t. 82l, e.t. 55l.	390
By BELLAMY & CO. (at Putney).	
Fulham.—64, Chessington-rd., u.t. 78 yrs, g.t. 84l, e.t. 42l.	260
23, Cedar-rd., u.t. 48 yrs, g.t. 74l 10s, y. 41l 10s.	1,675
93, 25, 63, and 65, Colchill-lane, f. y. 153l 5s.	
October 9.—By BISLEY & SONS.	
Rotherhithe.—81 and 83, Hawkstone-rd., u.t. 48 yrs, g.t. 61l, y. 67l 12s.	545
49 and 51, Derrick-st., f. y. 47l 12s.	410
By BROWETT & TAYLOR.	
Saffron Walden, Essex.—Church-st., range of stabling, workshops, and yard, f. y. 53l.	810
By C. RAWLEY CROSS & CO.	
Chelsea.—39, Camera-sq., u.t. 112 yrs, g.t. 44l 10s, y. 32l.	150
Notting Hill.—135, Elgin-cres., u.t. 37 yrs, g.t. 10l, e.t. 60l.	400
By FRANKBROTHER, ELLIS, & CO.	
Barnet, Herts.—The Barnet Castle Market, area 0 a. 1 r. 16 p., f. y. 100l.	4,500
By C. C. & T. MOORE.	
Sutton, Surrey.—Benhill-st., Avon House and 22 a., f. y. 100l.	2,500
Limehouse.—49 and 65, Clemence-st., u.t. 70 yrs, g.t. 94l, y. 78l.	740
Mile End.—465, Mile End-rd., f. y. 314 4s.	470
Forest Gate.—24, Forest-rd., f. y. 28l.	325
Mile End.—48, Grove-rd., u.t. 39 yrs, g.t. 41l 10s, e.t. 48l.	425
Poplar.—10 to 100 (even), Glengall-rd., u.t. 39 yrs, g.t. 24l, y. 100l.	700
By NEWBORN, EDWARDS, & SHEPHERD.	
Barnsbury.—1, Barnsbury-gr., f. y. 45l.	800
49, Thornhill-rd., f. y. 75l.	1,400
Clarendon Town.—163, Camden-rd., and stabling, u.t. 35 yrs, g.t. 61l, y. 85l 10s.	800
Holloway.—35, Arthur-rd., u.t. 391 yrs, g.t. 64l 6s, y. 42l.	430
New Southgate.—Lauder-rd., f. w.t. 204 16s.	250
October 9.—By MORETON RICHES.	
Wandsworth.—4 to 11, Dighton-rd., u.t. 74 yrs, g.t. 36l, y. 391.	2,200
By STIMSON & SONS.	
Old Kent-rd.—The Royal Deaf and Dumb Asylum, area 23,500 ft., f. p.	16,750
Battersea.—38, Almiral-rd., u.t. 223 yrs, g.t. charge for sacks.	475
28, Lindore-rd., u.t. 223 yrs, g.t. 64l 6s, y. 40l.	380

Clapham.—38, Jeffreys-rd., u.t. 65 yrs, g.t. 124 10s, y. 60l.	£430
Stockwell.—22, Tasman-rd., u.t. 72l yrs, g.t. 50l, y. 270l.	395
Blackfriars.—17, Great Charlotte-st. (S), u.t. 91 yrs, g.t. 54l 8s, y. 110l.	350
25 to 29, Great Charlotte-st. (S), u.t. 101 yrs, g.t. 50l, y. 270l.	1,300
Northwood.—24, Westow-st. (S), u.t. 143 yrs, peppercorn g.t. y. 54l.	360
Peckham.—78 and 80, Lugard-rd., u.t. 73 yrs, g.t. 94l, y. 26 4s.	500
Andsell-rd., &c., nine peppercorn g. rents, with reversion in 70 and 67 yrs. (in lots).	825
New Kent-rd.—No. 200, u.t. 22 yrs, g.t. 10l, y. 45l.	300
Old Kent-rd.—Nos. 875, 877, and 879, area 1,000 ft., f. y. 100l 12s.	1,750
Wulworth.—Kingston-st., f.g. 11l 12s, with reversion in 80 yrs.	380
Lambeth.—17, Tower-st., f. y. 40l 6s.	380
October 10.—By BRANK & SON.	
Battersea.—79 and 101, Falcon-rd., u.t. 41 yrs, g.t. 104l, y. 76l.	910
Caledonian-rd.—39 to 45, Charlotte-st., u.t. 19 yrs, g.t. 42l, y. 250l.	1,480
Maida Vale.—Bristol-gdns., f.g. 100l, 100l, u.t. 48 yrs, g.t. 24l.	555
By COOPER & GOULDING.	
Holloway.—24, Fairmead-rd., u.t. 65 yrs, g.t. 94l, y. 30l.	335
110, Dartmouth Park Hill, u.t. 74 yrs, g.t. 74l, y. 34l.	800
By KEYNOLDS & EASON.	
Oxford-st.—57 to 62, South Molton-st., area 5,750 sq. ft., building lease for 80 yrs, let at per annum.	2,855
By R. PRICE & SON.	
South Lambeth.—15, 17, 23, 25, and 27, Carrounder, f. y. 160l.	420
Kennington.—Meadow-rd., freehold stabling premises, area 4,400 ft., w. 49l.	2,015
Brixton.—61 to 67 (odd), Treherne-rd., f. y. 136l.	2,310
11, Treherne-rd., u.t. 61 yrs, g.t. 54l 5s, y. 34l.	345
Clapham.—34 and 38, Wilkinsons-st., u.t. 60 yrs, g.t. 134l, y. 80l.	875
By TOWERS.	
King's Cross.—Tiber-st., f.g.t. 124l, reversion in 40 yrs.	380
Stroud Green.—Ridge-rd., f.g.t. 310l, reversion in 77 yrs.	830
Clapham.—Sugden-rd., f.g.t. 494l, reversion in 83 yrs.	1,200

PRICES CURRENT OF MATERIALS.

* * * Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.	
£ s. d.	
Hard Stocks	1 13 0 per 1,000 alongside, in river
Rough Stocks and	" "
Crises	2 10 0 " " " "
Facing Stocks	2 12 0 " " " "
Shippers	2 5 0 " " " "
Flattons	1 8 0 " " " "
Red Wire Cuts	1 12 0 " " at railway depot
Best Fareham Red	3 12 0 " " " "
Best Red Pressed	" " " " " "
Best Blue Pressed	5 5 0 " " " "
Staffordshire	4 5 0 " " " "
Do., Bullnose	4 11 0 " " " "
Best Stourbridge	" " " " " "
Fire Bricks	4 8 0 " " " "
GLAZED BRICKS.	
Ivory Glazed	" " " " " "
Stretchers	13 0 0 " " " "
Double Stretchers	13 0 0 " " " "
Double Headers	16 0 0 " " " "
One Side and two	19 0 0 " " " "
Two Sides and one	20 0 0 " " " "
Splays, Chamfered	20 0 0 " " " "
Squints	20 0 0 " " " "
Best Dipped Slates	" " " " " "
Glazed Stretchers	12 0 0 " " " "
Quoins, Bullnose	12 0 0 " " " "
and Flats	14 0 0 " " " "
Double Stretchers	15 0 0 " " " "
Double Headers	18 0 0 " " " "
One Side and two	20 0 0 " " " "
Ends	20 0 0 " " " "
Two Sides and one	25 0 0 " " " "
Splays, Chamfered	25 0 0 " " " "
Squints	24 0 0 " " " "
Seconds Quality	" " " " " "
White Glazed	8 0 0 " " " "
Thames and Pit Sand	7 0 0 per yard, delivered.
Best Portland Cement	6 0 0 " " " "
Best Ground Blue Lime	22 0 0 per ton, delivered.
NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.	
Grey Stone Lime	20s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 57s. 6d. per ton at rly. dpt.	

PRICES CURRENT (Continued).

STONE.	
£ s. d.	
Ancestor in blocks	1 11 per ft. cube, deld. rly. depot
Bath	" " " " " "
Farleigh Down Bath	2 8 " " " "
Beer	" " " " " "
Grinshill	1 6 " " " "
Brown Portland in blocks	2 10 " " " "
Darley Dale in blocks	2 4 " " " "
Red Corshill	2 5 " " " "
Clooburn Red Freestone	2 15 " " " "
Red Mansfield	" " " " " "
YORK STONE.—Robin Hood Quality.	
Scrapped random blocks	2 10 " " " "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3 per foot super.
6 in. Rubbed two sides	" " " " " "
Ditto, Ditto	2 6 " " " "
3 in. Sawn two sides slabs (random sizes)	0 11 1/2 " " " "
2 in. to 2 1/2 in. Sawn one side slabs (random sizes)	0 7 1/2 " " " "
1 1/2 in. to 2 in. ditto, ditto	0 6 " " " "
BEST HARD YORK.	
Scrapped random blocks	3 0 per ft. cube
6 in. sawn two sides, landings to sizes under 40 ft. sup.)	2 8 per ft. super.
6 in. Rubbed two sides	" " " " " "
" " " " " "	" " " " " "
3 in. sawn two sides slabs (random sizes)	1 2 " " " "
2 in. self-faced random flags	0 5 " " " "
Hopton Wood (Hard Bed) in blocks	2 3 per ft. cube, deld. rly. depot.
" " " " " "	6 in. sawn both sides landings
" " " " " "	2 7 per ft. super, deld. rly. depot.
" " " " " "	3 in. 'do.
" " " " " "	1 2 1/2 " " " "
SLATES.	
£ s. d.	
20 x 12 best blue Bangor	12 5 0 per 1000 of 1200 sq. ft. dep.
20 x 12 best seconds	11 13 0 " " " "
20 x 12 best	11 11 0 " " " "
20 x 12	12 7 6 " " " "
16 x 8 best	6 17 6 " " " "
20 x 10 best blue Portman	11 7 6 " " " "
16 x 8 best blue Portmadoc	6 5 0 " " " "
20 x 10 best Eureka unfading green	15 0 0 " " " "
20 x 12	11 10 0 " " " "
20 x 10	11 10 0 " " " "
16 x 8	7 10 0 " " " "
20 x 10 permanent green	10 10 0 " " " "
18 x 10	9 0 0 " " " "
16 x 8	6 5 0 " " " "
TILES.	
£ s. d.	
Best plain red roofing tiles	42 0 per 1,000, at rly. depot.
Hip and valley tiles	3 7 per doz.
Best Broseley tiles	50 0 per 1,000 " " "
Do. ornamental	53 6 " " " "
Hip and valley tiles	4 0 per doz. " " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6 per 1,000 " " "
Do. ornamental Do.	54 6 " " " "
Hip tiles	4 0 per doz. " " "
Valley tiles	3 " " " "
Best Red or Mottled Staffordshire	51 0 per 1,000 " " "
Do. Ornamental Do.	54 6 " " " "
Hip tiles	4 1 per doz. " " "
Valley tiles	3 8 " " " "
WOOD.	
BUILDING WOOD.—YELLOW.	
£ s. d.	
Deals: best 3 in. by 11 in. and 4 in.	15 10 0 at per standard.
by 9 in. and 11 in.	15 10 0 " " " "
Deals: best 3 by 9 in.	14 10 0 " " " "
Battens: best 2 1/2 in. by 7 in. and 3 in.	10 0 0 less than battens
and 3 in. by 7 in. and 8 in.	11 10 0 " " " "
Battens: best 2 1/2 by 6 and 3 by 6	10 0 0 less than battens
Deals: seconds	10 0 0 " " " "
Battens: seconds	10 0 0 " " " "
2 in. by 4 in. and 2 in. by 6 in.	9 0 0 " " " "
2 in. by 4 1/2 in. and 2 in. by 5 in.	8 10 0 " " " "
Foreign Sawn Boards	11 0 0 more than battens.
2 in. by 7 in.	10 0 0 " " " "
Fit timber: Best mending Darning or Memel (average specification)	4 10 0 " " " "
Seconds	4 5 0 " " " "
Small timber (8 in. to 10 in.)	3 12 6 " " " "
Small timber (6 in. to 8 in.)	3 0 0 " " " "
Swedish balks	2 15 3 " " " "
Pitch-pine timber (20 ft. average)	3 5 0 " " " "
JOINERS' WOOD.	
£ s. d.	
White Sea: First yellow deals, 3 in. by 11 in.	23 0 0 " " " "
by 9 in.	21 0 0 " " " "
Battens, 2 1/2 in. and 3 in. by 11 in.	17 0 0 " " " "
Second yellow deals, 3 in. by 11 in.	18 0 0 " " " "
" " " " " "	17 0 0 " " " "
Battens, 2 1/2 in. and 3 in. by 9 in.	15 0 0 " " " "
Third yellow deals, 3 in. by 11 in.	13 0 0 " " " "
and 9 in.	15 0 0 " " " "
Battens, 2 1/2 in. and 3 in. by 11 in.	11 0 0 " " " "
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0 " " " "
by 9 in.	18 0 0 " " " "
Do. 3 in. by 9 in.	14 0 0 " " " "
Battens, 2 1/2 in. and 3 in. by 11 in.	12 10 0 " " " "
Third yellow deals, 3 in. by 11 in.	13 0 0 " " " "
Do. 3 in. by 9 in.	13 0 0 " " " "
Battens	10 0 0 " " " "

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Shaw & Son	5,158	19	2
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Lorden & Son .. 1,783 15 Ltd. 1,661 o
Rice & Son .. 1,784 o J. & C. Bowyer .. 1,646 o
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The Builder.

VOL. LXXXIII.—No. 316

OCTOBER 25, 1902.

ILLUSTRATIONS.

Figure and Canopy, St. George's Church, Newcastle-on-Tyne.....	Designed by Mr. T. R. Spence.
West End, St. George's Church, Newcastle.....	Mr. T. R. Spence, Architect.
Design for a Gesso Decorated Box.....	By Miss Hilda T. Baker.
Design for a Jewel Box.....	By Miss E. Thorp.
Hanley, Stoke, and Fenton Joint Infectious Diseases Hospital, Bucknall.....	Mr. Elijah Jones, Architect.

Blocks in Text.

Offices of the "Allgemeine Zeitung," Munich..... Page 364

The Infectious Diseases Hospital, Bucknall, Staffordshire..... Page 370

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Year's Work of the Local Government Board.



THE thirty-first annual Report of the Local Government Board for the year 1901-2 has just been issued, and is as full of interest as its predecessors. Those who regard what are popularly called "Blue Books" as mere statistics overlook both the importance and suggestiveness of this bulky volume, for it is, in effect, a history of Local Government for the past year; a history, not of a mere Government Department, but of the work of the popularly elected representatives of the people in urban and rural districts. The Report deals with a multitude of subjects upon which it is only possible to select a few.

At the present time there is no subject which touches the public more than the question of rates, and it is therefore interesting to give some particulars in regard to the financial condition of the County Councils and other public bodies. The amount borrowed by County Councils during the past year amounted to very nearly 1½ millions. The largest part of this sum was required for the purpose of lunatic asylums, and the amount raised for this purpose from year to year has been markedly on the increase. In the year 1896-7 the amount borrowed was 338,000*l.* odd, in 1901-2 it had risen to 857,000*l.* This is an immense increase, and it represents a considerable addition to local burdens. It also represents a very considerable amount of building and kindred work, and it represents, too, we take it, the absorption into public institutions of persons who would otherwise be a burden on their families in cottages and small homes.

Most of the balance was used for the purpose of erecting public buildings of various descriptions, such as halls, buildings, offices, and court houses, of which 6,250*l.* was raised for the purposes of the Technical Instruction Act, and 2,900*l.* for industrial schools. It is obvious that, when so much money has to be spent on the general purposes of County

Council administration, there would be a considerable reluctance, both by the authorities themselves and by those who have to pay, to raise money for educational purposes, which are not so obviously pressing as the extension of public buildings and institutions such as lunatic asylums.

Turning from the large authority of the County Councils to the smaller body, the Parish Councils, it is interesting to note that the latter borrowed during the year 22,000*l.* odd. A great part of this sum, as well as that which has been previously raised, was incurred for the purpose of the Burial Acts, the rest was spent on recreation grounds, reading-rooms, parish-rooms, offices, halls, lighting, and allotments, and also upon fire-engine stations. Although the amount, if we consider the number of Parish Councils in England, is small, it is yet noticeable, because a few years ago it would have been quite out of the question for any sum to have been spent in this manner, and there cannot be a doubt that it is the beginning of considerable public expenditure by Parish Councils. Every parish will, sooner or later, have its parish hall, and it will be necessary also to spend money upon the water supply. Another point of interest in connexion with parishes, is that of the adoption of the Public Libraries Act of 1892. This, again, is an entirely new departure. Up to March 31, 1902, twenty-nine Parish Councils had taken steps to put the Public Libraries Act in force in their parishes. They are limited to a rate of 1*d.* in the *£*, and they are empowered by the Act of 1901 to make by-laws, which require the authority of the Local Government Board for their formation, for the purpose of regulating or protecting any library or art gallery under their control. There can be no doubt that public libraries in the rural districts are even more required than in towns, where it is so easy for every passer-by to obtain literature, good or bad, at a very cheap rate, and it is to be hoped that some of the rural authorities will take advantage of the Public Libraries Act. In those cases in which a special building is erected for this purpose, it is much to be hoped that an attempt will always be made to have it designed in harmony with the surrounding features. Thus, in those villages which are characterised by half-timbered houses it is desirable to erect a building in that style rather than to place

among old-fashioned and substantial cottages a structure of red brick and slate which, however suitable for a suburb of a town, is yet quite out of place among the trees and gardens of a village.

The total amount expended by Parish Councils during the year amounted to 189,000*l.* odd, and here again, while much of the work has been useful, there is an obvious danger in the increase of the rates, which may prevent the raising of money. If there is one thing more than another which the ordinary dweller in the country detests, it is the increase of local rates.

A feature of considerable importance which appears in this Report is that which relates to the expenditure of County Councils on main roads, and this is the largest item in their outgoings. The Councils repaired during the year 15,986 miles of main roads. The actual mileage of the main roads of England and Wales was 26,989, but in about one-third of the rural districts the main roads were maintained by the District Councils on behalf of the County Councils. This is a plan which, on the whole, is to be deprecated, because there is no doubt that a large and central body such as the County Council is much more competent to systematically manage the roads of the county than any local authority.

The average cost per mile of the main roads repaired by the County Councils in urban and rural districts amounted to 61*l.*; by Rural District Councils 57*l.* per mile; and the difference in the cost is probably fully equalled by the difference in the character of road, for there can be no question that the roads maintained by the County Councils are in a better condition than those by Rural District Councils. Here, again, there is a certainty of increase, in the latter districts, of the expenditure, because there are a large number of roads which require to be brought up to a particular standard before they can be economically managed. During the last ten years County Councils have had to raise the character of the roads, and it is possible that in their case the expenditure may presently decrease, since the cost has been to some extent of late of a capital nature.

Dealing still with the financial question, we now turn to the expenditure on that most important of subjects, the sanitation of the districts. And here, again, we have to

face the unpleasant but inevitable fact that the rates have increased, and have increased to an extent which we hope represents an equal increase in the health of the community, for between 1874-5 and 1899-1900 the expenditure of Sanitary Authorities, whether Rural or Urban, increased by nearly 9½ millions; in other words, from 4½ millions to 14½ millions, or 204·1 per cent.

One point to be borne in mind in connexion with the increase of the rates in Urban Districts, which at first sight seems out of proportion to those of the Rural Districts, is that there have been considerable alterations in the area of the former. The effect of these alterations has been to add considerably to the amount of the rates in the Urban Districts and to reduce to some extent the amount levied in Rural Districts, or partly in Urban and partly in Rural Districts. The relative increase, therefore, in the Urban or Rural rates, is less disproportionate than might be inferred from the figures in the Report.

The importance of the annual Report of the Local Government Board is so great that we cannot but think the time has come when it might be considered whether it could not be divided into two portions, one dealing entirely with London and the other with the rest of the country. To a very great extent the interests of London and the country are so separate that it would be far more convenient to have two volumes dealing with these two separate subjects. In the very middle of this bulky volume of 714 pages we come across the subject of the Metropolitan Water Supply, which, however important to the dwellers in London, is totally without interest to those in the wilds of Wales. Indeed, it is a question whether the subjects dealt with in this Report could not be more clearly grouped. Preceding the question of the Metropolitan Water Supply come some interesting essays, for such in fact they are, on the boarding out of pauper children. There is, in effect, but a very elementary kind of order in this volume, and the index is by no means as full as is desirable. It would also be useful if with each volume some kind of *prices* of previous years could be given, so that it would be possible to form a comparison of the history of the year with that of the previous decade.

A FURTHER WORD ON THE LIVERPOOL CATHEDRAL AWARD.

THE assessors in the Liverpool Cathedral competition, Mr. Norman Shaw and Mr. Bodley, appear to have considered that the letter of "A Layman" in the *Times*, referred to in our article of October 11, required some reply from them, and their letter on the subject appeared in the *Times* of the 17th. We hardly think, however, that they have quite answered the criticisms of "A Layman." They point out, as we did, that one of their selected five was one of those who had "taken no trouble," in the sense that he (or they—for it was a partnership firm) had only sent in old drawings; but that these drawings were large and important, which is quite true; nor have we any fault to find with this selection. But certainly the wording of the assessors' Report implied a certain amount of slight to those who had only com-

plied with the invitation so far as to send in illustrations of executed work. What do the words of the Report mean if they do not mean this?

"Many of the competitors in this class have taken absolutely no trouble. They have simply sent in a portfolio containing few, or many, photographs or drawings which they happened to have by them."

That is exactly what Messrs. Austin & Paley did; they sent in a number of drawings which they happened to have by them; so that their selection is clearly at variance with the wording, at all events, of the Report. And those who sent in portfolios of photographs were simply accepting one of the alternatives offered to them in the advertisement of the Committee. The assessors now say that they were perfectly aware of this factor in the terms of the competition, and had not overlooked it; but surely they must see that the wording of their Report reads as if they had, and that the criticism of "A Layman" was a perfectly natural one. They now explain further as follows:—

"We wonder if the writer of the letter really saw and studied the drawings (there were about 1,200 of them) as carefully as we did, or if he is writing from mere hearsay?"

If he had seen them we believe he would have been as much surprised at the contents as we were. One competitor sent a single plan, rather suggestive of the Albert Hall, the entire area being closely seated. In his report he said he had never built any buildings, and that he had been unable to prepare a design, as he had been ill. Another competitor exhibited a large chalk drawing of a figure; a third, two photos of a brass lectern, and so on. There were many similar, and many designs equally little to the point."

Now, we did see the drawings, and spent a whole day in a very careful examination of them (to more purpose we think than the assessors did), and we deny that there were "many similar." These trivial and carelessly selected examples were certainly in a small minority. Moreover the author of the figure-drawing referred to writes to the *Times* to say that he has been very unfairly treated, as he sent in also a large perspective design for a cathedral made by him many years ago, "and other drawings to show my ability as a surveyor of buildings and an architectural draughtsman. I sent in this figure drawing to show my ability and training in a branch of art and drawing which I consider as essential for an architect as Euclid and algebra are for a mathematician." That is perhaps putting it a little too strongly; very fine buildings have been designed and erected by architects who could not draw the figure; but there is no doubt that it is a most important addition to an architect's qualifications and to the proof of his artistic equipment. Mr. George Taylor, the author of this set of drawings, goes on to say that his drawings were not hung up, but left in the portfolio in which they were sent and which was placed on the floor at the end of the room. If this is the case, he certainly has reason to complain; as far as we can identify them by his description we believe we did not see them; and we certainly saw and considered everything that was hung on the walls.

The assessors make a point of the fact that, by their express desire, the names and addresses of competitors were carefully concealed. As we have already said, this system ought to have been announced from the first, and not adopted

as an afterthought; but in any case it is hardly logical for the assessors to make such a point of this supposed anonymity, which in some cases must certainly have been only nominal. They must, for instance, have known the authorship of Messrs. Austin & Paley's drawings, most of which have been published and have been exhibited at the Royal Academy. Then again, one of the five selected candidates is well-known to have been for many years the able assistant of one of the two assessors, who must certainly have known his drawing. We do not suggest that favouritism had anything to do with the selection; but under these circumstances it was surely hardly wise to lay stress upon the anonymous conditions under which the award was made.

Then the assessors argue that the fact that the Committee have made no additions to the list of competitors, which they had full power to do, is a proof that they were quite satisfied with the result of their Report. Undoubtedly it is; as we have already said, it is just the kind of result to have pleased this particular Committee, who wanted nothing but orthodox modern Gothic architecture. But that is just what we complain of. The Committee was a weak one, with most inadequate ideas as to the very meaning of architecture, and as to what might be done with a modern cathedral besides mere archaeology. They wanted, or at all events they very much needed, ideas and instruction on this subject. They have had none. The Report has simply adopted the popular idea that a cathedral is a revived mediæval building; at all events it suggests nothing further.

As we said just now, we maintain that we studied the drawings in the competition to more purpose than the assessors did; and we think the study for a cathedral by Professor Pite, which we published last week, is a practical proof of it. We did not recognise the authorship of these drawings, but we at once saw that this was one of the most remarkable and powerful of the original designs, and suggested that the author of that certainly ought to have a place in the competition. Since we published it we have already had evidence that it has excited great, even enthusiastic admiration among some of our professional readers; and one asks naturally, what one is to think of the judgment of assessors who passed over such a design as that, in such a competition, without awarding even a "mention." Is this one of the designs that Mr. Shaw and Mr. Bodley stigmatise as "eccentric"? We do not think many of our readers will agree with them. We also mentioned with particular commendation the design numbered 38, also without being aware of the authorship. This turns out to be by Mr. Leonard Stokes, and we hope to have the opportunity of publishing it shortly; though, as he says, it can only be considered as a sketch. Now here are two remarkable designs entirely passed over in the competition, both of them turning out to be by men who, if it were a mere question of voting by names, apart from drawings, would unquestionably receive more votes, in a conclave of architectural voters, than any of the five who have been selected. And, apart from their names, they sent in designs which showed original thought, not mere archaeology. But this, we presume, is "eccentricity."

For the architecture of the two eminent

men who have acted as assessors we every admiration. But we cannot say we think their critical judgment has been very conspicuously in the matter of Cathedral Competition. They do not, in fact, any more than the Committee, to have at all grasped the problem before them.

NOTES.

MR. BALFOUR'S address at the opening of the Manchester School of Technology last week was chiefly interesting in that it impressed on the public at large the need and reasons for technical education. Mr. Balfour began by speaking of the necessity of the student who enters a technical school should be 'thoroughly' equipped with elementary knowledge. This is a very rudimentary truth, and it is one which in this age we have over and over again insisted upon, but it is none the less justifying to see the Prime Minister insisting so emphatically to a general audience of persons—a principle which has hitherto mainly not been sufficiently grasped. Mr. Balfour's other point was that it was useless for the Manchester Corporation to have established schools of technology, which are to be superior to those of any other city in England, and perhaps of the Continent, unless the employers of the county Lancashire make use of those who are created there. Mr. Balfour impressed upon the audience the fact that the practical instruction in the workshop might easily be underrated; and, as a matter of fact, the equipment of the Manchester School of Technology such that in addition to technical instruction student will have opportunities of obtaining practical knowledge in the best possible way—that is, side-by-side with oral instruction and scientific demonstration. Manchester is fortunate in having efficient elementary and secondary schools; but Manchester is not England, and what is required is the multiplication in various parts of the country of similar institutions, and the improvement in other localities of elementary and secondary education. It is the mixture of the present controversy over the Education Bill that, in the din of religious and political strife, the real interests of education are being overlooked; and this, it must be confessed, from a want of statesmanship on the part of the Government, and an insufficient appreciation of the points which are certain to raise conflicts.

Records of Ancient Buildings. LORD ROSEBURY made one of his usually interesting and suggestive speeches at the fourth annual meeting of the London Topographical Society last week. We are glad that he pleaded for the preservation of old points and maps of vanishing London. His appeal might, however, have been addressed to a larger audience. There are all over England, not only in the towns but in the rural districts, buildings which are fast disappearing and of which no trace is left, and unless old drawings and plans are carefully preserved by local authorities or local societies, the knowledge of future generations of the England of the past will be very limited. This is the great reason for county museums, as in no other way can the many evidences of the past, which are scattered

over English counties, be preserved. It would be very desirable if the County Councils were to appoint committees to consider what historical monuments within their jurisdiction may be preserved, or the best manner of retaining some evidence of their existence. (The London Topographical Society is certainly doing very good work for London, but a similar labour is required all over England, and the County Councils are the real bodies who should undertake it. We hope that Lord Rosebery's appeal will have wider results than he expected when he addressed it to his limited audience.

The Adelphi Site. We were glad to notice that in the discussion on the question of taking the Adelphi site for a County Hall, at the last meeting of the London County Council, one speaker, Mr. Cohen, supported strongly the view which we have already expressed in regard to the impropriety of sweeping away the Adelphi buildings; remarking that no architect had more impressed his individuality on London than Robert Adam. Colonel Rotton also observed that no doubt the Historical Records and Buildings Committee would have something to say on the subject. Another speaker however (not reported in the daily papers) observed that the objection could be met by having the new County Hall designed in the Adam style! This is really too good to lose. The scheme is however shelved for the present, at all events, by the tie vote which left the Council no present power to proceed with it.

Railway Rates (Owners' Risk). THE attitude of the railway companies is just now causing a considerable amount of friction between themselves and their customers, on this and other points. Brick-makers have an old-standing grievance in the matter of computation of weight, the complaint being that one district is favoured in comparison with another in this respect. The more drastic measures now taken in enforcing demurrage and siding rent charges strongly affect the building and engineering trades, and the same may be said with regard to the "Owners' risk" trouble. These rates range from 10 to 20 per cent. below the ordinary, or company's risk rates, and the railway companies are apparently seeking to impose more onerous conditions upon traders taking advantage of these lower rates. They require relief from any responsibility whatever, except upon proof of wilful negligence or misconduct, on the part of their servants; and it is argued that it is generally simply an impossibility for complainants to furnish such proof. At the time of the agitation which culminated in the Railway Rates Acts of 1891, the companies were more dictatorial still in this and other matters; but they soon had to abandon their attitude, owing to irresistible public opposition. Their proposed "owners' risk" agreement of that date contained the following clause:—

"In consideration of your charging me such reduced rates, I agree to relieve you from all liability for loss, damage, misdelivery, delay or detention, from whatever cause arising."

It will be seen that this was far worse than the clause which is so strongly objected to now. Our own impression is that the latter is not altogether new either, but, in any case,

a manifestly unjust or unreasonable stipulation would not avail a railway company in the Law Courts. It was long ago laid down that "the consent of the parties does not make that reasonable and just, which, in the opinion of the Court is unjust and unreasonable."

THE Queen Victoria-street fire The Metropolitan Fire Brigade has been made the subject of a special report by the Fire Committee of the London County Council, in which the result of a fire inquest held upon this fire in the City is dealt with by the Committee in some detail. The Fire Committee, apparently, in no way censure their Chief Officer; they, indeed, uphold his views, which are, of course, quite natural, seeing that the Fire Committee was quite as much on its trial as the Chief Officer. The fact, however, nevertheless remains that the equipment of the Brigade is notably defective, both in life-saving and in fire-extinguishing appliances; further, that it is undermanned and under-officered, and that its general arrangement or disposition is not what it should be. The Brigade further lacks that knowledge of building construction and building materials which is essential for modern fire-brigade work; and for the last ten years the force does not appear to have realised the gradual change which has been coming over London, both as to the character of its buildings and their contents. A stronger brigade, better equipped and more appreciative of the present building requirements is essential, and it would be well if this were understood before we are subjected to some great calamity. It seems puerile that, in its defence, the Committee should lay stress on its views that the practical height of a fire-escape cannot exceed 50 ft. Since it is common knowledge that very excellent fire-escapes of 70 ft. and 80 ft. in height are on the market and in use abroad, and, should the average height of our buildings become even greater than it is now, it will be necessary to have easily portable fire-escapes that will reach 100 ft. It is imperative that the Fire Brigade authorities should know that they have to meet altered forms of building construction, and that they are no longer dealing with the London of 1870.

IN the course of the meeting of the London County Council on Tuesday a Report was presented by the Theatres and Music Halls Committee dealing with the relationship of the Council to theatre licences by the Lord Chamberlain, from which it would appear that the Lord Chamberlain desired to screen himself behind the London County Council and obtain a County Council certificate for the safety of the theatres he licenses. The County Council, thereupon wisely expressed its desire to limit its certificate to the extent of saying that a theatre was "reasonably safe;" which is, of course, as far as the Council could go. It appears that certificates of this description are now to be issued, and that the definition of "reasonableness" is to be obtained by reference to the minimum requirements of the London County Council's regulations for new theatres. All this is, no doubt very satisfactory to the public, but the theatre manager is thereby placed in a most difficult position, with the result that one

well-known theatre, the Lyceum, has already had to close its doors. The arrangement now adopted by the Lord Chamberlain in conjunction with the County Council is, we think, quite contrary to the spirit of the Act of 1878, under which these authorities are co-operating. From a practical point of view, however, a definition of safety by some public authority is necessary; but what the theatre manager requires is that, given the definition, and the "reasonable" standard of safety having been achieved, he should be left in peace to enjoy the tenure of his playhouse without the constant vexatious interference of officialdom. He also desires the powers to be vested in a permanent authority. In other words, given the definition of "reasonable safety," it is also necessary to have absolute finality in the requirements for safety, and a continuity of policy; otherwise theatre enterprise becomes a too precarious business.

A Fire Test with Oak Flooring.

ON Wednesday last the British Fire Prevention Committee conducted another experiment to test the fire-resisting powers of timber flooring. On this occasion the Hamburg system was tested in the following manner:—A room with 14-in. enclosing walls of stock brickwork was fitted up with a framed floor having 12 in. by 10 in. deal girders and 10 in. by 10 in. deal binders covered with 2½-in. rebated oak flooring, the whole being supported on 15-in. deal posts and the brick walls. At the bottom of this brick chamber (which was about 22 ft. by 10 ft.) a water-gas flame was provided with the intention of maintaining a temperature of 2,000 deg. Fahr. for two hours. The maximum temperature reached, however, did not exceed 1,700 deg. Fahr., but even this temperature was quite sufficient to prove that the floor was by no means fireproof. At the time of leaving the fires were out, but the timbers were far too hot to handle and examine thoroughly; photographs will, however, be made, and careful notes compiled to show the results of the test. The 2½-in. oak flooring was in flames wherever it had not been covered with a stack of loose bricks, and would evidently offer little obstruction to the progress of flames travelling upwards. The girders and binders also appeared to burn freely in spite of the fact that, owing to the floor being without openings of any kind, the flames had less play than would often be afforded in a building.

THIS seventeenth century mansion, a seat of the Barons Bolton, which was consumed by fire last week, is situated near Leyburn and Castle Bolton on the road from Wensley to Redmire, and stands within well-timbered grounds, overlooking the beautiful valley of the Ure, or Yore. The house, somewhat modernised in the course of last century, was built of stone in 1660-70 for Charles, sixth Marquis of Winchester and first Duke of Bolton. On the death of Henry, sixth and last Duke, the Bolton estates passed to Thomas Orde, of Northumberland, husband of Jean Mary Paulet, or Powlett, on whom, failing male issue of his brother, her father, the fifth Duke, had entailed most of his property. In October, 1797, Thomas Orde-Powlett was elevated Baron Bolton, of Bolton Castle, co. York. At Bolton Hall

had been preserved many portraits of the Scropes, of Bolton Castle, one of them being that by Van Dyck of the last Lord Scrope, whom Charles I. advanced Earl of Sunderland, and whose daughter Mary married Charles, first Duke of Bolton. Most of the pictures and furniture were, fortunately, saved from the fire. In the parish church of Wensley, one mile distant, are numerous monuments and memorials of the Scropes of Bolton and the Orde-Powletts; the family pew is enclosed with richly-carved screen-work, taken thither from the Scrope chantry at St. Agatha's, on the Swale, near Richmond, commonly known as Easby Abbey, founded in or about 1152 by Roald, constable of Richmond Castle, for Præmonstratensian canons regular. In the aisle is the chantry of Richard, Lord Scrope, who in 1398 endowed a college of six canons at Wensley.

It is stated that the Secretary Duke of York's School, Chelsea.

disposed towards a project which the authorities have before them for the removal of the Duke of York's School from Chelsea into the country, where the boys could be maintained in more suitable buildings and be provided with more space for recreation. Ten years ago Queen Victoria sanctioned an order whereby the name of the Royal Military Asylum was changed to that which it now bears. The present buildings were erected in 1801-3, after plans and designs by John Sanders, and constructed of brick with stone dressings, the principal front, towards Burton's-court, having a high portico with an order of four columns and an angle-pediment. The school had been established for the children of soldiers, and the Duke of York laid the first stone on June 19, 1801. In 1809 a fund was opened for the restoration of the school chapel and the purchase of a new organ. Burton's, formerly Great or College-court, extending over 12 acres, had been a chosen resort of the Chelsea Hospital pensioners. It was leased in 1887 to the General in Command of the Home District, on behalf of the troops attached to his command, and has since been taken as a recreation-ground for the regiments of Guards quartered in London.

Institute of Painters in Water-Colours.

THE Institute of Painters in Water-Colours have this year reduced their autumn exhibition to a collection of "sketches and studies" in the literal sense of the words; and the drawings of each member are grouped together. We can thus distinguish between those whose productions are examples of genuine sketches, of broad style and rapid execution, and of great interest as such; those whose sketches are of more interest than their finished works; those which are of less interest than their authors' finished works; and those which are weak and of no interest at all. The latter may be passed over. Mr. Joseph Knight is among those whose sketches are inferior, *quod* sketches, to his finished works, which latter we admire very much, but it is obvious that the finish is an important element in them; the sketches are heavy in style. Mr. John White's are fine in themselves and happily suggestive of what the finished works should be. Mr. Frank Walton's drawings go perhaps a little further than the true "sketch" condition, but they are all admirable, es-

pecially "The Nunnery, Alderney" (299). Mr. Cotman and Mr. C. E. Johnson each have a good collection, among which we may particularise Mr. Cotman's "Hornsea Ferry" (321) as one of the best landscape studies in the room. Mr. John Reid's sketches show in a rather crude form the strong oppositions of colour which in his finished works are toned down into a more coherent but still powerful style; these are rather artists' memoranda sketches for exhibition. Mr. Fulleylove, another of the artists who tell better in finished work than in sketches. Mr. Dixon's two drawings, which go a little beyond the sketch stage, of the Fleet on August 16 and August 18 of the present year (397, 404), are admirable in themselves, if they recall Mr. Wyllie a little too much. Among Mr. Edgar Bundy's figure studies "A Reading from Boccaccio" (435) has the making of a good picture in it. Mr. Orrock's landscape studies have the true sketch quality, broad and free in execution; "The Nith" (511) shows a particularly fine sky. Mr. Weedon's are still better in this respect—perhaps the best set of landscape sketches in the rooms. Mr. Lee Hankey, though his drawings are rather unpleasant and puzzling in texture, has original suggestions in colour. Among Mr. David Green's exhibits is a very fine sea study, "A Derelict" (601), which might be worked up into an impressive picture. The President (Mr. Gregory) has a most expressive study of the head of a young girl, "Looking Forward" (514), and an exceedingly clever interior sketch with a lady looking over a newspaper, "Before the Sitting" (516), notable as an admirable piece of drawing. Among works of an exceptional type Mr. Percy Macquoid's studies for various costumes for characters in "Paolo and Francesca" and "If I were King" are very picturesque and decorative in character.

The Modern Gallery.

Two small exhibitions at the Modern Gallery in Bond-street are chiefly noticeable for the presence in one of them of several works (ten altogether) by Mr. John Fraser, one of the most powerful painters of sea and shipping of our day, and of whom we see far less in picture galleries than we could wish. His large study of sea only—"The Wine-dark Sea"—is really grand in character; "On the Medway" shows how he makes a ship drive along the water in a strong breeze; "Cape Trafalgar" has an old battle-ship under full sail for its centre-piece; "Kendal Dyke" is a most powerful landscape study; but all the works under his name are worth attention. Mr. Percy Heard, the other principal exhibitor in the same room, shows a good deal of originality of style in his landscape studies; and there is a most admirable architectural subject, "Windows of a Cairo Harem," by Mr. F. Ogilvie. In the other room is a large collection of drawings by Miss Sophia Woods, under the title "In Many Lands," which have a great deal of topographical interest; we do not know that they go much beyond that kind of interest at present, though there is promise in them; but they include a great many more or less architectural subjects, and the architecture is not drawn as well as it should be where architecture is a prominent element. The view of the Parthenon should not have been exhibited;

from an architect's point of view it is all wrong; it misrepresents entirely the character and proportion of the columns; and the Parthenon is too celebrated a building to be lightly treated.

COMPETITION DESIGNS FOR DEPT-FORD NEW MUNICIPAL BUILDINGS.

The assessor's award in the competition for new municipal buildings at Deptford was made known last week, and there has since been an opportunity of viewing the forty-five sets of design sent in. Mr. John Belcher was appointed at the beginning by the Borough Council to act as assessor in the competition, with the result that the instructions to architects competing were to the point. As is too often the case, the first premium of £100 merges in the commission paid to the successful architect. We should like to see this clause less frequently; it would be better to offer no first premium; as it is, it suggests the promoters' desire to have a sop to fling to the architect placed first by the assessor in the event of their wishing to adopt one of the other designs, while if they are loyal to the assessor it is idle and absurd.

The cost of the building is not to exceed £10,000, and if the successful design cannot be carried out within 10 per cent. of the estimate its author is disqualified. With a warning such as this in the instructions, some of the designs submitted are somewhat surprising. The site is limited, with practically only one frontage; the requirements include Council chamber and committee-rooms, Town Clerk's, Borough Surveyor's, Medical Officer's and Borough Accountant's offices, with lavatories and caretaker's apartments.

The winning design is No. 3, by Messrs. Lancaster, Stewart & Rickards, and without question the Council are to be congratulated on having the best design that was sent in. The ground plan is divided between the Borough Surveyor and the Borough Accountant on the left, and on the right between the Town Clerk and the Medical Officer. The entrance is in the centre of the frontage, with a central hall and staircase with top light at second floor level; the staff lavatories are in the basement, or, rather, what is only a half basement. The conditions state that "a complete set of water-closets, urinals, and lavatories are required for each floor." If the word *on* had been used instead of *for*, we think other competitors might have grounds for complaint whatever the Council intended this clause to mean, it is only another instance in favour of leaving as much as possible to the discretion of the architect. The first floor frontage is occupied by the Council chamber, the back contains a suite of committee rooms. The elevation shows a fine and carefully-studied facade in the best period of the Classic Renaissance as it was practised in England. The treatment of the large windows on the ground floor is a happy solution of the difficulty, and the effect in execution should be good. The design is open to criticism in certain details, details which after all are a matter of taste, but to our thinking the treatment of the segmental bay over the entrance is ill-considered, and it might even be preferable to omit the bay—which is somewhat meaningless in the Council chamber—even, it may be, at the risk of dulness. The figures on the cornice—they are not apparently in niches—have rather the effect of an afterthought stuck on. The perspective drawing is an exceedingly fine one.

In our opinion the second and third premiums designs should change places. The third premium awarded to design No. 27 by Mr. Arthur J. Gale is a very quiet design, well balanced, and evidently very carefully thought out, and the printed requirements seem to have been most conscientiously adhered to. The ground and half-basement floors contain all the public offices, and the first floor is devoted to the Council chamber and committee-rooms. The amount of lavatory accommodation on this floor is rather astonishing, and there seems no necessity for a separate staircase for the mayor and town clerk. No. 32, by Messrs. S. B. Russell and C. E. Mallows, receives the second premium, with a design for which there is much to be said both for and against. The keynote of the plan is a central area dividing the plan practically into two, between which the main staircase is placed, by which access from one to the other

is made, the two parts being at different ends. The offices are well lighted, but, on the other hand, there is waste in the excessive lengths of corridors. It seems also undesirable to have the committee-rooms and mayor's parlour on one floor, and the Council chamber and ante-rooms on another. The feature of the design is a low and not very beautiful tower peeping out of the main roof, at the foot of which is the entrance.

No. 47, by Mr. A. Brunwell Thomas, shows a good plan on somewhat extravagant lines, the recessed entrance opening into a finely proportioned hall, occupying about a third of the ground floor. This arrangement suggested a mezzanine floor for the remaining offices, the rooms of which open on to a gallery carried by columns in the hall below, the effect of which would have been extremely pleasing. On either side of the hall are moderately sized staircases of similar dimensions which look well on paper, but we believe in practice work badly, and are, moreover, an extravagant arrangement. The first is the principal floor, with Council chamber, committee rooms, &c. The faults of an otherwise clever and dignified front are a meaningless dome in the centre and an overpowering tower at the angle. But for these two features we imagine no assessor could have passed this design without recognition; it is conspicuous for courageous planning and for qualities of mass and light and shade in its elevation; but with the features already objected to, it would be impossible to recommend it as being within the limit of cost.

No. 15, by Messrs. Wills & Anderson, as a whole, is a nice design. We doubt the wisdom of the huge three-quarter columns in conjunction with the tiny rusticated pilasters on the first floor. The plan is simple and economical. Mr. Alfred Cox and Mr. F. Dare Clapham send a design, No. 14, having much to recommend it. The plan is based on a central area, the elevation is a well-balanced unsymmetrical facade. No. 1, by Messrs. William Wallace & Gibson, is a well thought out design, the elevation shows a rather overpowering roof, apparently for effect; in other respects the vigour of the design is very telling. No. 17, by Messrs. Butler Wilson & Oglesby, is an effective piece of planning, though somewhat fussy in design, particularly in the elevation, which is too full of features, but has, nevertheless, a generally pleasing effect. A design by Mr. A. E. Dixon is in a strong masculine way, though the *flèche* or clock turret is unworthy of the rest, and does much to mar the effect. The plans are readable and straightforward. No. 20, by Messrs. Armstrong & Wright, is a very nice design, which would have been more easily appreciated had the plans been tinted. There seem to be too many staircases, and, in our opinion, the tower was unnecessary to the general effect.

Nearly all the designs are of considerable merit, and, although it is impossible to call attention to them all, there were none that had not some points worthy of consideration.

ARCHITECTURAL SOCIETIES.

THE TRANSVAAL ASSOCIATION OF ARCHITECTS.—Since it was decided to alter the title of the South African Association of Engineers and Architects, founded in 1891, and to eliminate the word "Architects," there has been no Association in South Africa adequately representing the profession. The architects belonging to the South African Association of Engineers, with other qualified members of the profession, practising there before the war, have now constituted themselves into a separate association to be known as "The Transvaal Association of Architects." The objects of the Association are primarily to form an influential representative body on the lines of the Royal Institute of British Architects, to whom the Institutions, the Town Council, and other public institutions may refer matters on which they desire the views of the profession, and to represent the views of the profession generally. The following gentlemen form the Executive:—Viscount Milner, G.C.B., G.C.M.G. Hon. President; E. B. J. Knox, M.I.C.E., A.R.I.B.A., President; W. Leck and G. A. Hamilton Dickson, A.R.I.B.A., Vice-Presidents; P. E. Treeby, G. S. Burt Andrews, W. H. Stucke, A.R.I.B.A., J. Waterson, F. Emley; and G. A. Hamilton Dickson, A.R.I.B.A., Hon. Sec. and Treasurer.

GLASGOW ARCHITECTURAL ASSOCIATION.—At a recent meeting of this Association, held

in their own rooms, Pitt-street, the President intimated that this autumn the Association celebrates the twenty-fifth anniversary of its foundation. He proceeded to describe how it came into existence through the initiative of Mr. James Lindsay and Mr. William Dunn. These gentlemen, early in the year 1878, called together a few kindred spirits to discuss the possibilities of an Association, and set the ball rolling by calling a meeting of those interested. At this meeting it was resolved to form an Association, rules were submitted and passed, and office-bearers elected. A room for meetings was shortly afterwards secured in the Belgravia College, Newton-terrace. This remained the headquarters for two or three years, when a move was made to more central premises at 101, St. Vincent-street. The stay there was also of short duration, being brought to a sudden and tragic end by a fire. Thereafter a suite of rooms was secured at 114, West Campbell-street, where a successful and progressive existence of about eleven years ensued, till, in 1895, the Association joined with the Institute of Architects in securing joint chambers at 187, Pitt-street. The President then reviewed the progress of architecture during the lifetime of the Association, and remarked on the great advances that had been made from a practical and artistic standpoint, and referred to the advantages the younger generation of architects had over those of even thirty years ago in the latest illustrated works, process prints, and the greatly increased facilities for foreign travel. Looking to the present conditions of the art world, he further remarked how the present state of economics had affected it. The competition for trade, and the consequent rivalry between nations, had raised their patriotic spirit, and had led to a general revival in national literature and art. This was manifested in Scotland by the number of books on Scottish history, &c., being published, the great run on examples of Scottish art, and the restoration during the last few years of quite a number of our national monuments. Another pleasing result of this movement was the revived interest being taken by architects in the national phases of architecture in Scotland, especially those delightfully picturesque conceptions of the seventeenth and early eighteenth centuries. The President remarked on the fitness of the style for modern treatment, and diverged into a sketch of the domestic life of that period. He drew attention to the fact that the combined evidence of that domestic life and the buildings themselves clearly showed that Scotland was behind her great neighbours in her handling of the Renaissance, not through lack of originality or taste in her architects, but through lack of means in the country to indulge them.

COMPETITIONS.

PUBLIC BATHS, HANDSWORTH.—The whole of the competition plans were on view to the public during the whole of last week at the Council House, Handsworth. The five sets of plans were submitted to Mr. A. Hessel Tiltman, F.R.I.B.A., and he recommended that the plans marked A be adopted. This was agreed to by the Council, and on opening the sealed envelope containing the author's name it was found that the selected plans were the work of Mr. John P. Osborne, F.R.I.B.A., of 95, Colmore-row, Birmingham.

ELECTRICAL ENGINEERING PRACTICE.—The Council of the Institution of Electrical Engineers have circulated among the Clerks of some of the principal counties and boroughs the following suggestions with regard to the standard of professional etiquette which ought to be observed by, and expected from, consulting electrical engineers:—

1. No consulting engineer should solicit employment as consulting engineer verbally, by letter, by agent paid by commission or otherwise, or by any other means.
2. No consulting engineer should answer advertisements for consulting engineers.
3. No consulting engineer should advertise for employment.
4. No consulting engineer should pay by commission or otherwise any one who introduces clients.
5. No consulting engineer should receive trade or other discount, or surreptitious commissions or allowances in connexion with any works which he superintends.
6. A consulting engineer, who is also directly or indirectly interested in any contracting or manufacturing business, should inform his client in writing what his connexion is with such contractor.—These are excellent rules, and it will of course be the more easy for electrical engineers to act up to them if public bodies are informed in regard to them.



Offices of the "Allgemeine Zeitung," Munich. Professor Dülfer, Architect.

(Reproduced from the *Architektonische Rundschau*.)

OFFICES OF THE ALLGEMEINEN
ZEITUNG, MUNICH.

We referred, in our issue of the 11th inst., under the head of "Magazines and Reviews" (p. 318, *ante*), to the design of this building, published in the *Architektonische Rundschau*, and now give a reproduction of it as an example of modern German street architecture, which has some additional interest also as the office of a journal of European celebrity. Professor Martin Dülfer, of Munich, is the architect.

The reader will observe the curious contrast, in which we have already remarked, between the sober and practical iron construction of the ground story, and the wild whirl of ornament (?) in the gable, as well as the weak sinuous line of the gable itself. Modern German street architecture, with all its cleverness, is constantly going off into these unnecessary vagaries, and thus what might have been a clever and interesting front is spoiled—to the English eye, at all events.

THE ARCHITECTURAL ASSOCIATION.

The first ordinary meeting of the Architectural Association was held on Friday evening last week, in the Meeting-room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, W., Mr. H. T. Hare, President, in the chair.

Mr. H. P. G. Maule, hon. secretary, having read the minutes, which were confirmed,

Mr. C. H. Brodie proposed the adoption of the Report and balance-sheet for last session, which were printed in the "Brown Book." In the Report would be found a very gratifying account of the work of the Day school, and a statement of the fact that the Royal Institute of British Architects had again given a donation of £100, towards the educational work of the Association, for which the Committee were very grateful.

Mr. Francis Hooper, hon. treasurer, in recording the motion, said that the figures in the balance-sheet spoke for themselves, and very little comment was necessary except to point out that the increasing expenditure of the Association in various departments was the result of the increasing work, and the wider scope of that work in the educational task which had been undertaken. With the increased classes and the establishment of the Day School, the clerical work had necessarily increased, and consequently more had to be expended in establishment expenses. The increase, however, was evidence of progress. As to the Institute grant, which had been received for eleven years in succession, they would have found it difficult to carry on the work without that grant. The remuneration of the lecturers and workers in connexion with the studio and classes, is, it is now believed, on a sufficiently business basis, that when changes are necessary, either from resignation or other causes, there should be no difficulty in finding capable and qualified men to take the place of those who had done so much to establish the courses which exist. The success of the Day school made it unnecessary to call upon the guarantors to tide the Association over the initiation of that school, which was a matter for congratulation, and it seemed likely that the work would soon be on a self-supporting basis. But while they had a paid staff, it was not to be forgotten that there is still a large amount of voluntary work done by men who give their time and experience ungrudgingly and unselfishly for the good of the Association. The list of candidates for election that evening showed the increasing popularity of the Association. They must be prepared for the social expenses to increase to some extent, but it was hoped that by careful supervision of details to keep those expenses within moderate limits, consistent with the success of their social functions, and the keeping up of their tradition for sociability, which had been one of the causes for the success of the Association. He thought he should be failing in his duty were he not to give expression to the valuable help received from the staff in the management of the financial and other work of the Association. There was a large amount of financial and clerical work carried out by Mr. Driver and his assistants, and there was the testimony of the accountant to the accurate

and clear manner in which the very complicated accounts were kept.

The Chairman then put the motion to the meeting, and it was carried unanimously.

The following gentlemen were then elected members of the Association, *i.e.*, Messrs. Cecil G. Hare, H. C. Ingram, W. Paul, A. S. W. Mackay, H. J. Scott, A. Tudor Groves, R. M. Butler, A. N. Prentice, S. I. Adams, W. J. Feare, S. Ford, T. W. Fullerton, R. C. Foster, H. H. Whittington, N. A. F. Haslewood, E. R. Nixey, R. Tasker, M. E. Webb, E. J. Whitley, F. E. Whiting, A. Clavel Withers, J. W. Waite, G. Vey, W. N. Couldrey, B. Chaikin, A. A. Hands, W. T. Temple, A. Binning, H. Reaney, A. M. Millwood, P. O. Dunk, C. Gascoyne, S. W. Hill, J. R. Osborn, M. R. Martin, P. H. Topham, E. F. Ferry, A. E. Munby, A. Horsnoll, G. F. Royds, T. C. Pope, C. M. Harris, T. S. Atlee, W. G. de M. Wilkinson, J. H. Markham, L. Cohen, C. A. S. Vardy, W. Whymper, W. K. McDermott, G. D. Chimes Ross, G. G. Sigismund, and L. Morgan.

Mr. R. S. Balfour, Hon. Secretary, announced that the next meeting of the Discussion Section would be held on November 5, when Mr. H. M. Cautley will read a paper on "Buildings About a Farm."

The Chairman announced that the *conversations* will be held at the Royal Institute of Painters in Water Colours, Piccadilly, on the 31st inst.

Homer and Architecture and the Crafts.

Mr. T. R. Spence then read the following paper:—

The aim of this paper is not to enter into vexed questions of archaeology or the latest discoveries relating to archaic art and their relation to the life of Homer.

It is more in the nature of a fairy journey with him, noting the delicate and subtle suggestions on architecture and the crafts which interlace the expression of his joy in battle, and the lovely sea and land in which is set the story of his characters. He was the seer who "dipped into the future and saw the wonder that would be," for, we may take it, the art he described was more in the sense of a vision of its fruition. He gave in literature what Phidias gave in marble and metals. May not archaic work be the strenuous childhood of effort to materialise the conception of the seer? and only when Phidias came did his ideas reach their permanent ripeness and fulfilment.

How well he has suggested in the *Odyssey* a broad conception of architecture in speaking of shadowy halls, echoing galleries and fragrant chambers, and the value of the bath. His genius seems to have indicated most of the things in architecture and its accessories which are acceptable to those who find their joy in this great art. Any discussion on Homer and architecture really embraces all that is best in Greek art, so that the subject is a vast one. It is like accepting a brief for the scheduling of all that adds to the beauty and refinement of life in architecture. Of course, I mean one phase of architecture only, and my reverence is equally great for many others of widely distinct periods of expression in form and treatment; but here we have infinitely more than will suffice for this evening. The architecture that Homer gives largely appertains to stately dwellings; it is the hope of all students that commissions for such will reach them sooner or later. Recently architecture has suffered somewhat from persistent efforts to graft on to that architecture, which should be spacious, large, and dignified, such forms, shapes, and dimensions as appertain to the cottage or kitchen furniture.

Homer's appreciation for the decorative details of marble, colour, metals, &c., associated with architecture, seems to run on true schemes of harmony. Their gamut is not large (probably the better for that), and consists of gold, silver, ivory, and bronze, so that you feel he was familiar with the refinements of life and free from the tyranny of the commonplace. His heroes, during the delight of battle, were decked with magnificent beaten armour, ornamented in *reposé* of gold and silver; some descriptions of such are quoted later, and we only need to refer to vase paintings, &c., to see how good was the general scheme of the armour of the best Greek period. In the "Iliad" we find the first reference to architecture in a suggestive passage on Priam's palace, "adorned with polished colonnades—and in it were fifty chambers of polished stone, builded hard by one another, wherein Priam's

sons slept . . . and for his daughters over against them, on the other side within the courtyard, were twelve roofed chambers of polished stone, builded hard by one another."

Hephaistos plays a great part in the arts, he being the great craftsman in metal in the house of the gods. His own dwelling is described as being imperishable, star-like, a house of bronze worked by the crooked god himself, where he forged "tripods, twenty in all, to stand round his hall, and beneath the base of each he had set golden wheels, that of their own motion they might enter the assembly of the gods and again return unto his house, a marvel to look upon; this much were they finished that not yet were the ears of cunning work set thereon—these he was making ready and welding chains," &c.

Here follows the description of the shield of Achilles. It is carefully detailed at some length, but quite worthy of your attention, and gives, with a keen insight, all that goes to make magnificent subjects illustrating such incidents as embrace all those elements which are decorative. Here there is no lack of matter to fill with interest and beauty many friezes, and we know how difficult it is to find a motif or a subject that is really decorative in itself. "He threw bronze that weareth not in the fire and tin and precious gold and silver, and next he set on an anvil stand a great anvil and took in his hand a sturdy hammer. First fashioned he a shield great and strong, adorning it all over, and set thereon a shining rim triple, bright glancing. Five were the folds of the shield itself; and thereon he fashioned much cunning work from his wise heart. There wrought he the earth, and the heavens, and the sea, and the unwearied sun, and the moon waxing to the full, and the signs every one wherewith the heavens are crowned: Pleiads and Hyads and Orion's might, and the Bear that men call also the Wain, her that turneth in her place and watcheth Orion, and alone hath no part in the baths of Ocean.

Also he fashioned therein two fair cities of mortal men. In the one were espousals and marriage feasts, and beneath the blaze of torches they were leading the brides from their chambers through the city, and loud arose the bridal song. And young men were whirling in the dance, and among them flutes and viols sounded high; and the women, standing each at her door, were marvelling. But the folk were gathered in the assembly palace, for there a strife was arisen, two men striving about the blood price of a man slain; and both were fain to receive arbitrament; and the folk were cheering both as they took part on either side. And heralds kept order among the folk, while the elders on polished stones were sitting in the sacred circle, and holding in their hands staves from the loud-voiced heralds. Then before the people they rose up and gave judgment each in turn. And in the midst lay two talents of gold, to be given unto him who should plead among them most righteously.

But around the other city were two armies in siege with glittering arms. And two counsels found favour among them, either to sack the town or to share all with the townsfolk even whatsoever substance the fair city held within. On the wall there stood to guard it their dear wives and infant children, and with these the old men; but the rest went forth, and their leaders were Ares and Pallas Athene, both wrought in gold, and golden was the vesture they had on. Goodly and great were they in their armour, even as gods, far seen around, and the folk at their feet were smaller. And when they came where it seemed good to them to lay ambush, in a river bed where there was a common watering place of herds, there they set them, clad in glittering bronze. And two scouts were posted by them afar off to spy the coming of flocks and of oxen with crooked horns. And presently came the cattle, and with them two herdsmen playing on pipes, they took no thought of the guile. Then the others, when they beheld these, ran upon them and quickly cut off the herds of oxen and fair flocks of white sheep, and slew the shepherds withal. But the besiegers, as they sat before the speech places and heard much din among the oxen, mounted forthwith behind their high-stepping horses, and came up with speed. Then they arrayed their battle, and fought beside the river banks, and smote one another with bronze-shod spears, and among them mingled Strife and Tamul, and fell Death, grasping one man alive fresh wounded, another without

wound, and dragging another dead through the mæle by the feet. Like living mortals, they held together and fought, and hurled the corpses each of the other's slain.

Furthermore, he set in the shield a soft, fresh-ploughed field, rich tilth, and wide, the third time ploughed, and many ploughs therein drave their yokes to and fro as they wheeled about. Whosoever they came to the boundary of the field and turned, then would a man come to each and give into his hands a goblet of sweet wine, while others would be turning back along the furrows laid to reach the boundary of the deep tilth. And the field grew black behind and seemed as it were a-ploughing, albeit of gold, for this was the great marvel of the work.

Furthermore, he set therein the demesne-land of a king, where hinds were reaping with sharp sickles in their hands some armfuls along the swathe were falling in rows to the earth, whilst others, the sheaf-binders, were binding in twisted bands of straw. Three sheaf-binders stood over them, while behind, boys, gathering corn and bearing it in their arms, gave it constantly to the binders; and among them the king in silence was standing at the swathe with his staff, rejoicing in his heart; and henchmen apart beneath an oak were making ready a feast, and preparing a great ox they had sacrificed; while the women were strewing much white barley to be a supper for the hinds.

Also he set therein a vineyard teeming plentifully with clusters, wrought fair in gold; black were the grapes, but the vines hung throughout on silver poles; and around it he ran a ditch of cyanus, and round that a fence of tin; and one single pathway led to it, whereby the vintagers might go when they should gather the vintage. And maidens and striplings in childish glee bare the sweet fruit in plaited baskets. And in the midst of them a boy made pleasant music on a clear-toned viol, and sang thereat a sweet Linos-song with delicate voice; while the rest, with feet falling together, kept time with the music and song.

Also he wrought therein a herd of kine with upright horns, and the kine were fashioned of gold and tin, and with lowing they hurried from the byre to pasture beside a murmuring river, beside the waving reed. And herdsmen of gold were following with the kine, four of them, and nine dogs, fleet of foot, came after them. But two terrible lions among the foremost kine had seized a loud-roaring bull that belloved mightily as they haled him, and the dogs and the young men sped after him. The lions rending the great bull's side were devouring his vitals and his black blood, while the herdsmen in vain tarred on their feet dogs to set on, for they shrank from biting the lions, but stood hard by and barked and swerved away.

Also the glorious lame god wrought therein a pasture in a fair glen, a great pasture of white sheep, and a steading, and roofed huts, and folds.

Also did the glorious lame god devise a dancing place like unto that which Daidolos wrought for Ariadne of the lovely tresses. There were youths dancing and maidens of costly wooing, their hands upon one another's wrists. Fine linen the maidens had on, and the youths well-woven doublets faintly glistening with oil. Fair wreaths had the maidens, and the youths daggers of gold hanging from silver baldrics. And now would they run round with deft feet exceeding lightly, as when a potter sitting by his wheel that fitteth between his hands maketh; trial of it whether it run; and now anon they would run in lines to meet each other. And a great company stood round the lovely dance in joy (and among them a divine minstrel was making music on his lyre).

Also he set therein the great might of the River of Ocean around the uttermost rim of the cunningly-fashioned shield.

Now, when he had wrought the shield great and strong, then wrought he him a corslet brighter than a flame of fire, and he wrought in a massive helmet to fit his brows, goodly and graven, and set thereon a crest of gold, and he wrought him greaves of pliant tin."

In the *Odyssey* we learn more of the arts that appertain to home life and its hospitality, the provision for these things is mainly the architect's function, so that we may not pass them over. Bathing and anointing with olive oil and sweet herbs to end all fatiguing journeys and to precede all feasts. Much was made of guests arriving from either peaceful

or warlike expeditions. They were led into the hall.

"They sat down orderly on seats and high chairs, and when they were come the old man mixed well for them a bowl of sweet wine, which now in the eleventh year from the vintage the housewife opened."

When Telemachus was welcomed at the house of Menelaus by his wife we find the following: "Helen bade her handmaids set out bedsteads beneath the gallery, and fling on them fair purple blankets and spread coverlets, and thereon lay thick mantles to be a clothing over all. So they went from the hall with torch and spread the beds, and the henchmen led forth the guests. Thus they slept there on the outer gallery of the house—the hero, Telemachus, and the splendid son of Nestor."

Again, when Telemachus and his men had "tilted his chariot against the shining faces of the gateway, and led them into the hall divine, and they beheld and marvelled as they gazed through the palace, for there was a gleam as it were of sun or moon through the lofty palace of renowned Menelaus. But after they had gazed their fill, they went to the polished baths and bathed them. Now when they had bathed and anointed them with olive oil, and cast about thick cloaks, they sat on chairs by Menelaus, and a handmaid bore water for the hands in a goodly golden ewer and poured it forth over a silver basin to wash withal, and to their side she drew a polished table and laid upon the board many dainties." When they had put from them "the desire of meat and drink," there comes a finely-expressed speech of thanks from Telemachus. To quote: "Son of Nestor, delight of my heart, mark the flashing of bronze through the echoing halls, and the flashing of gold and of amber, and of silver and of ivory. Such like, methinks, is the court of the Olympian Zeus within, for the world of things that are here; wonder comes over me as I look thereon." A portion of the reply of Menelaus should be quoted: "Yea, for after many a woe and wanderings manifold I brought my wealth in ships. I roamed over Cyprus and Phœnicia and Egypt and reached the Æthiopians and Sidonians and Erebi and Libya."

Here is another passage bearing on the domestic life: "Helen came forth from her fragrant vaulted chamber, like Artemis of the golden arrows; and with her came Adrasté and set for her the well-wrought chair, and Aleippé bare a rug of soft wool, and Phylô bare a silver basket which Alcandré gave her, the wife of Polybus, who dwelt in Thebes of Egypt, where is the chiefest store of wealth in the houses. He gave two silver baths to Menelaus and tripods twain and ten talents of gold, and besides all his wife bestowed on Helen lovely gifts; a golden distaff did she give, and a silver basket with wheels beneath, the rims thereof were finished with gold," &c.

Other quotations follow bearing on the matter: "Helen stood by the coffers wherein were her robes of curious needlework which she herself had wrought." Menelaus to Telemachus: "And of the gifts such as are treasures stored in my house I will give thee goodliest and greatest of price. I will give thee a mixing bowl beautifully wrought; it is all of silver and the lips thereof are finished with gold—the work of Hephestus."

Throughout the whole of Homer's writing there is evidence of a close acquaintance with the treasures of art of many races, and the examples of these may have fired his imagination; but it is not my function to enter into this wide field of archaeology and conjecture. In the descriptions handed down by ancient writers of the work of Phidias and his pupils, there is the great statue of Zeus, with which no other artist can compete, a statue of large proportions carved in gold and ivory, seated on a throne holding in his right hand a figure of victory and a sceptre, capped with an eagle in his flight. His garment was covered with low-relief sculpture of figures and lilies. On the throne and footstool were mythological conceptions worked in relief and colour. The rests for the footstool were lions in gold. The head of the god was not passionate or distorted in expression, but calm, majestic, and god-like; and through the whole work of figure, throne, and canopy was that rare sense of refinement and impressive distinction in design which should stamp a supreme piece of art. Then there was the great statue of Athene on the Acropolis, and the incomparable frieze; but his supreme position and works in the world are too well

known for me to take up your time in enumeration, uniting, as it does, all that is perfect in craftsmanship and dignity of design. Many quotations might be given from the "Odyssey," but probably the following will suffice as bearing on architecture.

"Meanwhile, Odysseus went to the famous palace of Alcinoüs, and his heart was full of many thoughts as he stood there, or ever he had reached the threshold of bronze, for there was a gleam, as it were, of sun or moon through the high-roofed hall of great-hearted Alcinoüs. Brazen were the walls which ran this way and that from the threshold to the innermost chamber, and round them was a frieze of blue, and golden were the doors that closed in the good house. Silver were the door-posts that were set on the brazen threshold, and silver the lintel thereupon, and the hook of the door was gold. And on either side stood golden hounds and silver . . . and within were seats arrayed against the wall this way and that from the threshold even to the innermost chamber, and thereon were spread light coverings thinly woven, the handiwork of women. . . . Yea, and there were youths fashioned in gold, standing on firm-set bases, with flaming torches in their hands, giving light through the night to the feasters in the palace. And he had fifty handmaids in the house, and some grind the yellow corn on the millstone, and others weave webs and turn the yarn as they sit restless as the leaves of the tall poplar trees, and the oft oil drops off that linen, so closely is it woven. . . . And without the court hard by the door, is a great garden of four plough gates, and a hedge runs round on either side, and here grow tall trees blossoming, pear trees and pomegranates and apple trees with bright fruit, and sweet figs and olives in their bloom. The fruit of these trees never perisheth or faileth, winter nor summer, enduring all through the year evermore; the west wind blowing brings some fruits to birth and ripens others. Pear upon pear waxes old, and apple on apple, yea, and cluster ripens on cluster of the grape, and fig upon fig. There, too, hath he a fruitful vineyard planted, whereof the one part is being dried by the heat, a sunny plot on level ground, while other grapes are gathering, and yet others they are treading in the wine-press. In the foremost row are unripe grapes that cast the blossom, and others there be that grow black to vintaging. There, too, skirting the furthest line, are all manner of garden-beds planted trimly, that are perpetually fresh, and therein are two fountains of water, whereof one scatters his streams all about the garden, and the other runs over against it beneath the threshold of the courtyard and issues by the lofty house, and thence did the townsfolk draw water."

The greater part of this applies to the garden, but as many architects now include schemes for laying out gardens in their plans it should be of interest.

The following quotation may be added which bears on the reception and treatment of a guest, necessarily associated with domestic architecture:—"Pononous, the henchman, set for him a high chair inlaid with silver, in the midst of the guests, leaning it against the tall pillar, and he hung the loud lyre on a pin, close above his head, and showed him how to lay his hands upon it, and close beside him he placed a basket and a fair table, and a goblet of wine by his side. . . . after they had put from them the desire of meat and drink, the Muse stirred the minstrel to sing the songs of famous men."

It seems to me that the architect Ictinus and Phidias have petrified the dreams or prophecies of Homer, so that we can in a measure believe they were one in architectural design, the one finding his expression in words and the other in such material elements which embody architecture and give it a local habitation and a name.

It should be our function to gather the threads together of what makes Greek art so great, and I can only indicate some things which occur to me as evidence. These I submit with some diffidence, not being an expert or having my mind charged with a great store of knowledge of the vast field of Greek architecture.

From what I have seen in Greece, the perfection of the workmanship of every detail in the architectural remains is very patent—from the perfect arises of fillets and flutes of the immense Doric columns, the soft and accurate curves of the volutes in the Ionic caps, the daintiness, finish, and shape of the egg and tongue and other details of acanthus

lavage on horizontal mouldings; the fine, inuous uniting curves, and relief of the canthus when used in larger and detached forms; the true and delicate contours of their mouldings and the juxtaposition of larger at curves with smaller incised and sharply up members; the sense of decoration they set in soft horizontal lines of shadow being picked up and accentuated by the sharp incisive darks below.

The evidence of reserve in the disposition of ornament—if their ornament was full of ice detail so was it laid on a quiet field, and thus lost none of its value. This vignetting of the sculptor's jewels is a most commendable feature in architecture.

The satisfactory way in which their bas-relief panels filled up the space they were to adorn—the subject filled the space fully and with dignity, the heads not slipping far below the top moulding. What could be better in his respect than the frieze of the Parthenon?

In their groups of ornament note, notwithstanding much small work in parts, running through are always larger curving, uniting forms so that the general effect is in no way belittled, but delicacy and breadth of expression is maintained.

Note the coins of the best period, how largely the heads fill the circle. How fine and dignified is the convention or design of the hair and other accessories. How the lions, the goats, the bulls, have those parts accentuated which express their attributes; forerunner of the same sense as is seen in animal forms in the early heraldry of the Middle Ages. It may appear curious to cite coins in speaking of architecture, but their sense of largeness and true invention contains that which makes fine architectural ornament. Whatever may be the period or style of architecture in which it is your destiny to work, the storing of these details up mentioned in the cells of the mind should create such an innate sensitiveness to bad proportion, clumsy forms, and imperfect workmanship as would form a large proportion of an architect's education.

Their candelabra are fine in contour and ornamentation of curved forms and the right distribution of mouldings, with long spaces between on the shafts.

The real Greek lyre is a fine example of design as seen on the coin. In modern times there is no poor instrument that has been so tortured away from its great prototype. The stage property-man has much to answer for in this respect.

Our incomparable British Museum is a treasure house of Greek art and there you may note how satisfactorily many things relating to architecture are accomplished. See how the groups of sculptors in the Parthenon pediment fill the triangular space and, as you may know, this has not always been done in modern buildings with success. The high reliefs of the figures in the metopes show a fine expressive crispness suitable to their position. The frieze, which, of course, comes within the shadow, has a treatment of another kind, comparatively low in relief, yet giving a fine sense of breadth and refinement. At the first glance you think that the great purple shadows on Greek architecture are lightless, but on examination such is the quality of the iridescent light, innumerable soft reflections play on these reliefs and give them more definition and harmony. Well, in such juxtapositions where two ways of treatment are involved, the result is an added value to each form of detail. This also applies to mouldings and other forms of decoration. The architects of the Italian Renaissance have treated the ornamentation and profiles of mouldings with a charming variety and liberty. Mino de Feisole is about the best in this way. Yet do not start from Mino de Feisole in your efforts to add further interest to such detail; rather add your invention to the purer Greek forms.

The Museum contains in the Archaic room an Ionic capital from the Temple of Ephesus, which seems to me the perfection of treatment in the volutes—so soft, yet large and truly architectural. It seems to me to be finer than those of the Erechtheum.

Note in some of the statues how broad and searchingly expressive of the contours of the figures are the draperies, yet when leading away from the figure how they are licked up into crisp and expressive lines which would show against the sky or other background (especially in those statues that are to express movement).

In the Museum you will notice how architecturally that noblest of decorative animals, the horse, is treated. Note how fine and complete in design is the gravestone No. 599.

It may be contended that there is not much to be learned of architecture proper from Homer, yet I venture to think that what he says of it is of significance and interest to those practising this art, for by that means they will be led to take a deep interest in the efforts of later Greek architects and artists to illustrate or build up into permanent form his imagery. The examination of their achievements will result in an education. Really, beauty is required of you on special occasions, apart from that which is scientific or constructive. You cannot give beauty to your work by a paragraph in the specification. Now the world expects you, over and above perfect planning, construction, and sanitary excellence, that crown which we name beauty, and which Jules Breton has defined as "the splendour of the true."

Please do not think that your task is to reproduce only from the cells of memory the best details of the Greek or any other period; but think how much can be gathered from their sense of proportion, the value of plain spaces, and the vignetting and placing of such adornments as their sculptors, painters, and metal craftsmen could supply.

To me the clothing of the Greeks ranks, as costume, very high, if not the highest, as a motif for the architectural sculptor. It does not seem an invention of pushing tailors. It is of the simplest construction, and follows and accentuates all the sinuous motions of the figure. Its lines are endless in variety, and can be governed by, and made subservient to, the sculptor's aims. What perfect gems in design, craft and line are the best Tanagra figures, as you may observe in the British Museum, mostly illustrating quiet domestic incidents, but there is in the museum in Athens several examples showing remarkable and vigorous technique in the expression of the swirl of the dance.

The best mediæval costumes bear a close relationship to those of the Greek. Then, again, the symbols of their religion, as seen in the Parthenon frieze, are of refined and decorative forms. The late Lord Leighton uses them with great effect in his picture, "The Daphneoria." I venture to say, one of the finest decorative pictures ever painted. Although it represents another form of festival than that on the Parthenon, it always leads me to realise how great as a decoration in form and colour must have been the actual procession which Phidias illustrates. We can imagine it on its progress along the sacred way, winding through the shallow valleys, and anon outlined against the blue and sapphire of the Saronic Gulf and the Peloponesian mountains.

We gather from Homer a fine sense of site for his architecture, as he mentions in his descriptions of the House of Alcinoüs as having a fair prospect. Then, again, a later writer speaks of Athens as the "City of the violet crown," the crown being the Parthenon.

I can speak from experience of the site of the House of Agamemnon on the lower spur of the mountains of Argos. Behind are the higher peaks, and far away below stretch the plains of Argolis. As Homer phrases it, the pasture land of horses, and beyond the boundaries of this plain lies the blue shimmering bay of Nauplia. On speaking of Greek landscape with its long, horizontal lines of blue seas and grey-green plains, from the boundaries of which rise the broad and dignified mountain forms, all bathed and united in the iridescent air of that divine land, makes it an unequalled source for instilling into an architect such a sense of colour for decorative purposes as cannot be obtained from textbooks of coloured ornament.

This reference to landscape may seem a wandering away from architecture, but on source of inspiration is unworthy. Most architects have a deep interest in interior colour, but many cherish as their only idols schemes of grey-greens and reds, avoiding that which is sumptuous in colour. When you get over the wall of the Swiss Alps revelations come upon you that the diffused purple has harmonies equally beautiful. In Greece, all the greens, blues, and greys, &c., seem to be steeped in a bath of purple. This veil of purple iridescent atmosphere is the magician which assimilates and brings all local colour into decorative completeness. Unfortunately,

we cannot bring the quality of the sunlight here, but still remembrance of these things has an educational value.

An architect's life and practice is, we know, inextricably mixed up with specifications, quantities, dilapidations, sanitary and other engineering, *et cetera*. There is no escaping the well-known ending to specification paragraphs—the very convenient *et cetera*. Yet sometimes the opportunity comes when a fine creation is demanded of him in which all these things for the moment are of secondary importance—when, like Homer or Shakespeare, he must give to airy nothingness a local habitation. Even as seeds in the idle fallows long for the gentle rains, so will he sigh for that enthusiastic and superstitious state of mind from which creation is won. My remarks may have been of a wandering nature, but apart from the science and ever-changing needs of architecture, it is a great and beautiful art, and to give it that crown of art or beauty, air of distinction or style—call it what you will—that subtle seal which Phidias, Bramante, Wren, Inigo Jones, the great Goths, and many others have set upon their work, some little deviation in the side paths of the softer emotions cannot be a fruitless journey. Whatever may be the perfection of the anatomy of the parts of your architectural work, it can never suffer from wise and restraining disposition of its bewellings.

Frankly a great architect must possess many gifts. He must have that which is generally known by the words common sense; it is rather a clumsy phrase, which means so much, for it really embraces a subtle practical wisdom, a sense of winnowing the wheat from the chaff, and as far as architecture is concerned, a thinker in building material rather than in pencil. I venture to say he must have added to these qualities the instincts of a poet to finally set that seal of completeness on his conception which makes a work of art.

Mr. John Slater, in proposing a vote of thanks, said they had all listened with very great interest to what he might call the "prose poem" Mr. Spence had favoured them with. He was bound to say that Mr. Spence had taken a line which was rather different from what he had expected, but perhaps Mr. Spence was wise in doing so, as although, from the excavations which Dr. Schliemann had made, we had been able to gain some sort of an idea of the plan of a Trojan house, he did not think much was known about the exterior or interior elevations of the same. It appeared to him that very much the same thing had happened on the hill of Hissarlik, which Schliemann excavated, as happened to the poems themselves. On this hill, as they knew, as Dr. Schliemann carried the excavations down deeper and deeper, he found that one city had been built on another—one passed away, and another was built and so on, so that there were accretions on this hill of all sorts as the centuries went on. He thought that much the same occurred with the Homeric poems. There was no writing or printing in those days, and the bards simply committed to memory the poems relating to the legendary heroes of Greece and recited the exploits of these heroes. It was inevitable that in the course of time various accretions were made to the poems, and they were not quite the same as the early ones. There could be no doubt about that, and he was disposed to think that it did not do to take the descriptions too literally of the palaces which Homer gave. Even in the quotations Mr. Spence had read it would be noticed that almost exactly the same words occurred, almost word for word, in the description of the beautiful palace of Menelaüs as in that of Alcinoüs, and he had little doubt that these similar descriptions arose from the bards having in memory the words of a particular beautiful palace and using them to describe another palace. There was no doubt that the precious metals were largely used in decorating the houses which may have existed, but in one of these descriptions the looker-on says that the palace might almost be taken to be the palace of Zeus. Well, if they read the descriptions of any legendary or ideal grand buildings, such as were to be found in the Apocalypse, or in the description of Solomon's temple, they would realise that the writers exaggerated; they knew what barbaric splendour and colour were, and they thought that the more of this they could introduce in their poems the more it would appeal to their public

and the more impressed the public would be. He did not think, therefore, that these poems should be taken literally; they should be taken, as they were probably meant to be taken, as poems composed for the purpose of exciting the imagination of the listeners. The general drift of Mr. Spence's paper seemed to be to impress upon students the great desirability of filling their minds with the beauty of Greek work, and that advice could not be taken too much to heart by students of architecture. We know how greatly the Greeks loved beauty of all kinds. As we know, they were in the habit, without any feeling of shame or prudery, of seeing at the gymnasium or the Olympic games the beauty of the undraped human form, and they acquired a love of beauty which northern nations never had or never could have. How the Greeks must have been impressed by the love of beauty and the effect it had on them, the story of Phryne tells us. He had been glad to read in the early part of the paper the warning of what had gone on in architecture at the present time. Mr. Spence said: "Recently architecture has suffered somewhat from persistent efforts to graft on to that architecture, which should be spacious, large, and dignified, such forms, shapes, and dimensions as appertain to the cottage or kitchen furniture." The President in his address at the last meeting urged students to find out for themselves what constituted the beauty of the art of architecture in various periods, and a few months ago, when he (the speaker) read an address to students, he tried to impress that upon them. To find out for themselves why things are beautiful was the better for them, for the better appreciation they would have of architecture. As to the crafts alluded to in the poems, Mr. Spence had paid more attention to them than to architecture, but that seemed to be inevitable.

Mr. R. Phené Spiers said he had listened with great interest to the paper, but the first paragraph, in which Mr. Spence said he should omit everything of an archaeological nature, cut the ground from him (the speaker) to a certain extent. Of late years he had been much interested in the discoveries which had been made by Dr. Schliemann and others who had tried to work out the problem of the ancient houses; and facts as to that Mr. Spence did not and, it seemed, did not intend to deal with. He was inclined to think that Mr. Spence had taken the right course, for, after all, it was only an archaeological question as to what Homer meant, and he was not sure that students were much interested in that. Their studies did not lead them in that direction, and he did not think that they would altogether appreciate the arguments pro and con for this or that sort of plan. He thought Mr. Spence had taken the right line in pointing out the great beauty of Greek work, and in suggesting to the young architect that building construction, and specifications, tracing, &c., should not take up all his thoughts, and that there was a higher conception of architecture, *i.e.*, its poetical aspect, and that that should inspire him. The paper was really of value as showing the young architect that he must study more than the practical part of an architect's profession. Mr. Spence, in the early part of his paper, seemed to think that Homer, in his elaborate description, rather foreshadowed that which was eventually to be produced by the works of Phidias. Mr. Spence said that if we saw what Homer saw and based his descriptions on, we should think it barbarous compared with later work, though we should probably take an interest in it from the craftsman's point of view. That seemed a very true remark. One must interpret Homer, and not forget the poetic imagination in the poems. The elaborate description of the shield of Achilles referred to such an enormous number of subjects that were worked into it that it seemed almost incredible that so many subjects could be dealt with; but if they looked at Flaxman's shield, a cast of which was to be seen at the Royal Academy, they would be astonished at the number of subjects on that and the amount of interest in it. In the early shields the artists did not hesitate to cut off and divide the spaces and put a subject in each space, their object often being to illustrate the mythology of the ancients. The treatment was similar to what was found in embroidery work of the last century, in which a story was told in a number of small squares. Very likely the shield of Achilles was treated in that way

Later and more accomplished artists got the necessary subjects without necessarily dividing and sub-dividing. Mr. Spence gave Homer's description of the elaborate intermingling of the metals in various ways, and one could not help thinking of the present times compared with forty years ago. There was an immense difference in the sculpture work in the two periods. It was about forty years since he first entered as a student of the Royal Academy, and he remembered going through the rooms and noticing the monotony of the exhibition of sculpture. In an exhibition at the Academy nowadays a great difference was noticeable. He need only mention two sculptors, Mr. Gilbert and Mr. Frampton, and their works in bronze and enamel, to indicate how great the change had been for the better. Such a paper as they had had, and the quotations from Homer, should inspire modern sculptors, and one would imagine that if it was possible in those past days for men to weld into beautiful forms, there could be, or should be, no reason why in this twentieth century one should not attempt to do the same. The great work by Phidias of the gold and ivory statue would probably be beyond us, but it had been attempted. He recollected that one of the French sculptors made a statue for the Duc de Luynes of gold and ivory. It was on a small scale, and it was only an attempt to realise what the famous statue of Phidias was like. It was a question whether Mr. Spence was right in his use of the word "amber." There was a metal which was referred to in several works on ancient Greece as "electron," and it was more likely that than amber, for it was not known that the ancients had amber; and, besides, amber did not shine, so that the metal was probably some amalgam of the two metals. He desired to second the vote of thanks to Mr. Spence for the trouble he had taken in going through the *Iliad* and *Odyssey* to extract the quotations which he had read, and for bringing the subject before them in so poetic a way.

Mr. J. D. Crace, in supporting the vote of thanks said the paper would be of great value to those who were beginning their careers as architects. He thought that no poet's imagination was altogether independent of things that had been seen, and the descriptions of the palaces of Alcinoüs and Menelaüs seemed to indicate that the poet must have seen or heard about such palaces—had seen or heard something that, while not so elaborate or gorgeous as the descriptions suggested, seemed to imply the existence of the things described so finely. He thought it was extremely unlikely that the poet would describe beautiful embossed armour if he had not seen something of the kind, and in describing the golden gates he was describing, not in detail but in generalities, gates which must have existed. Of course, as to the splendours of architecture, there exist Egyptian monuments which go back very far, and it must not be forgotten that Homer represents himself as speaking of having gone into Egypt and Libya, and in doing so showed some familiarity with those countries, and possibly with their monuments. It was interesting to recall the fact of the frequency of the mention of golden gates in ancient writings. They were mentioned not only in Homer, but in the scriptural descriptions of Solomon's Temple, and also in the removal of the plates of gold from the doors of the Temple by Hezekiah. Evidences of golden gates were to be found in the British Museum, where could be seen strips or thin plates of metal, with which the gates were formerly plated, and which were delicately worked in low relief with processions of horsemen and others, and probably gilt. Homer must have had opportunities of seeing or hearing about such gates that resembled gold, which were elaborately carved, and there was no reason to think that these descriptions were altogether poetical phantasms. There were many touches in the poems which were delightful, as showing the refinement with which Homer treated very ordinary subjects. One such touch occurred at the beginning of the poem, where Telemachus goes to meet Pallas, who is in the disguise of Mentes, and as he welcomes him into the palace he takes his spear from him, and places it against a pillar which had been made fair with sculpture. That was very suggestive, and one wondered whether the poet had seen a pillar with fair sculpture. It might have been the capital only, but the allusion seemed to suggest more than that. It must not be forgotten that the poem was probably the work of more

than one mind, and many of the descriptions of architecture or the arts may have been interpolated, but in any case, they were interesting records. In the matter of the architecture of what might be called prehistoric Greece, a very interesting illustration had been presented by Sir L. Alma Tadema's design for the scenery for the play of Agamemnon. The palace of Agamemnon was shown full of details carefully studied and treated in a very rich and interesting manner.

The Chairman, in putting the vote of thanks, said he did not think Mr. Slater had put it too strongly in referring to the paper as a "prose poem." It was a paper which afforded more to think about than to talk about. Mr. Spence had referred to the value of contrast in design, meaning, no doubt, the contrast of plain space with ornament, and there was one photograph there that evening, a photograph from a picture of Mr. Spence's, which illustrated the idea very forcibly. Connected with the study of Greek architecture in England was this disadvantage, *i.e.*, climate. It seemed to him that for any one to appreciate properly the beauty of Greek art, it was necessary to see it in the atmosphere of Greece. He had not studied it himself in that way, but he could imagine what the effect must be of the iridescent light on the marble. Toned by time, and under the sky of Greece, and in that climate, the examples of Greek art, which in this country might seem cold and uninteresting, must seem very charming.

The vote of thanks having been agreed to, Mr. Spence, in reply, said as to the Chairman's remarks about Greek art seen under the sky of Greece, when he returned from Athens he went straight to the British Museum to see the friezes, and he was very much disappointed, because the fragments there were destitute of colour. There were warm flashes of amber running through the marble of Greece, and all kinds of colour produced by the weather. The marble of Pentelicus seemed in the beautiful atmosphere to take up all kinds of delightful colour, which made them look as though cut in gems. When he advocated the study of it he did not mean that that was the only kind of architecture they should study. From Greek architecture he thought they got a sense of refinement and reserve which was of extreme importance in the treatment of any other style of architecture.

The Chairman announced that the next meeting will be held on November 7, when Mr. F. C. Eden will read a paper on "Roof Coverings."

The meeting then terminated.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

AN Eastern Counties' meeting of the members of the Association of Municipal and County Engineers was held at King's Lynn on Saturday, October 18. The members assembled in the Council Chamber of the Town Hall, where they were received and welcomed by the Mayor (Mr. T. H. Bagge). Mr. T. H. Yabbicom, C.E., of Bristol, President, occupied the chair, and there were present Messrs. A. E. Collins, Norwich; E. Buckham, Ipswich; J. W. Cockrill, Great Yarmouth; F. C. Grimley, Weedon; E. J. Silcock, Leeds; H. J. Weaver, King's Lynn; J. Clare, Sleaford; A. F. Scott, Cromer; Foulsham, Peterborough, &c.

The Mayor offered the members a hearty welcome, and hoped they would find something to interest them in the engineering works of the borough.

The President thanked the Mayor for inviting them to that ancient and interesting town, and for giving them so cordial a welcome. In his historical sketch of the town, Mr. Weaver had carried them back to the time of the granting of the charter by King John. Coming down to modern times, the town was associated with Eugene Aram, and, in the middle of the eighteenth century, Frances Burney, whose father wrote of the town, "Lynn was a town of merchants who imported wine, and brewers who exported beer, chiefly to the Baltic; a town where the adventurous settled, to rise if they could into the powerful Corporation; a town of high living rather than of high thinking." He added, "He was ill at ease when playing an execrably bad organ to foggy aldermen, totally ignorant of music." They did not know anything of the musical talents of the aldermen, but he (Mr. Yabbicom) was quite sure, after glancing through Mr.

weaver's paper, that the aldermen and councillors of King's Lynn were by no means glib, but had risen to the occasion, and were carrying out their duties for the health and benefit of the citizens in a manner which reflected great credit on the town.

Mr. Cockrill, Borough Engineer of Great Yarmouth, was re-elected Honorary Secretary for the Eastern Counties district.

Mr. H. J. Weaver, Borough Surveyor, read a paper on "Five Years' Municipal Work in King's Lynn." He said the town was about 10 miles long and over half-a-mile broad, and an area of 3,601 acres, with a population exceeding 20,000. Extensive ruins of the old town wall, which encircled the land side of the town, still exist, and the south gate of it—a fine wall with a lofty archway for carriages and two smaller ones for pedestrians—was in excellent preservation. The Guildhall, formerly the hall of the Trinity Guild, had a chequered past of flint and stone with Gothic windows, and included under its roof assembly rooms, council chamber, committee-rooms, mayor's apartments, and a complete suite of offices for the Corporation officials. The custom house on the Purfleet was erected in 1683. It occupied the site of a religious house which belonged to the Trinity Guild, and was a mixed Greek style of architecture with a curious raminal roof surmounted by a small open turret, terminating with a pinnacle at a height of 90 ft. The Stanley Public Library was in James's-road; it was erected in 1883, and was presented to the town by the late Earl of Derby, K.G. In former years the space between the town and the open sea was obstructed by two banks of mud and sand formed by the rapid action of the tide over the bed of the river, and the passage to the harbour was by a narrow and intricate channel. These evils were, however, corrected by the construction of a direct channel four miles long, which was commenced in 1850, and had resulted in the gain of a large tract of land on the bank of the river on the northern side of the town. A new dock, the Alexandra, constructed in 1867-9 at a cost of 80,000l., contained a water area of 63 acres. An important addition to this was made in 1884, when the Bentwick Dock, 1,000 ft. long by 400 ft. wide, was opened for traffic. The state of the King's Lynn Dock and Railway was covered an area of over 100 acres, and in addition to the docks included every convenience for the shipment and discharge of cargoes, together with a branch railway which connected the dock with the Great Eastern, the Midland and Great Northern, and London and North-Western Railways. Prior to the new waterworks being carried out, the old supply was drawn from the Gaywood river, which rises some seven miles away at the village of Elmston, issuing from the chalk springs in the district. The question of an entirely new supply became imperative as the result of an inspection of the Local Government Board tracing the cause of an outbreak of typhoid fever to the contaminated water supply. The new works, which were completed in 1890, were designed by Mr. E. J. Silcock, M.Inst.C.E., of Leeds, who was at the time Borough and Water Engineer of Lynn. The site selected was seven miles to the east of the borough, at the village of Gayton, and consisted of two wells sunk in the lead chalk, 14 ft. apart, centre to centre, each 6 ft. 2 in. in diameter and 100 ft. deep, both being steepled with concrete varying in thickness from 14 in. to 6 in. At the bottom of the western well were two headings, each 5 ft. high and 4 ft. wide; one was driven for a distance of 153 ft. to the south and the other 213 ft. to the north. At the bottom of the eastern well a third heading was driven to the east for a distance of 203 ft., and in this well a borehole 8 in. in diameter was sunk to a depth of 65 ft. The bottoms of the wells were 32 ft. above Ordnance datum. The plant was in duplicate and all parts interchangeable. It consisted of two sets of boilers, engines, and pumps, which were made to deliver respectively 1,000,000 gallons and 1,250,000 gallons of water per day through 6,243 lineal yards of 15 in. rising main to the reservoir at Bawsey. The head, due to friction in the rising main, was 15 ft., so that the total head against the pumps was 123 ft. The engines were of the horizontal, compound, triple expansion type, and had lately been so arranged as to run coupled together, and work both sets of pumps. The requirements of the contract were as follows:—1. The engines to be capable of pumping 1,000,000 gallons of water from the wells at

Gayton to the reservoir at Bawsey in twenty-three hours. 2. The engines to give an efficiency of one pump horse-power to every 2½ lbs. steam consumed per hour. 3. The boilers to evaporate 9 lbs. of water per lb. of coal. The subsoil consisted of boulder clay. The walls were constructed of cement concrete composed of one part of cement, two parts of sand, and four parts of shingle. They varied in thickness from 5 ft. at the base to 18 in. at the top, and were lined with 4½ in. of brickwork set in cement. Their height was 14 ft., and the top of the reservoir was 11 ft. above the ground level. The floor was composed of cement concrete 18 in. thick, and where it supported the columns, carrying the roof, it was 3 ft. 6 in. thick. It was in the form of a series of inverted arches, springing from the base of the columns, and had a 4½ in. lining of brickwork set in cement. The roof was constructed of 4½ in. brickwork, in a series of arches, which were carried by cast-iron girders. When the reservoir was full it contained 1,000,000 gallons. The internal dimensions of the reservoir were 140 ft. by 100 ft. The rising and gravitation mains were fitted with sluice valve at the lowest points, and air-valves were fixed at the summit of each hill. The whole of the above work was carried out at a cost of 30,761l. The daily quantity of water supplied through the water mains to the borough in 1898 amounted to 1,150,000 gallons, or 57½ gallons per head. Early in 1899 the author strongly urged the Waterworks Committee to adopt a complete system of waste water detection, the enormous quantity pumped into the town at that time being such that the new supply was unable to keep it going. Thirteen 6-in. Deacon waste-detection meters were fixed, and the town divided into districts, each of which was governed by a meter; stopcocks were fixed on every service, and valves so arranged on the mains as to command each street and section of district. Two night and two day inspectors were appointed, the duty of the former being to sound at night each stopcock with a stethoscope, first with the stopcock open, and then with it closed, in order to ascertain and locate the leakage, if any. These inspectors made a daily report to the day inspectors, who visited the houses reported and took the necessary action to meet each case. The result of the working of the scheme had been that over 20 gallons per head per day had been saved, so that instead of an average of 57½ gallons per head, 37 gallons were now used; and the author was convinced that although underground leakages were very few, the latter amount could still be further reduced by from 7 to 10 gallons per head by the Waterworks Committee taking action and prosecuting persons for wilful waste; but beyond this it appeared to be quite impossible to reduce it, as in a town similar to Lynn, with sewers of very flat gradients, necessitating constant flushing, also fish-washing, cockle-boiling, water used by the docks and railway companies and breweries, an unusual amount must necessarily be consumed. The existing fire station was most inadequate and uncircular, and the question of providing a new one was under the consideration of the Council; the author had prepared plans for a new station, which would include horse tower, stables, and all other conveniences. The Corporation also made all concrete slabs for footpaths, which cost about 2s. 6d. per square yard. This found work under cover for men during wet days, and at the same time the slabs were made cheaper than they could be bought and delivered to Lynn. The Health Department had also been most active. During the last four years, 1,600 privies had been abolished and modern water-closets fixed. It was estimated that not more than thirty old cesspits remain, and the next few months would, he hoped, see the last of them removed. Courts, alleys, and yards, with which old towns were unfortunately troubled, had received their share of attention, and no less than 280 had during the above period been either repaved or redrained and made sanitary. The infectious diseases hospital was a red brick building having two separate wards, male and female, with a frontage of 77 ft. 6 in. It had bed accommodation for twelve patients. In the centre was the nurses' room, also a bathroom. The administration block, which consisted of nurses' bedrooms, bedroom and sitting-room for the resident caretakers, pantry, scullery, kitchen, and wash-house, was connected by means of a covered way. The inclusive cost of the hospital amounted to 1,200l.

The small-pox hospital was situated about a mile outside the town. Previous to the new sewerage scheme which had just been completed, no system of sewerage could be said to have existed. There were very many outfalls to the river of various sizes and kinds of construction. In 1887 Mr. E. G. Mawbey, M.Inst.C.E., Borough Engineer of Leicester, who was at that time Borough and Water Engineer of King's Lynn, prepared and presented to the Corporation a scheme for sewerage of the town, but this was not proceeded with at the time, and on Mr. E. J. Silcock becoming Borough Surveyor of Lynn he designed a scheme which had been carried out. It differed somewhat from Mr. Mawbey's scheme, inasmuch as it practically divided the borough into four drainage districts, each having a separate outfall, known as the South, Millfleet, Purfleet, and North districts, whereas Mr. Mawbey's scheme collected all these districts to one point, which was at St. Ann's Fort, North End, and from thence to the river by means of a large outfall sewer. Mr. Silcock, however, claimed that his scheme could be carried out at a less cost, and that such deep sewers would not be necessary; also that better gradients could be obtained. The combined system had been adopted, so that they had the one set of sewers carrying both surface water and sewage. Each of the four districts had a sufficient storage culvert to hold the sewage during tide-locked periods, and the culverts discharged through tidal gates in a confluent state into the river at low water. The total cost of the scheme amounted to 27,713l. The author had prepared a similar scheme for sewerage South Lynn, a district which had grown considerably lately. The outfall would be into the River Ouse, between the railway bridge and the free bridge at South Lynn, which was about one mile from the centre of the town. The storage culvert, to which a penstock was fixed, was of cast-iron flange-pipes where it crossed the foreshore, and the remainder was constructed of red brick, with a blue brick invert. Hassall's patent jointed stoneware pipes would be used, and ventilation provided by means of shafts and manhole covers.

In the discussion which followed,

Mr. A. E. Collins, Norwich, said he understood in times past there used to be a system of septic tanks to each house with overflows to the sewers.

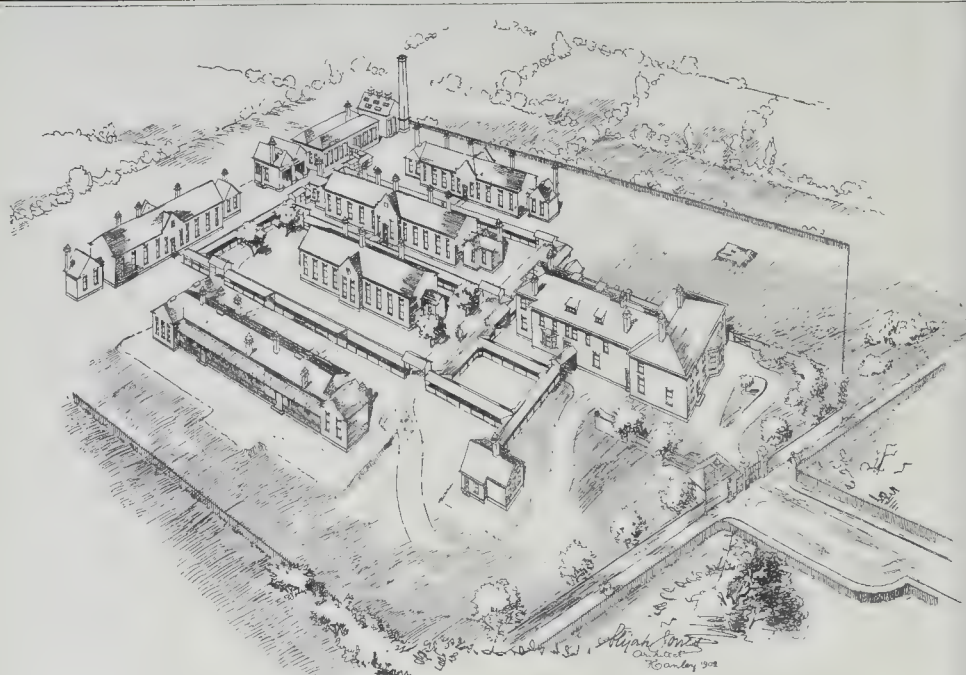
Mr. E. J. Silcock, Leeds, in moving a vote of thanks to Mr. Weaver, said the last few years had been times in Lynn during which the Corporation had had to undertake important works for the health of the town. The water scheme ought to have been carried out years before. The old supply was taken from the open stream, draining an agricultural district, and the intake of the water within the borough limits. The stream was liable to pollution at many points, and the result was that Lynn was constantly suffering from epidemics. They had two very serious epidemics of typhoid which, in the opinion of the Local Government Board, were due to the water supply. The new supply was taken from the chalk outcrop, about seven miles distant from Lynn, and was exceedingly copious in quantity, and, coming from such a source, was bound to be pure though somewhat hard. With reference to the sewerage scheme, there was in the old part of the town a great deal of artificially-made ground. So they had to have all the trenches close timbered and the greater part of the timber had to be left in. Most of the sewers were laid at a depth at which the water in the land was above the sewers when finished. The amount of subsoil leakage, however, was very small. The septic tanks, of which Mr. Collins had spoken, were called decomposing chambers, and each house had one of these chambers. It was a brick structure 4 ft. by 2 ft., and there was an outlet dipping down into the sewer. The object of this was to form a trap between the sewer and the house. It did undoubtedly form a septic tank as they had septic action going on, and, practically nothing but liquid came away from that chamber. He had seen scores opened, and undoubtedly they had a great effect in liquefying the sewage.

Mr. Collins: Were they situate in the house or outside?

Mr. Silcock: Sometimes in the house.

Mr. E. Buckham, Ipswich, seconded the vote of thanks.

The President said that the quantity of water which had been supplied was abnormal



The Infectious Diseases Hospital, Bucknall, Staffordshire.

and even now that it had been reduced to 37 gallons a day it was a very considerable consumption.

The vote of thanks having been passed,

Mr. Weaver briefly replied.

Mr. J. Pilling, Borough Electrical Engineer, presented a paper on the King's Lynn electricity works.

The members attending the meeting were then entertained to luncheon by the Mayor, and the afternoon was devoted to visits to the electricity works, the depot—where the members had an opportunity of seeing a new junction-pipe recently patented by Mr. Weaver—and the waterworks pumping station.

Illustrations.

WEST END, ST. GEORGE'S CHURCH, NEWCASTLE-ON-TYNE.

WE give a general elevation of the west end of this church, and a second illustration showing the detail of the figure of St. George and the canopy. The architect of the church is Mr. T. R. Spence, the author of the paper read at the Architectural Association last week and published in our present issue; and the bronze figure was modelled by him. The glass was designed by him conjointly with Mr. T. Brown.

The stone tracery is in Caen stone, and was added after the church was built to mask the plain wall surface at the sides of the window. The font shown in the baptistry has some interest in that the bowl is of one single piece of onyx. The columns and tracery supporting it are of rouge-red marble and alabaster, and the cover in wrought iron and copper.

The subject of the large window is the Resurrection. The baptistry windows have interwoven with the ornament the various symbols of the Christian Church. The floor is in vitreous mosaic, and contains in its design those early symbols which appertain to baptism. The whole of the roof timbering is decorated in gold and colour, somewhat after the style of the Norfolk screens.

The whole church was presented to the parish by the late Mr. Charles Mitchell, of Jesmond Towers, Newcastle-on-Tyne; who was fortunate in his choice of an architect.

DESIGN FOR A GESSO DECORATED BOX.

This design for a box decorated in gesso obtained for its author, Miss Hilda Baker, of Edgbaston, a silver medal in the National Competition at South Kensington this year.

The artist has sent us no special description of her work, which however speaks for itself.

DESIGN FOR A JEWEL-BOX.

The jewel-box, for which a bronze medal was awarded to the artist, Miss E. Thorp (Huddersfield), at the National Competition this year, is an example of design worked out in cut and embossed leather. The motif of the design is a woodland scene. On the front two figures, one with hounds in leash are looking for the deer; on the end the hounds have been slipped and are in full cry; the back of the box shows a doe and fawn unconscious of the chase, while the other end shows a stag fleeing from the hounds. At each corner rabbits scuttle into the undergrowth, while overhead pheasants rocket out of the wood. The wood is suggested by the briar rose which gathers together on the lid into a complex harmonious design. Inside, the box is lined with Japanese block-printed silk of conventional rose design.

BUCKNALL INFECTIOUS DISEASES HOSPITAL.

The original building for the Hanley, Stoke, and Fenton Joint Infectious Diseases Hospital, at Bucknall, North Staffordshire—which was built in 1885—accommodated twenty-nine patients, comprising the south twelve-bed pavilion, west half of isolation block for five beds, iron pavilion for twelve beds (now demolished), the south-east portion of the administrative block, and the laundry block. All the other buildings shown on the plan have been erected since the year 1895, at which time Mr. Elijah Jones was appointed architect to the Board.

These new extensions comprise two twelve-bed pavilions, one eighteen-bed pavilion, eastern extension to isolation block for four beds, two wings to administrative block, a discharge block, waiting-room at entrance, power station, stable block, the remodelling of laundry block, a concrete water-storage tank, overhauling and renovating the whole of the

drainage. The latest extensions were formally opened on February 6, and consist of eighteen-bed pavilion, western wing to administrative block, power station, stable block, and the remodelling of laundry block.

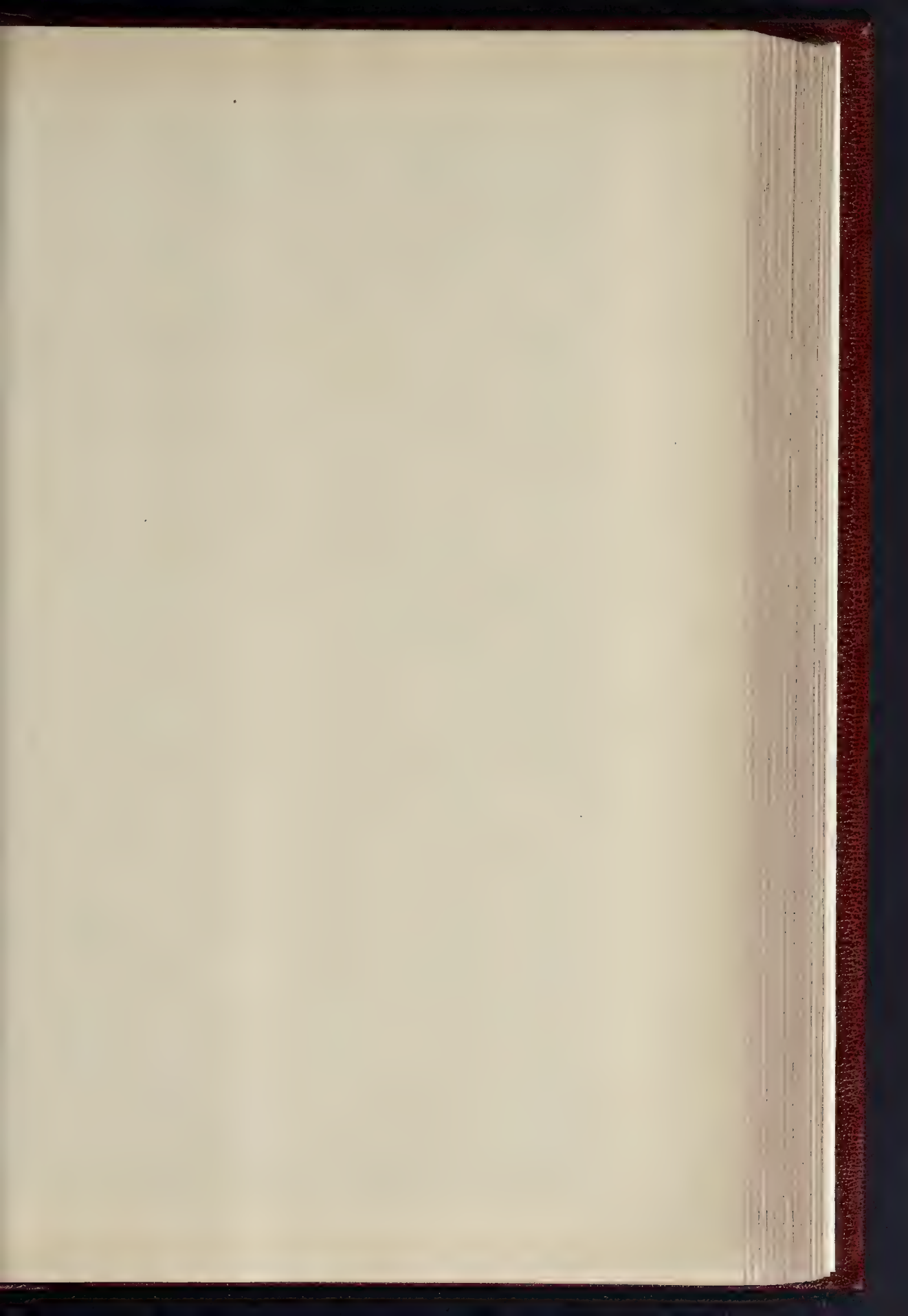
The whole of the fittings of every description are of the very latest type and principle, the laundry being fitted with steam-driven machinery by Messrs. Summerscales, & Keighley, together with drying-horses and hot-air drying-room. The disinfectant is Messrs. Manlove & Alliott's patent oval form. The whole of the buildings are lighted by electricity, generated by the complete plant in the power station, and overhead telephones from all buildings to the administrative block. When the covered ways are completed, the institution will in every way be a modern one. These covered ways are rendered a necessity by the bleakness of the site, and are disconnected at each building containing infection.

The whole of the exteriors of the buildings are quite plain, in common brickwork, with red pressed-brick dressings to the opening and angles, the roofs being covered with red pressed tiles. The interiors have glazed tiles and brick dados; maple and pitch-pine floor polished cement plaster, with Keen's cement finish, pointed to walls (where not tiled) and ceilings. The whole of the walls in the new eighteen-bed pavilion are covered from floor to ceiling with glazed tiles in selected tint. The heating is by means of hot-air down draught stoves, in bronze-green faience, with 3-in. orange-coloured tiles to form hearths, and green faience kerbs. The lavatories, sinks, and baths are of fireclay, with white porcelain finish.

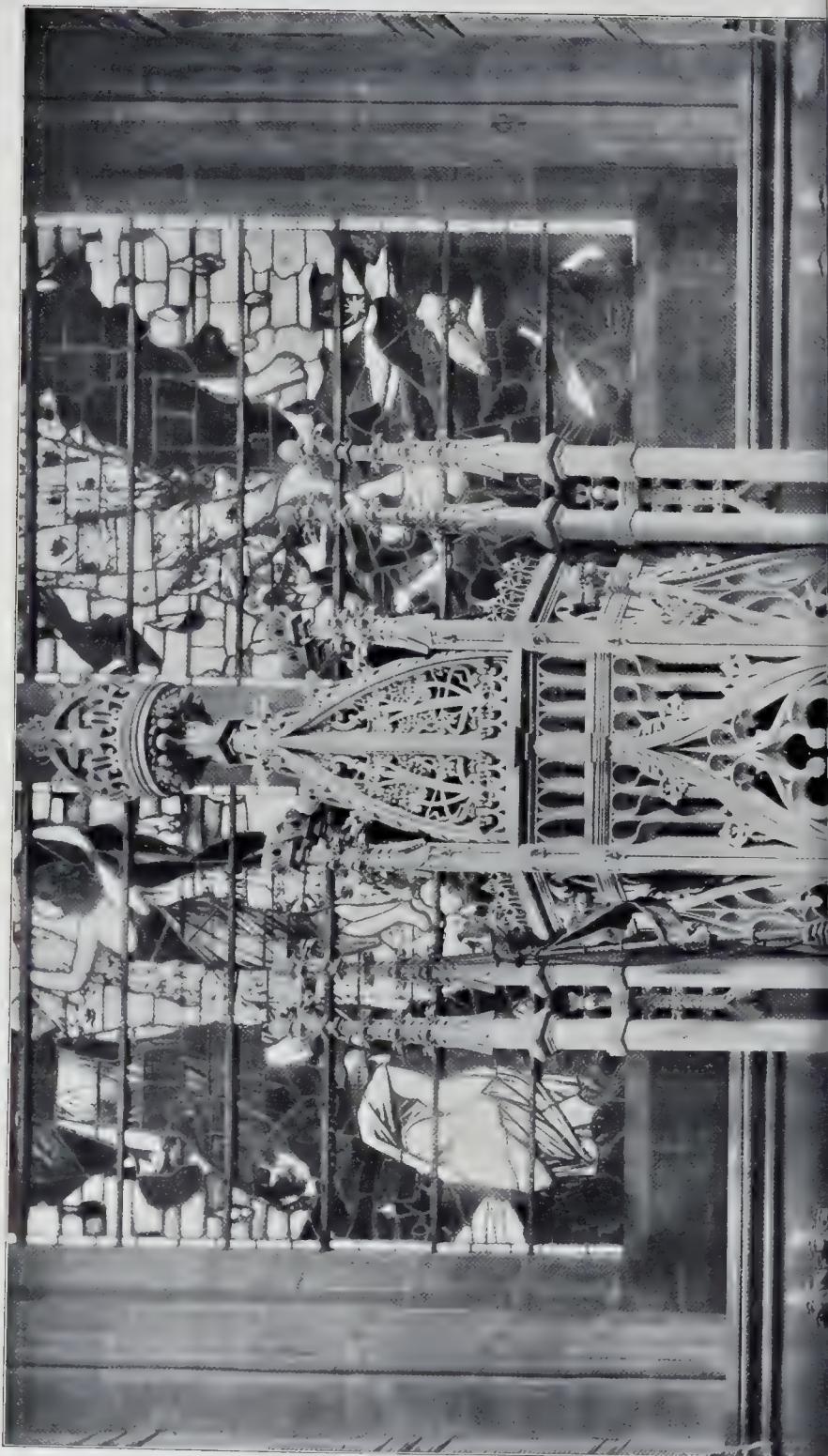
The ventilation is by means of Boyle's inlet and extractors to walls and grids in ceiling connected to ridge ventilators. The hot-water supply to baths, &c., is by means of a self-contained boiler in each annexe, which is also used for heating the several places in each annexe by means of wrought-iron piping round each.

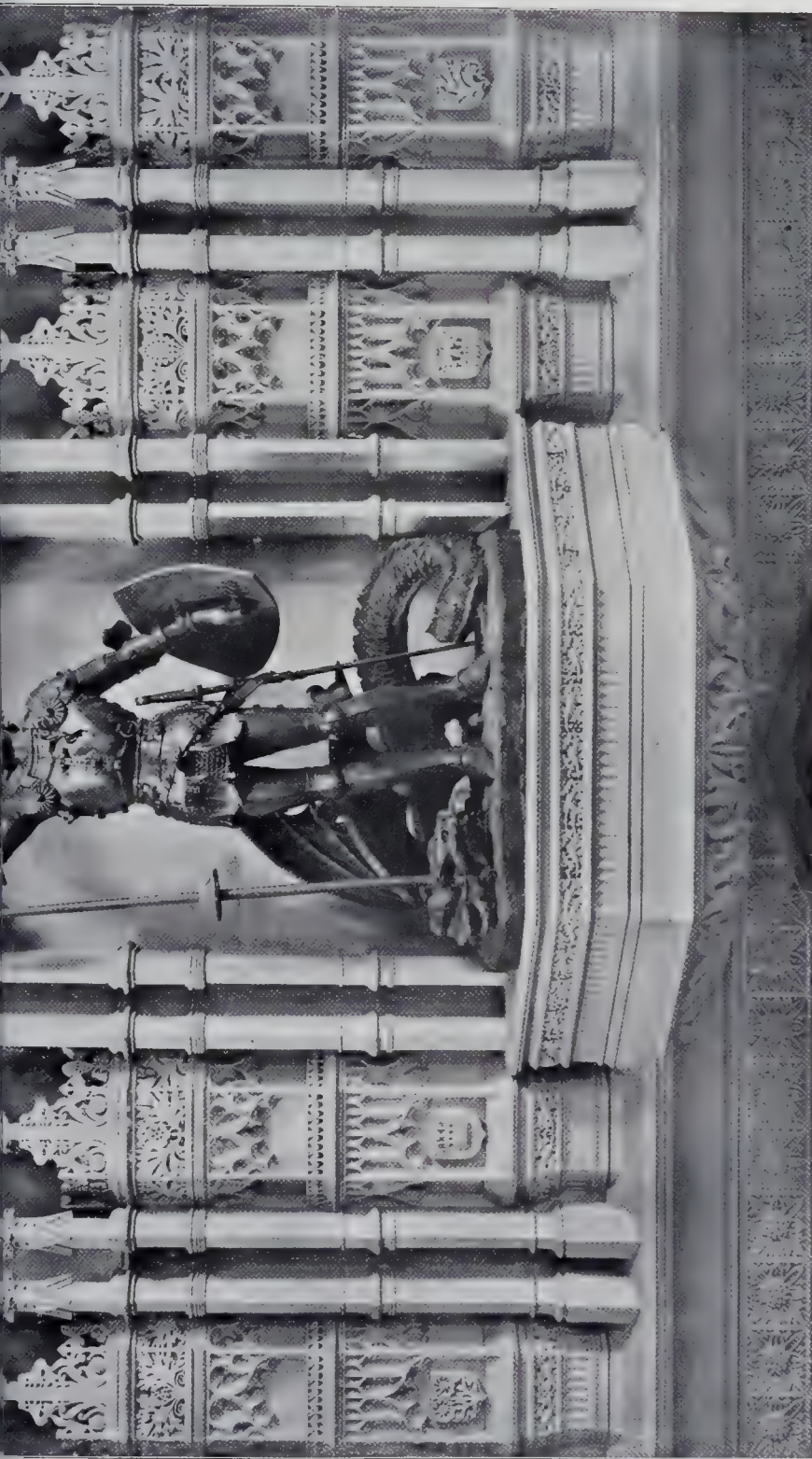
The total number of beds is now sixty-three, and the land has as many buildings on it as will conveniently allow.

The whole of the pavilion erections and alterations, comprising forty-six out of the sixty-three beds, and other blocks, as mentioned, erected since 1895, have been carried out under the directions and supervision of Mr. Elijah Jones, architect, of Hanley, Messrs. Embrey & Co., Fenton, were gener-



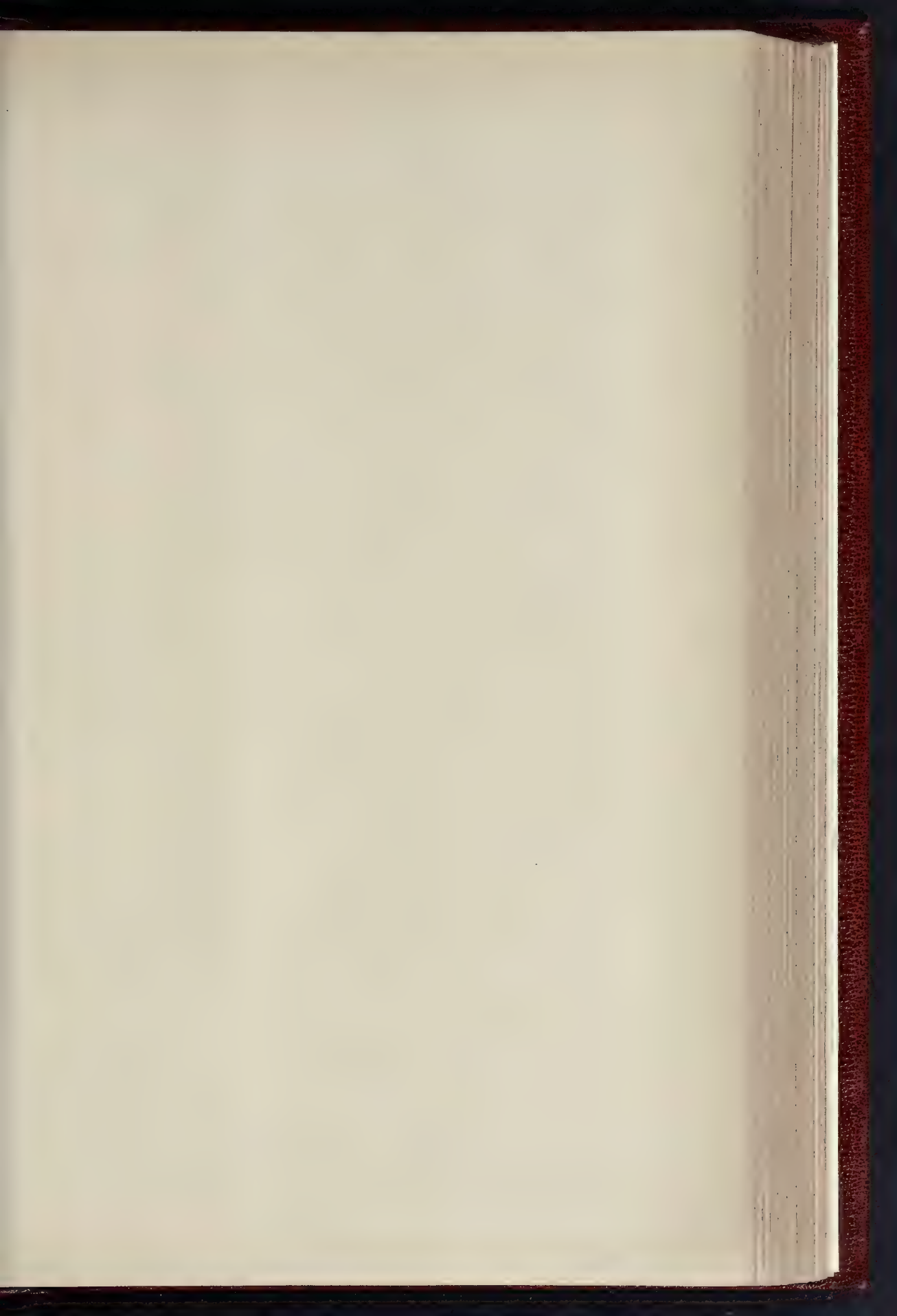
THE BUILDER, OCTOBER 25, 1902.



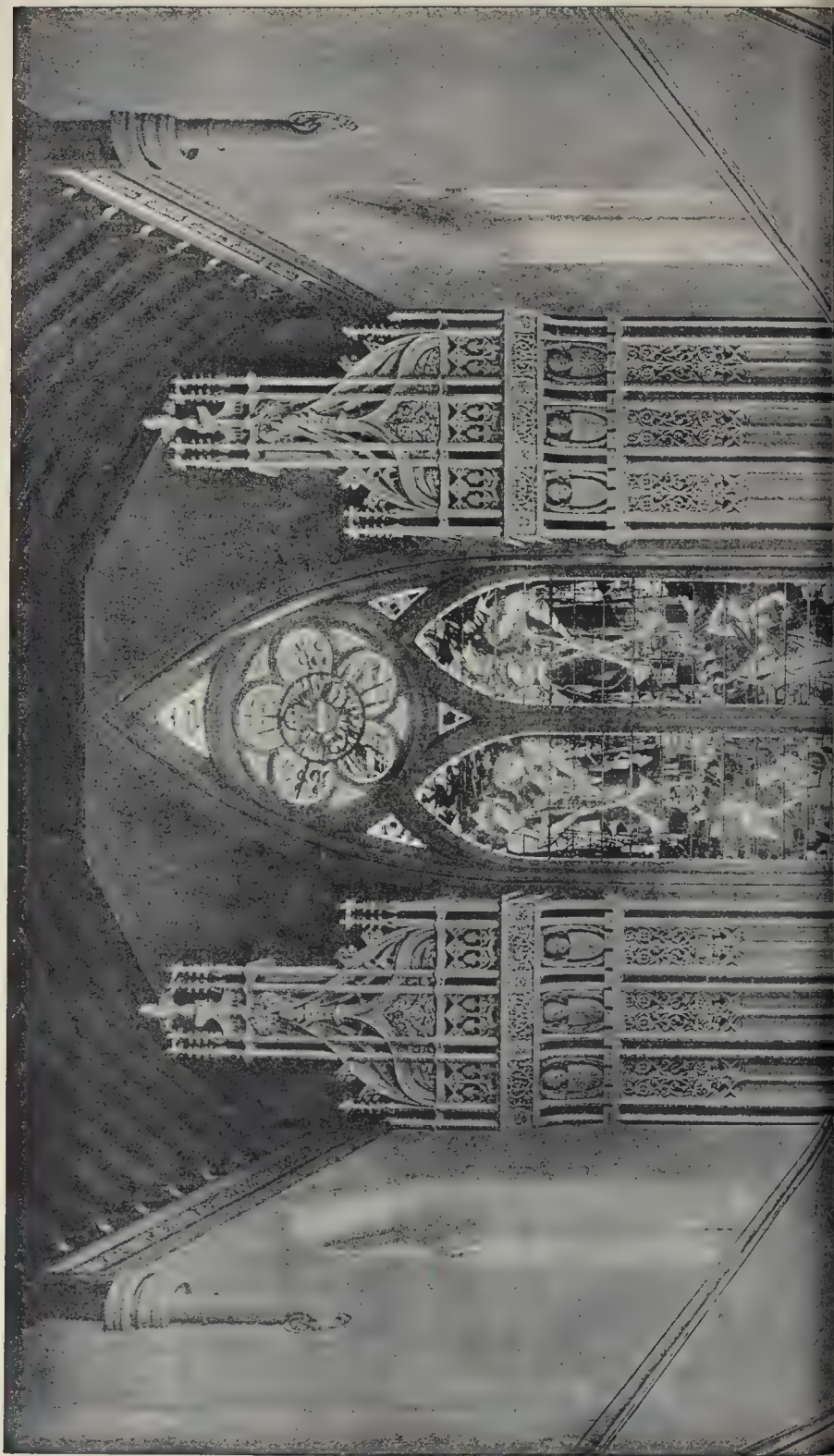


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FIGURE AND CANOPY, ST. GEORGE'S CHURCH, NEWCASTLE-ON-TYNE.—DESIGNED BY MR. T. R. SPENCE.



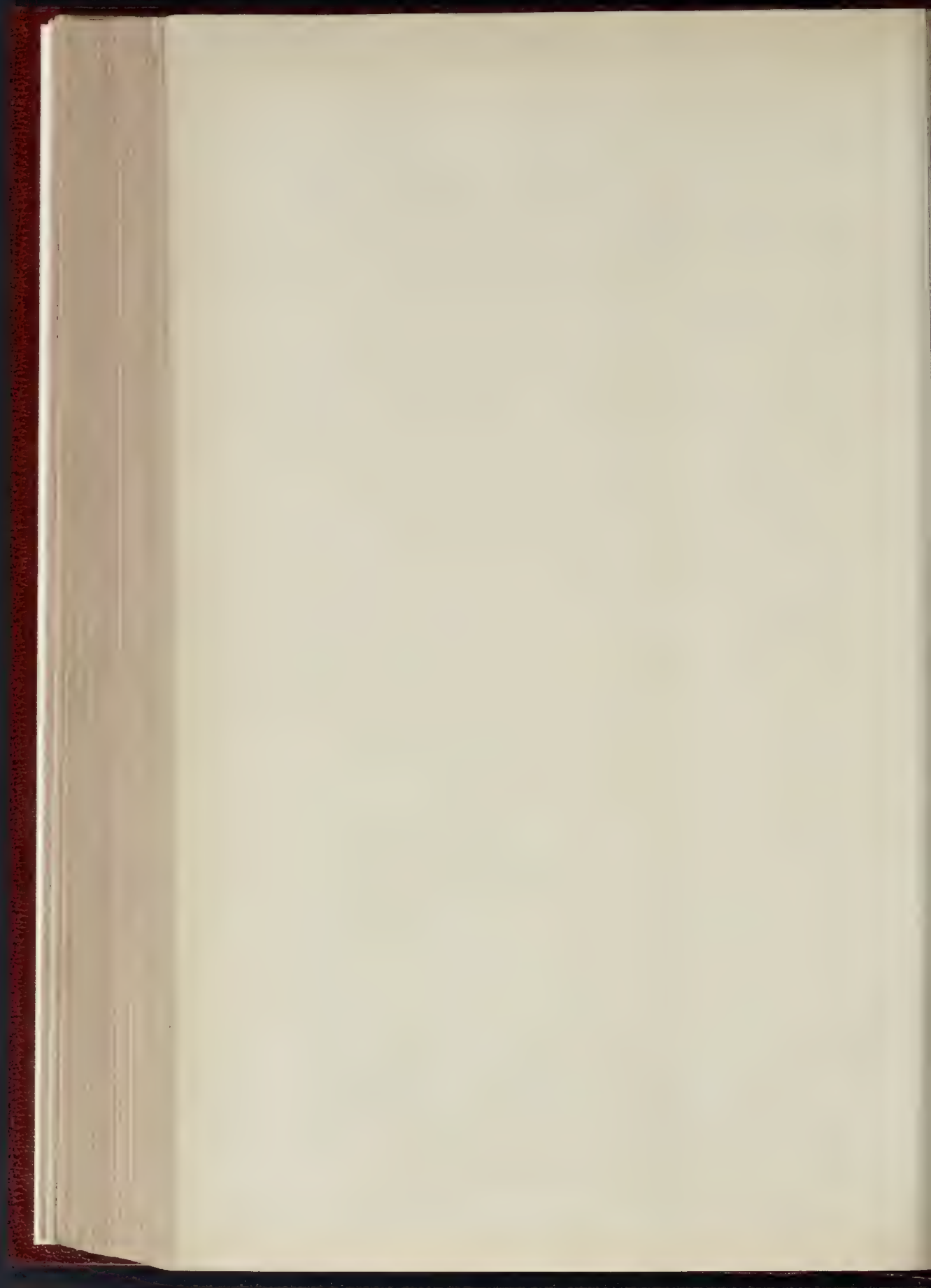
THE BUILDER. OCTOBER 25, 1902

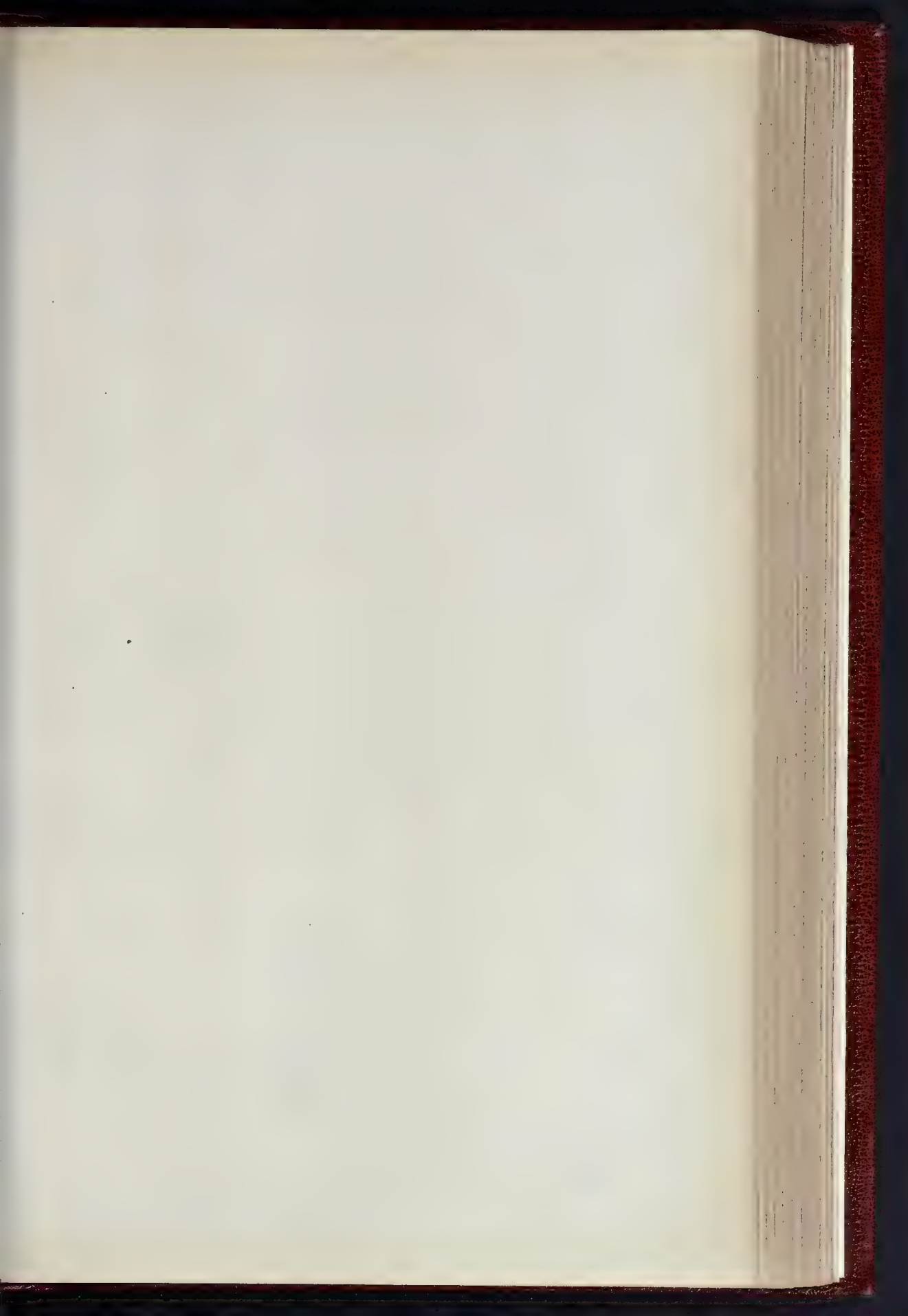




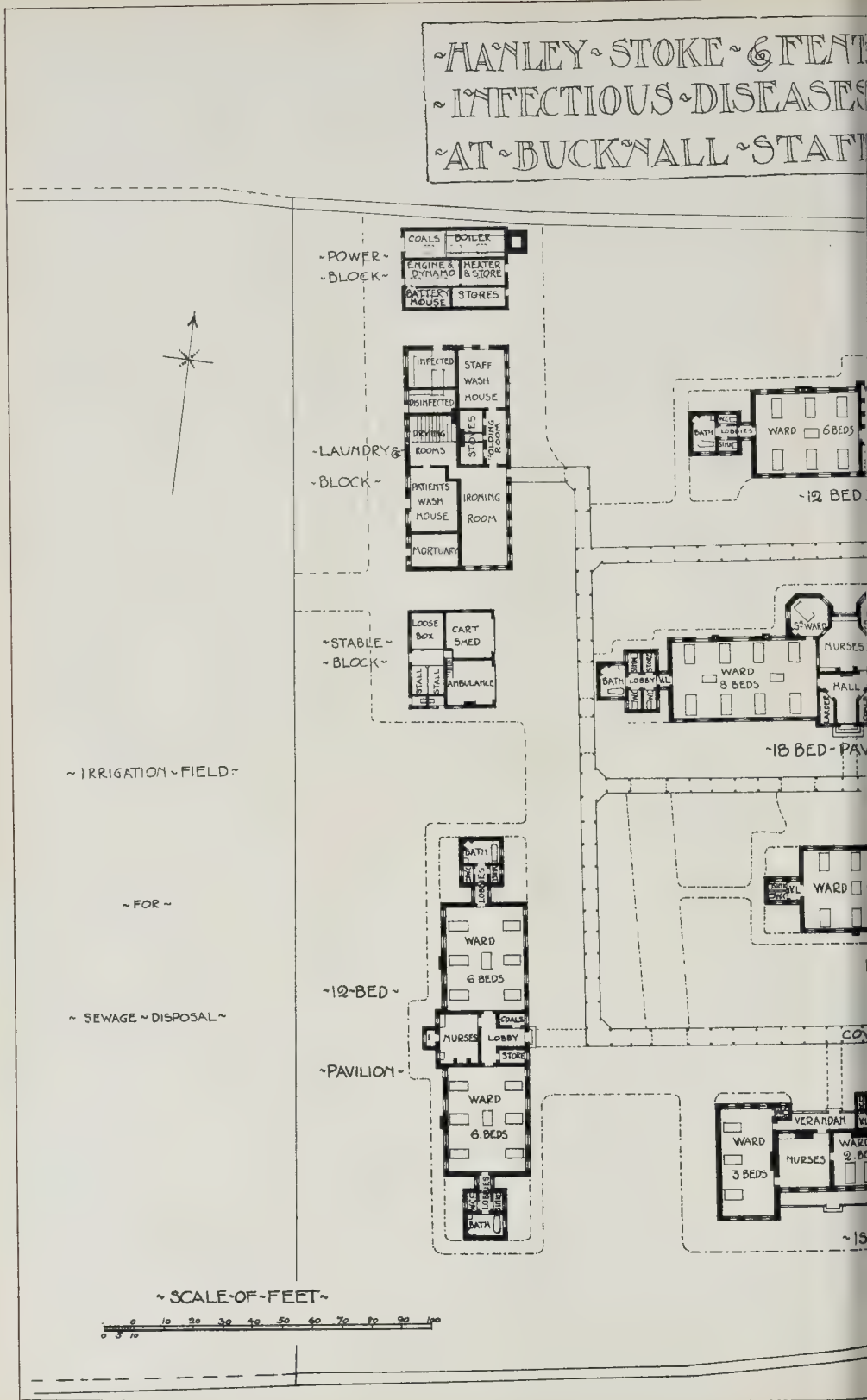
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WEST END, ST. GEORGE'S CHURCH, NEWCASTLE-ON-TYNE.—MR. T. R. SPENCE, ARCHITECT

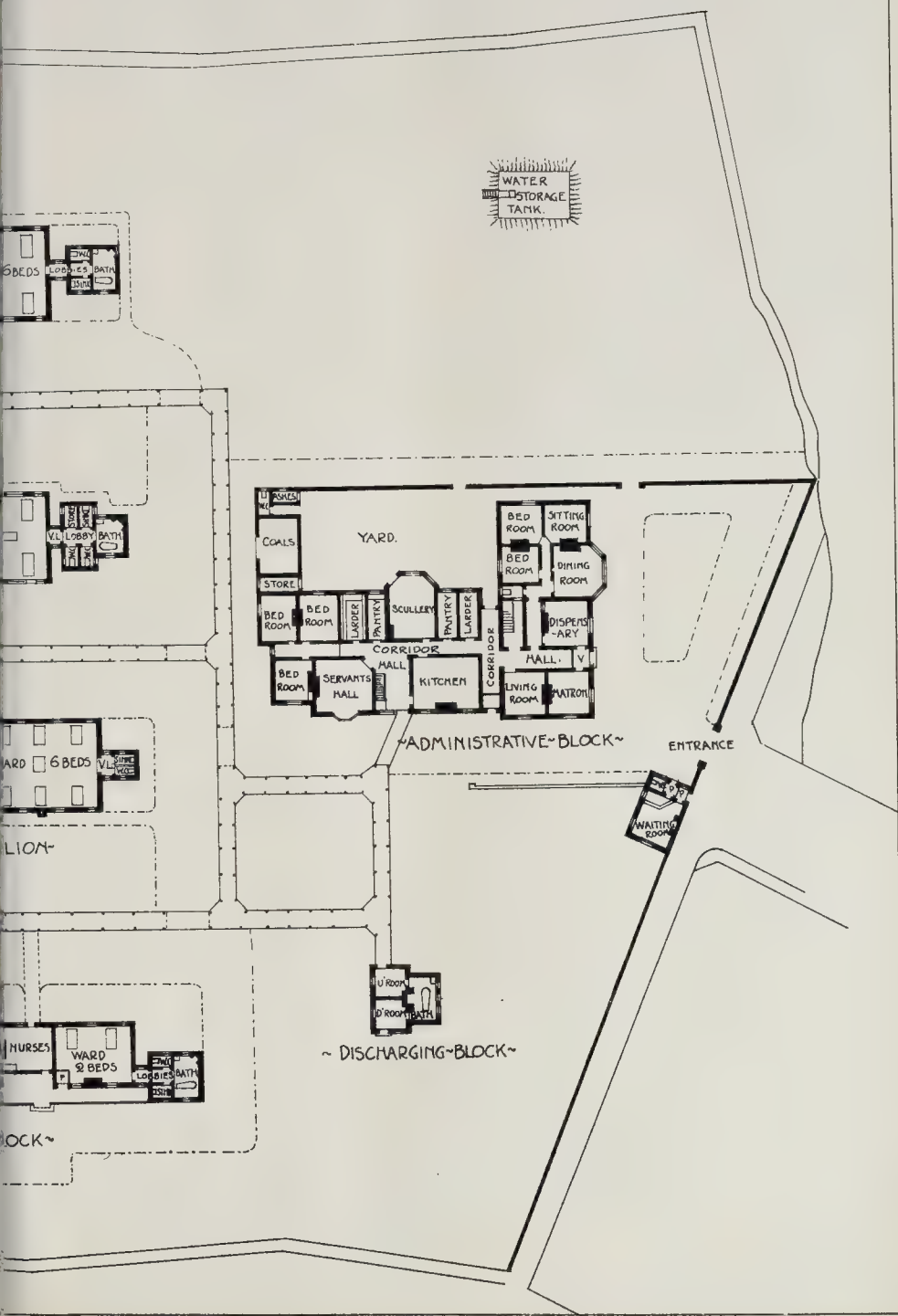


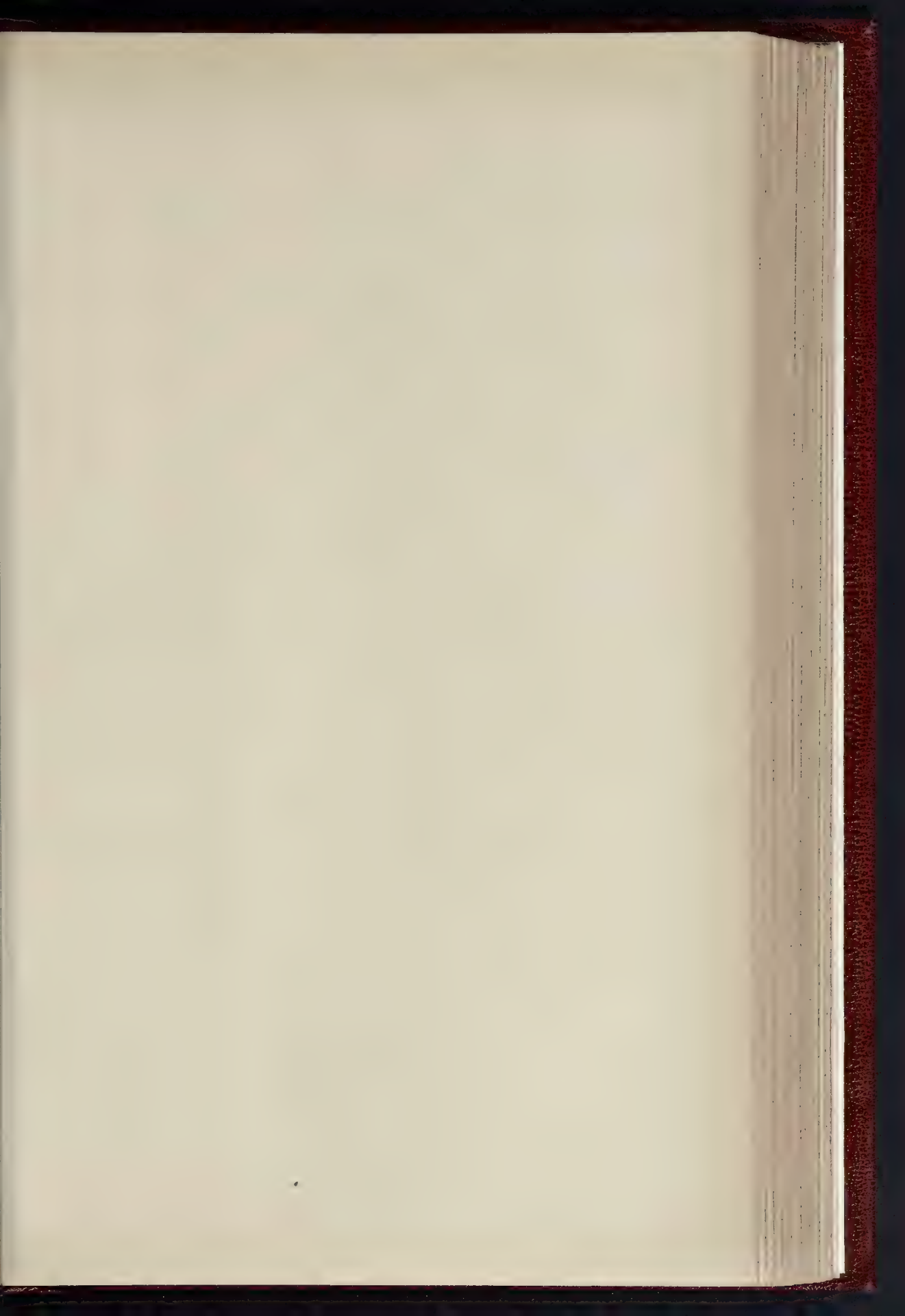


HANLEY-STOKE & FEAT INFECTIOUS DISEASES AT-BUCKHALL-STATION



JOINT ~
HOSPITAL ~
AM. JONES, M.S.A.
ARCHT. HANLEY.









DESIGN FOR A JEWEL BOX BY MISS E. THORP

NATIONAL BRONZE MEDAL

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir J. McDougall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend St. George-in-the-East Guardians 3,000l. for receiving homes for children; and Southwark Guardians 1,000l. for a receiving home for children.

Site for New Offices.—The debate was resumed on the Report of the Special Committee on new offices recommending the Council to apply to Parliament for power to acquire compulsorily for the purposes of new offices the properties bounded on the north by William-street, the Tivoli Music-hall, and Adam-street, on the south by the Embankment-gardens, on the east by the Hotel Cecil, and on the west by York-buildings. The estimated cost of the site, which includes an area of 335 acres, is 900,000l.*

Mr. Beachcroft moved the following amendment:—"That, in view of the costly undertakings now being carried out or about to be carried out by the Council, the Council deems it inexpedient to incur so large an additional expenditure as would be involved by the adoption of the scheme proposed by the Committee; and that the recommendation be accordingly referred back with an instruction to the Committee to report (a) at what cost certain property in Spring-gardens, belonging to the Government and reported to be available, could be immediately acquired; (b) to what extent such property could be utilised for the erection thereon of offices to accommodate the staff now housed in outside premises, and in such a way as to be hereafter available for an extension of the present premises; and (c) the cost of such building."

Mr. A. T. Williams seconded the amendment.

In the course of a long debate, Mr. W. Emden appealed to the Council to treat the matter on a business basis. At present they had the staff housed in forty different buildings, which was most uneconomical. From his experience he did not think the building would cost more than half a million of money. They had to consider they were paying 18,560l. a year in rent, and they had paid 150,000l. for leases. When those leases ran out they would have to pay more, because the value of the property would have increased. If they realised their present leases and deducted that from the cost of the new scheme, he did not believe the difference would amount to more than 400,000l. or 500,000l.

Colonel Rolton, while in favour of housing the staff under one roof, said this could not be done on the Adelphi site. He felt that the whole of the Historical Records and Buildings Committee must vote against the idea of pulling down the houses on the Adelphi site.

Mr. Fletcher, the Chairman of the Special Committee, said the buildings would be constructed in the "Adam style of architecture—in the style that Robert Adam would have approved of."

The amendment having been defeated,

Mr. Cohen moved:—"That, before coming to a decision on the Adelphi site, the committee be instructed to report on the advantages of a site south of the Thames, adjacent to Westminster Bridge." He condemned the Adelphi site on the score of unsuitability, while it was impossible to house all their staff on it. It was possible, he believed, to acquire a site between Westminster Bridge-road and the Works depot for about 650,000l., and this would give them 54 acres, compared with the Adelphi site of 335 acres, costing 900,000l. If they constructed a road from Westminster Bridge to Waterloo Station the recompense would go a measurable distance towards the cost of the building. There had been a few remarkable architects who had made their mark on London, but no man had made so distinctive a mark upon the buildings he erected than Robert Adam, and perhaps his brother. And one of the great merits of their work, which enabled any one to recognise it at the moment it was seen, was the beauty of the proportions of the buildings they erected, and the idea of building some eight story monstrosity in place of this work was hardly worthy of the Council, especially bearing in mind what Lord Rosebery had recently said at the meeting of the Topographical Society.

* See our last issue for details of the scheme, p. 345.

The amendment was defeated, and Mr. Gaskell moved, and Mr. Sankey seconded, a further amendment to add the following words to the recommendation, viz.:—"And that the Council be empowered to hold over the development of the site until such time, not exceeding ten years, as it may determine." This was rejected by a large majority.

A division was taken on the recommendation, with the following result:—

For the recommendation..... 50

Against..... 50

The Chairman said that Mr. Beachcroft's name had been given him as a teller, but being informed that Mr. Beachcroft had left the room he ordered Mr. Cousins to tell in his place. Mr. Cousins went out to tell and found Mr. Beachcroft there, but Mr. Cousins did not vote. The difficulty was that there was a tie, and the motion was not carried.

Mr. Cousins claimed the right to vote against the recommendation.

After some discussion the Chairman said he must accept the division list as handed to him, but a note could be added in the minutes recording the fact that Mr. Cousins tendered his vote, and it was not accepted.

Erection of Warehouse Buildings on West Side of Eyre-street Hill, Hatton-garden, Holborn.—The Building Act Committee reported as follows, the recommendation being agreed to:—

"The District Surveyor having received notice from Messrs. Patman & Fotheringham of their intention to erect two factory buildings on the west side of Eyre-street Hill, Hatton-garden, within the prescribed distance from the centre of the roadway, and to a greater height than the buildings formerly existing on the site, served a notice of objection upon them under Section 150 of the London Building Act, 1894. The street in question is about 20 ft. to 22 ft. in width; the buildings formerly on the site were six domestic buildings about 28 ft. in height, and the buildings which are being erected are factory buildings of the 'warehouse' class under the Act, and about 50 ft. in height. Under Section 13, Sub-Section 5 of the Act, if a person has obtained certified plans of any building or structure existing within the prescribed distance either at the commencement of the Act or at any time within seven years previously, he may alter or re-erect such building or structure, but so that no land within the prescribed distance is occupied by the re-erected building or structure except that which was occupied within the prescribed distance by the building previously existing. The builders in this case had obtained certified plans from the District Surveyor of the six domestic buildings formerly existing on the site, and they contended that they were legally entitled to build as they proposed, and stated that they should not therefore appeal against the District Surveyor's notice of objection, but should proceed with the erection of their buildings. We are of opinion that the erection of buildings of a totally different character from those formerly existing on the site cannot be said to be an alteration or re-erection of such buildings, and we therefore instructed the solicitor to serve a penal notice on the builders. The notice was not complied with, and two summonses (in respect of each building) were issued against the builders. The case was heard at the Clerkenwell Police-court before Mr. Bros on July 18, 1902. The facts were not disputed, and after hearing the arguments of counsel on both sides the magistrate dismissed the summonses with 5l. ss. costs, but agreed to state a case for the opinion of the High Court. As the point raised is a very important one, we instructed the solicitor to get a special case stated, and the form in which it should be stated has been practically agreed upon, and will no doubt be signed by the magistrate. We recommend:—That the solicitor be instructed to take all necessary steps for obtaining the decision of the High Court upon the case stated by the magistrate in the matter of the Council v. Patman & Fotheringham (erection of factory buildings on the west side of Eyre-street Hill, Hatton-garden)."

Tramways: Electric Sub-station.—The Highways Committee recommended and it was agreed:—

"That the expenditure on capital account be authorised (a) of a sum not exceeding 3,000l. for the erection of workshop buildings, adjoining the sub-station in course of erection at Clapham for the electrical working of the London County Council tramways, and (b) of a sum not exceeding 550l. for remuneration of the quantity surveyor employed for getting out the quantities and measuring the work in connexion with the erection of the sub-station and workshops at Clapham, and of the sub-stations at Brixton and near the Elephant and Castle respectively."

Housing: Reid's Brewery Estate.—The Housing of the Working Classes Committee reported that block D, Reid's brewery estate, has been completed and is now ready for

occupation. This block of dwellings is one of the six interior blocks on the estate; it has been built by the Works department, and will accommodate 250 persons in fifteen tenements of three rooms, and forty tenements of two rooms.

Buildings at Farnfield.—The Inebriate Act Committee reported that the works included in Messrs. Potter Brothers' contract for the erection of new buildings at Farnfield have been completed, and that the certificate of the Secretary of State in respect of the building has been received. The certificate allows of the reception of eighty additional patients, so that there is at present accommodation for 113 female inebriates at Farnfield Reformatory.

View from Richmond Hill.—In answer to a question by Mr. Sankey, Mr. Piggott said it was a fact that Buccleuch House, Richmond, the residence of Sir Whittaker Ellis, was for sale, and if the site were built upon it would destroy the view from Richmond Hill. Sir Whittaker Ellis, however, was under a covenant not to build. On the opposite side of the river was Cambridge Terrace-gardens, and Sir Whittaker Ellis promised, when the Marble Hill Estate was being acquired, that these Gardens should not be further built upon. That estate was offered for sale, and it was the intention of the Committee to write to Sir Whittaker Ellis, drawing his attention to his promise, because there was no condition in the sale carrying out that promise.

Proposed New Institute for Paddington and North-West London.—The Technical Education Board reported as follows:—

"We have for some time been endeavouring to arrange for additional accommodation and improved organisation of technical education in the extensive district of Paddington (including Queen's Park), Kilburn, and South-West Hampstead, in which a large artisan population has grown up. The Council at present aids very liberally the classes carried on at the Westbourne Park Institute and the Queen's Park Institute, together with some small art classes which have practically no independent resources, and all of which urgently require better accommodation. These are no polytechnic nearer than those at Regent-street (Oxford-circuit) and Manresa-road (Chelsea), which are far too distant to meet the local needs."

We have now succeeded in finding premises which, with comparatively little alteration, will enable us to concentrate the present classes into one strong institution, providing adequate laboratory and workshop accommodation, and in a position to serve as the educational centre for the whole district. These premises are in Saltram-crescent, lying between Queen's Park and Westbourne Park. The buildings are freehold, standing on a site of about 35,000 sq. ft., and were erected about twelve years ago for use as a higher grade voluntary school. The proposed organisation of the school did not meet the approval of the Education Department, and the project was eventually abandoned. They have been inspected by the architect and valuer, and it is estimated that an expenditure of 2,000l. would fit them for use as a technical institute by October next. The value has been in negotiation with the owners, and has, with our approval, secured the option of purchase of the freehold, with possession, for the sum of 15,000l., which we consider a very reasonable price. . . . We recommend 'That the freehold of the premises in Saltram-crescent be acquired for 15,000l.; that the cost be provided from the funds already appropriated by the Council for technical education; that the solicitor do complete the matter, and that the seal of the Council be affixed to any necessary documents in connexion with the purchase of the property.'"

Lord Chamberlain's Theatres.—The Theatres and Music Halls Committee reported that they had noticed statements in the Press concerning the Council's action in respect of the theatres under the jurisdiction of the Lord Chamberlain. The public might be assured that no action of the Council sought either to put obstacles in the way of the managers, or to allow a state of things which would endanger the safety of theatre-goers. To meet the wishes of the Lord Chamberlain, the theatres were inspected, and a report was forwarded to him before the day fixed for the renewal of the licences. Full licences were then granted by his Lordship to all theatres which had complied with all the requisitions, and provisional licences for three months were granted to others, to be exchanged for full licences on completion of the work.

Theatres.—The Theatres and Music Halls Committee reported that the following had been approved:—Canterbury Music Hall—rendering lounge floor fire-resisting—submitted by Messrs. Wylson & Long; Grand Palace of Varieties, Clapham—new lobbies—submitted by Mr. F. Matcham Shepherd's

h Empire—building to accommodate 2,500 people—submitted by Mr. F. Matcham.
repainting Chelsea Bridge. The Bridges Committee reported as follows:—

On July 22, 1902, the Council authorised an expenditure of 2,495*l.* for repainting Chelsea Bridge, instructed us to invite tenders for the work and accept the lowest satisfactory tender. The following tenders were accordingly opened on August 8:—

Quartermaine	£1112	5	7
A. H. Inns	1717	0	0
W. Dudley	1,952	13	9
E. Proctor	2,325	3	6
Vigor & Co.	2,480	0	0

asmuch as there was a difference of over 600*l.* between Mr. Quartermaine's tender and the next best, and further that he was a provincial contractor who had not previously done work for the Council, we were careful to have full inquiries made respecting his capability to properly carry out the contract. It was not, therefore, possible until September 13 to send the usual letter of acceptance, and the gross amount of the contract being sent for execution some three days later. On September 19 Quartermaine wrote to the effect that since entering he had undertaken other works and that, owing to the delay in communicating to him the decision of the Council, he had found it impossible to execute the work. We have had, therefore, to reconsider the matter, with the result that we deem it desirable that the carrying out of the work should be postponed until the spring of next year.

The Council adjourned shortly before 10 o'clock.

METROPOLITAN ASYLUMS BOARD.

At the monthly meeting of this Board was held on Monday, Mr. Hensley presiding.

The Works Committee reported that they had received acceptance of the contract of Messrs. Ke & Ockenden, of Littlehampton (as subcontractors), for the supply and fixing of a gas main and pump with a lifting capacity of 2,000 tons per hour, at the Millfield Homes, at the sum of 43*l.* 10*s.*, and also for the supply and fixing of external cast-iron connecting pipe from the well water tower with the necessary fittings, fire valves and service boxes at the additional sum of 10*s.* The necessity for this work arises from the desire to obtain the water supply from a well head of from the local water company as originally contemplated.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Terlychbone, East.—Enclosures to the entrance to No. 21, Portland-place, St. Marylebone (Messrs. Ray & Murrells for Sir A. Edmonstone, &c.).—Consent.

Hackney, Central.—Blocks of dwellings on the north side of Dalston-lane and east side of Navarino-lane, Dalston (Messrs. N. S. Joseph, Son, & Smith for the Four per Cent. Industrial Dwellings Co.).—Consent.

Lewisham.—Three buildings on the south side of resourne-road, Lewisham, eastward of Monmouth-road (Mr. J. W. Webb).—Consent.

Otherlyth.—Projecting oriel windows at the second and third floor levels, and of projecting balconies at the first floor level, in front of a proposed block of offices upon the site of Nos. 17 and 19, (odd numbers) inclusive, Tooley-street, Otherlyth (Mr. C. S. Peach for Messrs. Mills & Brown).—Consent.

Trand.—Projecting oriel windows to a building the site of Nos. 1, 3 and 5, Ryder-street, St. Eas (Mr. W. Woodward for Mr. C. Guiffanti).—Consent.

Terlychbone, West.—Two blocks of residential buildings on the north side of Marylebone-road and east side of Lisson Grove, St. Marylebone, of projecting bay and oriel windows, porches and balconies (Messrs. Gordon & Gunton for Mr. T. H. Brooke-Hitching).—Consent.

Clapham.—A projecting porch in front of No. 17, Tolly-grove, Clapham (Mr. S. J. Collins, for Mr. J. Jago).—Consent.

Greenwich.—Wood and tiled porches in front of dwelling-houses on the north side of Shooter's-road, Greenwich (Mr. D. Wilson).—Consent.

Hammersmith.—Extension of the periods within which the erection of a block of flats, with shops on ground floor, on the site of Nos. 156 and 158, ridge-road, Hammersmith, was required to be commenced and completed (Mr. A. H. Hart).—Consent.

Hampstead.—Retention of a shop front erected on the projecting landing at No. 150, Finchley-lane, Hampstead (Messrs. C. Saunders & Son for H. J. S. Abrams).—Consent.

Lewisham.—A porch addition at the rear of No. 179, Hither-green-lane, Lewisham, to abut upon Ennersdale-road (Messrs. J. Outhwaite & Son for Mr. J. Outhwaite).—Consent.

St. Pancras, South.—A building on a site abutting upon Euston-road, Southampton-street, and Warren-street, St. Pancras (Mr. E. C. Macpherson for Mr. H. Regent).—Refused.

Clapham.—A church on the site of Nos. 26, 28, and 30, Larkhall-lane, Clapham (Mr. W. Romain for the Rev. Canon St. John).—Refused.

Hackney, Central.—A one-story addition upon part of the forecourt of the Star Steam Laundry, Anton-street, Hackney (Mr. J. Hamilton for the Star Steam Laundry Co., Ltd.).—Refused.

Kensington, South.—An iron and glass covered way in front of No. 26, Kensington-court, Kensington (Messrs. Green & Abbott for Mrs. McConnell).—Refused.

Marylebone, West.—A covered way at the side of No. 20, Upper Hamilton-terrace, Maida Vale, St. Marylebone, abutting upon Carlton Hill (Mr. G. A. Sexton for Mr. J. Peters).—Refused.

Marylebone, West.—A porch on the north side of No. 33, Montagu-square, abutting upon Montagu-place (Mr. F. W. Foster).—Refused.

Norwood.—One-story shops on the east side of Norwood-road, Lambeth, between Nos. 333 and Norfolk-lane (Mr. C. M. Quiller for Mrs. F. Parker).—Refused.

St. George, Hanover-square.—A porch at the entrance to No. 16, Queen-street, Mayfair, St. George, Hanover-square (Messrs. Rolfe & Matthews for Mr. W. Stone).—Refused.

Width of Way.

Kensington, North.—Extension of the period within which the rebuilding of a chapel, on the western side of Bosworth-road, Kensington, with the external walls of the new building at less than the prescribed distance from the centre of the roadway of Stockton-mews, was required to be commenced (Mr. J. W. Chapman).—Consent.

Linehouse.—Retention of a detached water-closet building in a yard on the west side of Gill-street, Stepney, next the Great Eastern Railway arch (Mr. M. W. Jameson for the Metropolitan Borough of Stepney).—Consent.

St. George-in-the-East.—School buildings on the north side of High-street, Wapping (Mr. T. J. Bailey for the School Board for London).—Consent.

Bethnal Green, South-West.—A building commenced to be erected on the south side of Princes-court, Bethnal Green (Mr. G. H. Lovegrove).—Refused.

Hampstead.—Four three-story houses on the north side of Willow-road, Hampstead (Mr. F. S. Hammond for Mr. W. Selley).—Refused.

Width of Way and Line of Fronts.

Dulwich.—An extension of the period within which the erection of buildings, with shops on the ground floor, on the west side of Grove-lane, Camberwell, at the corner of Champion-grove, was required to be commenced (Mr. J. Heath for Mr. T. Freeman).—Consent.

Space at Rear.

Wandsworth.—A modification of the provisions of Section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a house on the west side of Nepean-street, southward of Union-street, Wandsworth (Mr. A. J. Hardwick for Mr. T. D. McMeekin).—Consent.

Westminster.—A deviation from the plan approved on March 25, 1902, for the erection of a block of artisans' dwellings on the south side of Page-street, Westminster, next No. 125 (Messrs. N. S. Joseph, Son, & Smith for the Council of the City of Westminster).—Consent.

Formation of Streets, &c.

Hackney, South.—That an order be issued to Messrs. Hodson & Whitehead sanctioning the formation or laying out of a new street for carriage traffic to lead from Morning-lane to Chatham-place, Hackney, and, in connexion therewith, the widening of a portion of Morning-lane (Mr. H. W. Rowlandson).—Consent.

Width of Way and Cubical Extent.

Southwark, West.—A building, to be used as a printing and bookbinding factory, on the east side of Bear-gardens and west side of Rose-alley, Southwark, with the external walls at less than the prescribed distance from the respective centres of the roadways of those streets, and such building to exceed in extent 250,000, but not 450,000, cubic feet (Mr. E. D. Hoyland for Messrs. E. Newman & Sons).—Consent.

Buildings for the Supply of Electricity.

Marylebone, East.—A building to contain a water softening plant at Grove-road, St. John's Wood, abutting upon Lodge-place (Mr. C. S. Peach for the Central Electric Supply Co., Ltd.).—Consent.

Means of Escape at Top of High Buildings, Section 63.

Marylebone, West.—Means of escape in case of fire proposed to be provided in pursuance of Section 63 of the Act on the sixth story of two blocks of residential flats on the north side of

Marylebone-road and west side of Lisson-grove, St. Marylebone, for the persons dwelling or employed therein (Messrs. Gordon & Gunton for Mr. T. H. Brooke-Hitching).—Consent.

St. George, Hanover-square.—An alteration in the means of escape in case of fire, provided in pursuance of Section 63 of the Act, on the fifth and sixth floors of a building known as Hanover-buildings, Hanover-square, St. George, Hanover-square, so far as relates to an alteration of the lower flight of the north-western external staircase (Mr. J. Sawyer).—Consent.

Working-Class Dwellings.

Hackney, Central.—Blocks of intended dwelling-houses, to be inhabited by persons of the working-class, and proposed to be erected, not abutting upon a street, on a site at the corner of Dalston-lane and Navarino-road, Dalston (Messrs. N. S. Joseph, Son, & Smith for the Four per Cent. Industrial Dwellings Co.).—Consent.

Dwelling Houses on Low-Lying Land.

Lambeth, North.—Two buildings on low-lying land situated at the corner of Short-street and New-cut, Lambeth (Mr. W. R. Milton for Mr. T. L. Green).—Consent.

* * * The recommendations marked † are contrary to the views of the Local Authorities.

Correspondence.

POLLUTION OF THE RIVER LEA.

SIR,—I am glad to see in your issue for the 18th inst. that you draw attention on p. 339 to this subject.

It has always been a mystery to me how the filthy state of the old bed of the River Lea from the East London Water Works Filter Beds down to Old Ford Lock, about three miles, can possibly be tolerated by the authorities. This is the old bed of the river, the part for traffic being diverted to a new channel called the Hackney Cut, and is the highest part of the river reached by the tides. It is little better than a sewage pond and a nuisance to the whole neighbourhood. This is the more remarkable considering the number of authorities that might be supposed to have an interest in putting a stop to the nuisance; it partly forms the boundary between Low Leyton, Stratford, and Hackney and Poplar, so that the Sanitary Authorities on both sides must be interested. It skirts for more than a mile Hackney Marshes, lately turned by the London County Council into a public park and health resort, so that the Committee of Parks and Open Spaces might have something to say. The Lea Conservancy Board are, of course, directly interested, and as each ebbing tide takes a portion of its sewage down the lower part of the Lea into the River Thames to assist in the pollution of that river, the Thames Conservancy might have something to say. The reservoirs and filter beds of the East London Water Co. cannot be improved by the polluted air in their immediate locality. Moreover, as the main outfall sewer runs over the very place where this sewage pond discharges into the navigable part of the Lea, with a pumping station close by, the question arises, Why does not this sewer take this sewage? The whole thing seems to be a striking illustration of the well-known proverb that "What is everybody's business is nobody's business." This neglected neighbourhood is not without historic interest. The place of discharge above mentioned, "the Old Ford," was the main thoroughfare out of London to the north-east from the time of the Romans, as is attested by the names "Old Ford-road" and "Roman-road," and the White Hart public-house at this corner stands on the site of one that has been there for centuries, and Roman remains were found here in 1863 on the site of the Old Ford goods station. There was also an old palace in the neighbourhood, attested to by the names Palace House and Palace Gate, remains of the old gateway being still there.

The polluted part of the river is crossed by the North-Western and Great Eastern Junction Railway; by Carpenters-road, which leads direct from this part of London to Stratford; and by Temple Mills-road, forming the junction between Homerton and Lower Leyton by Temple Mills Bridge; and by this bridge is the other White Hart public-house mentioned by Dr. Warry in his report, which has just been rebuilt on the site of one which bore the date 1574. The neighbourhood is also increasing in population, and a new road has just been passed by the London County Council—Waterden-road—which connects the two thoroughfares above named, and runs very near the polluted stream.

DISTRICT SURVEYOR.

ASWAN DAM LOCK GATES.

SIR,—In a recent notice on the Aswan dam you state that Mr. Stokes designed the gates; as a matter of fact Mr. F. D. M. Stoney designed the gates, the regulating gates, and the lock gates. Mr. Stoney worked at the dam gates from 1893 to 1895, and spent February, 1895, in England paying

visits to Ipswich and seeing that the iron work was in accord with the stonework. The lock and regulating gates as erected are as they were designed by Mr. Stoney. Doubtless, Mr. Stokes has had much work in fitting in details to suit modifications as the construction has advanced, but the designs are Mr. Stoney's. The only thing Mr. Stoney did not design, at least, not in my time, was the lift bridge. We hoped later on to design a lift bridge between dwarf pylons, but *Dis aliter visum*.

W. WILLCOCKS,

Late Director-General of Reservoirs.
Cairo, October 11, 1902.

HOW TO SET OUT AN ELLIPTIC ARCH.

SIR.—The contribution of your correspondent, "W. P." (p. 325 *ante*), is very amusing, but as an exposition of ignorance it would be hard to beat.

He says that the method described by him—which, by the way, is but a variation of that given by "Knox & Wells"—is that in most common use among carpenters and masons.

Granted; and it would be strange, indeed, if this were not the case, for all modern teachers of "Practical Geometry" define the ellipse in a sentence which forms the basis of this construction, and, after all, the methods which the average mechanic employs are easily traceable to his early training.

No geometrician can demonstrate that the curves obtained by the method "W. P." employs are not ellipses, for they are *absolutely correct*, this notwithstanding "W. P.'s" readiness to grant the impossible.

But your correspondent is wrong when he says "the two ellipses are equidistant from one another throughout their length," and if by his assertion that "a continuation from Q of rod QP will give radiating joints at any point in the circumference," he means "will give correct radiating joints for the voussiors" he is again incorrect. T. L. B.

BOOKS RECEIVED.

THIRTY-FIRST ANNUAL REPORT OF THE LOCAL GOVERNMENT BOARD: 1901-1902. (Eyre & Spottiswoode.)

THE PRIVATE STREET WORKS ACT. By Joshua Scholfield and Gerard R. Hill. (Butterworth & Co.)

THE PAINTERS' LABORATORY GUIDE.—By G. H. Hurst, F.C.S. (Chas. Griffin & Co.)

THE MODERN CARPENTER, JOINER, AND CABINET MAKER. By G. L. Sutcliffe. Vol II. (The Gresham Publishing Co.)

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

17.—GLASS.

COMPOSITION.—Glass consists of a combination of silicates, the predominating constituent being usually silica. Silicates of the alkalis are soluble in water, and silicates of the alkaline earths are soluble in acids, although insoluble in water; but double silicates of an alkali and an alkaline earth are practically insoluble either in water or common acids, although hydrofluoric acid decomposes them. Silicate of soda, which is sometimes called *water-glass*, is one of the silicates soluble in water, and is frequently a constituent of preservative and fireproofing solutions.

In ordinary window-glass the alkali is soda, and the alkaline earth is lime; and the composition of the double silicate which constitutes window-glass approximates more or less closely to the formula $\text{Na}_2\text{O} \cdot \text{CaO} \cdot 6\text{SiO}_2$. In the manufacture of flint glass oxide of lead is employed instead of lime, and in some forms of glass potash is used in place of soda. Most forms of glass contain small quantities of alumina and iron, these being present in most cases as accidental impurities.

The varieties of glass which have from time to time been manufactured are innumerable, but the glasses most largely manufactured at the present time may conveniently be divided into the following four classes:—

1. *Crown, sheet, and plate glass*, which consist of silicates of sodium and calcium.
2. *Flint, crystal, or lead glass*, which consists of silicates of potassium and lead.
3. *Common green bottle glass*, which consists of silicates of sodium, calcium, aluminium, and iron.
4. *Bohemian glass*, which consists of silicates of potassium and calcium.

The following table shows the approximate compositions of some common commercial

glasses, but the compositions of such glasses are, of course, variable:—

Description of Glass.	Approximate Composition.						
	SiO ₂	K ₂ O	Na ₂ O	CaO	PbO	Al ₂ O ₃	Fe ₂ O ₃
Sheet Glass	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
Plate Glass	73	—	14	11	—	2	1
Flint Glass	78	—	13	6	—	2	1
Green Bottle Glass	69	—	1	23	—	10	4
Bohemian Glass	76	15	—	8	—	3	—
Optical Glass (very variable)	44	12	—	—	43	3	3

Uses of Different Glasses.—Crown, sheet, and plate glass are used for windows. Flint or lead glass is used for domestic articles. Green bottle glass is used for bottle making, and may be made with sand containing a larger proportion of impurities than is permissible in sand to be used for the manufacture of colourless glass. Bohemian glass is used for flasks and for other chemical apparatus which may be required to withstand a high temperature. Sheet glass and flint glass melt at a lower temperature than Bohemian glass, and green bottle glass usually has a melting point intermediate between that of flint glass and Bohemian glass.

Coloured Glass.—Coloured glass is usually produced by adding a small quantity of one or more metallic oxides to molten colourless glass, or to the mixture of raw materials before fusion; but in some cases a metal, or sulphur, or organic matter is employed instead of a metallic oxide. The quantity of metallic oxide required to impart a deep colour is often only a small fraction of 1 per cent. of the total weight of the glass.

Many different recipes for producing glass of a specified colour have been adopted by different manufacturers, and the following list gives but a few of the materials used for imparting colour to glass. The colour of the glass is, of course, as largely dependent upon the quantity of the colouring agent employed as upon its composition. Sulphur, for example, may produce a yellow glass if added in small quantity, or a black glass if in larger quantity:—

Deep blue glass may be produced by adding oxide of cobalt.

Sky blue glass may be produced by adding oxide of copper (0.01 per cent.)

Deep green glass may be produced by adding ferrous oxide or oxide of chromium.

Yellow glass may be produced by adding ferric oxide or sulphur.

Orange glass may be produced by adding ferric oxide and manganese oxide.

Purple glass may be produced by adding manganese oxide.

Red glass may be produced by adding suboxide of copper.

Crimson red glass may be produced by adding gold chloride.

Black glass may be produced by adding sulphur (10 per cent.) or a mixture of metallic oxides.

Indescent glass may be produced by exposing the hot glass to fumes of stannous chloride.

Raw Materials for Glass Manufacture.—The silica employed is white sand, almost free from iron. In certain districts beds of comparatively pure sand well adapted for glass manufacture are found. Sand containing ferric oxide produces glass of a yellow colour, and sand containing more than a trace of iron must not therefore be used for crystal or best quality plate glass. For ordinary sheet glass the iron oxide may amount to $\frac{1}{2}$ per cent. To a certain extent the prejudicial effect of ferric oxide may be avoided by adding oxide of arsenic to reduce the ferric oxide to ferrous oxide, for ferrous oxide in small quantity merely gives a greenish hue to the glass. Manganese dioxide in small quantity imparts a faint violet colour to colourless glass, but when the manganese dioxide is added to glass having a greenish tint the colours neutralise one another, and an almost colourless glass is obtained. At one time the silica used for glass-making was commonly obtained by grinding flint; hence the name "flint-glass."

Soda is generally used in the form of "soda-ash" (sodium carbonate) and potash in the form of "pearl-ash" (potassium carbonate). Lime is used as quicklime, or as carbonate of lime either in the form of chalk or limestone.

For the production of flint-glass the lead is added in the form of red lead (Pb_2O_3).

Cullet is the name given to the waste and broken glass obtained during the process of manufacturing sheet-glass and glass articles. Cullet is always mixed with the sand and other materials used for producing glass, for undressed waste is thus prevented, and the cullet itself acts as a flux. Potash and soda are to an appreciable extent volatile at the temperature required to cause sand to combine with the alkali and lime, and much of the alkali is liable to be lost by volatilisation unless cullet, which melts at a lower temperature, is added. The cullet dissolves all the glass-making materials, and causes them to enter into combination to form glass at a lower temperature than that required when no cullet is present. The consumption of fuel and the loss by volatilisation are therefore reduced by the addition of cullet.

Manufacture of Glass.—Crown glass has become almost obsolete, as glass can be manufactured more cheaply, more conveniently, and in larger sheets by casting. In making crown glass a mass of molten glass weighing from 10 lbs. to 20 lbs. was drawn from the melting-pot on the end of a blow-pipe. By blowing through the tube the mass was converted into a hollow bulb or globe. The bulb was removed from the blow-pipe, heated, and rapidly rotated until it assumed the form of a flat disc having a bullion or "bull's-eye" boss in the centre. When the disc was subsequently cut into panes, the boss was cut out in a small pane and used for stable windows, or for residences built in the Queen Anne style. Imitation "bull's-eye" bosses are now made by casting glass in suitable moulds. The sizes of panes of crown glass were, of course, limited to much smaller dimensions than those obtained by casting.

Sheet glass is made by blowing the glass into the form of a hollow cylinder. The contracted end of the cylinder is subsequently cut off, and the cylinder is split along one side with a diamond and then placed in a furnace until it softens and can be opened out into a flat sheet; the sheet is then carefully annealed. All glass articles have to be cooled very slowly after manufacture, i.e., annealed, for if allowed to cool rapidly they would be excessively brittle and liable to crack when subjected to a sudden change of temperature.

Plate glass is made by pouring molten glass on to a flat iron table and rolling it flat under a metal roller. Fillets placed along the edges of the table determine the thickness of the sheets. The surface of plate glass is ground by placing water and emery-powder upon the glass, then placing a heavy cast-iron plate over the emery, and sliding the glass and iron plates so that the grinding action takes place between them. The glass may be subsequently smoothed by rubbing two of the glass plates together with fine emery between them, and finally polished by rubbing machines working with an epicycloidal motion.

Etching by Hydrofluoric Acid.—The glass is covered with a thin layer of beeswax, and designs are drawn through the wax with the needle or by machinery. The articles are then dipped into a solution of hydrofluoric acid contained in gutta-percha or lead troughs provided with lids. Weak acid attacks the glass slowly, but produces clear designs. When the etching is completed, the wax is removed and the glass washed in hot water containing washing-soda. The length of the period of exposure to acid and the strength of the acid are regulated to suit the designs to be etched. Etching may also be accomplished by exposing the waxed glass on which the design has been drawn to the vapour of hydrofluoric acid.

Etching by Sand-blast.—Etching is now largely executed by means of the sand-blast. The etching is not so fine, nor is it possible to etch such delicate patterns with the sand-blast as with hydrofluoric acid, but for the etching of glass panels for public-houses, and for etching of a similar character, the work of sand-blast is sufficiently fine. The glass is pasted over with a paper stencil, and the sand etches only that portion of the glass exposed by the stencil. By concentrating the sand-blast on any particular spot on the glass, a hole may be driven through plate-glass $\frac{1}{2}$ in. thickness in a few minutes.

MASONIC HALL, NEWTOWNARDS, BELFAST.
The new Masonic Hall in Newtownards was dedicated recently. The hall is situated in James-street. Mr. A. Donnelly was the architect.

OBITUARY.

R. W. B. WILKINSON.—Mr. W. B. Wilkinson, of Newcastle-on-Tyne, who died on October 13, in his forty-fourth year, was the founder of the firm of R. Wilkinson & Co., of Newcastle-on-Tyne and London, and the originator of the now well-known concrete pavings. The first floor ever laid in this way was a greenhouse floor in Newcastle-on-Tyne, his firm, and afterwards the business greatly prospered, and even as far away as Lisbon. Mr. Wilkinson took out a patent in 1854 for fireproof construction, in which he used wire rope and small iron bolts embedded below the central axis of the concrete. In 1856 he patented a hollow tubular fireproof and soundproof partition, and in the eighties he patented a decorative concrete paving, which he called "Decorative Granite." Mr. Wilkinson was Chairman of the Newcastle and Gateshead Gas Co., director of the Newcastle and Gateshead Water Co. and the Shields Gas Co., and was connected with many of the largest businesses of the North of England.

GENERAL BUILDING NEWS.

ST. PATRICK'S CHURCH, TRIM, IRELAND.—On the 18th inst. St. Patrick's Church, Trim, Meath, was dedicated. The church comprises sanctuary, nave, transepts, side aisles, side chapels, nuns' choir, and organ-chamber, and heating-chamber. The total length of the church is 137 ft. 8 in., and the width across transepts is 77 ft. 8 in., and the width across the nave, 106 ft., and width of side aisles, 40 ft. The nave is of hammer beam construction, the timbers supported on marble shafts with carved caps and moulded bases. The ceiling is of pitch pine, divided into panels by mouldings. The nave is flanked by aisles and side chapels, the latter supported on carved and polished columns with carved caps and polished bases. The nave is lighted by five three-light tracery windows on each side in the clerestory. The transepts are 27 ft. 6 in. deep by 22 ft. 3 in., having two confessionals in each, and lighted by five-light tracery windows in the clerestory. They are roofed and celled in every respect similar to the nave. The aisles are lighted by lancet windows with tracery heads, one on each bay. The sanctuary is 32 ft. long by 27 ft. wide, and is lighted by five-light tracery windows; the ceilings of the sanctuary and side chapels are groined arching in fibrous plaster ringed from polished marble shafts. The nuns' choir, which is 24 ft. long and 16 ft. wide, is divided into the sanctuary by a carved and paneled oak screen. The principal entrance to the church is through the tower porch. The tower itself, which is 18 ft. square, rises to a height of 100 ft., with a spiral staircase at angles, surmounted by a spire 90 ft. high. The total height of the spire from the ground to the top of the cross is 205 ft. The church is lighted by two porches at the west end, on each side of the tower, and by two at the east end of the transepts. The walling generally is of cutstone throughout and of Irish limestone; the roofing, &c., of pitch pine. The organ gallery is situated in the tower. The floor of the sanctuary is laid in mosaic, the design being a design of the Holy Evangelists and the twelve apostles, taken to a large extent from the Book of Kells and the Book of Durrow. The Communion rail, which is of Sicilian marble, with polished marble shafts and carved and moulded bases, extends across the full width of the church, including sanctuary and side chapels. The gates in the centre of the Communion rail are of hammered and beaten brass, with ornamental scrollwork. The high altar is of Sicilian marble, generally, with coloured marble shafts, and sculptured groups in statuary marble. The high altar is 9 ft. long, supported on polished shafts of Mexican onyx, with carved caps and moulded bases. In the front of altar are three groups, consisting of the centre, the Sacrifice of Abraham; on the right, the Sacrifice of Melchisedech; and on the left, the Sacrifice of Abel. The canopy over Tabernacle is surmounted by gables on four sides, with carved crockets and finials, the arch of canopy is cusped, the canopy is supported on shafts of foreign marbles, with carved caps and carved and moulded bases. The Tabernacle door is of ornamental hammered brass, gold plated. The spire over canopy has pinnacles at each angle, with carved crockets and finials. The total height of canopy and spire to top of cross from sanctuary floor is 27 ft. The first stage of reredos over candle niches is formed of moulded arches supported on coloured marble shafts, with carved caps and moulded bases. The upper portion of reredos on each side of central canopy consists of two canopied niches, with moulded and cusped arches, moulded gables, carved crockets and finials, with carved tracery; the arches supported on clustered columns of coloured marbles, with moulded and carved caps and moulded bases. The groups are the Resurrection and Ascension; those on the Gospel side of the Nativity and Transfiguration. The wings of the altar at each end are surmounted by canopies and spires, &c., similar to central canopy; but containing in niches figures

of St. Brigid on the Epistle side and St. Patrick on the Gospel side. The church was designed by the late Mr. W. Hague, architect, of Dublin, and the shell of the building carried out under his superintendence. After the death of Mr. Hague the work was entrusted to Mr. William H. Byrne, architect, Dublin. Mr. Patrick Nolan, of Monaghan, was the builder. Messrs. James Pearce & Son, of Dublin, were contractors for the high altar, Mr. Edmund Sharpe for the Communion rail, and Mr. George Smith for one of the side altars. The brass ornamental gates of the Communion rail were made by Messrs. Smith & Son, of Dublin. Mr. Ludwig Oppenheimer was contractor for the mosaic flooring of the sanctuary.

CONGREGATIONAL CHURCH, LEEDS.—Trinity Congregational Church, Leeds, is situated in Woodhouse-lane. Erected from designs by Messrs. Danby & Simpson, the buildings comprise church, a lecture-hall, vestries, class-rooms, and caretaker's house. The church consists of nave, aisles, transepts, chancel, and a tower and spire rising to 130 ft. The main entrance is approached by a flight of stairs leading to an outer vestibule. Above is a seven-light window, and there is a corresponding window at the chancel end. The latter is filled with stained glass, and this is the case also with one of the series of two-light windows in the south aisle. The pulpit is at the corner of the southern transept, and is of carved oak resting on a pediment of Caen stone, relieved with alabaster pillars. The fittings in the chancel, the choir stalls, and the organ-case are also in carved oak. The nave is of pitch pine, and gives accommodation for over eight hundred worshippers. There are no galleries. The chancel window is by Messrs. Atkinson Bros., Newcastle-on-Tyne. The other memorial window is a reproduction by Mr. T. F. Curtis (of Messrs. Ward & Hughes, London) of the altar-piece in the church at Molde, Norway. The contractors were—Masonry, Messrs. C. Myers & Sons; carpentry, Messrs. H. Atkinson & Son; plastering, Mr. J. W. Watson; slating, Messrs. J. Atkinson & Son; plumbing, Messrs. W. Barrand & Co.; painting, Mr. A. Bateman; heating apparatus, Messrs. J. and H. Smith; electric lighting, Mr. Norman Hirst and Mr. A. Dickinson.

WYCLIFF BAPTIST CHURCH, NEWCASTLE-ON-TYNE.—Wycliff Church, Elswick-road, Newcastle, has just been opened. The full accommodation is for a mixed congregation of about 450. The building consists of a nave with hammerbeam open-timbered roof and plastered ceiling. There are double transepts on each side with timber arches supported on iron columns, and each transept is lighted with a three-light tracery window. Two two-light tracery windows are in each side of the wall of the nave. There is a projecting portico in front with vestibule and inner lobbies. On one side is a vestry, and on the other side a staircase in the tower, which gives access down to the schoolroom, and will give access up to the gallery when it is constructed. There is also a staircase on each side of the pulpit down to the schoolroom, and the minister's and deacons' vestries. The seating is arranged semicircularly. The heating is by hot-water pipes and radiators. There is an exit door from the tower, and another from the back into Northburn-road. The two entrances are from Elswick-road. All the doors open outwards. Under the church are a church parlour, vestries, a heating-chamber, and lavatories, &c. The contract for the building was £3,337, including boundary walls, gates, railings, &c. The builder is Mr. A. Bruce, Newcastle; the architects are Messrs. G. Baines and R. Palmer Baines, London; and the work has been carried out under the supervision of Mr. W. I. Lamb, clerk of works.

CHURCH, ETTINGTON.—On the 16th inst. the foundation-stone of a new parish church was laid at Ettington, near Stratford-on-Avon. Messrs. Collins & Godfrey are the contractors. The new church has been designed by Mr. C. Ford Whitcombe, and is a cruciform structure in the Perpendicular style.

RECONSECRATION OF WITTON-LE-WEAR CHURCH, DURHAM.—The ancient church at Witton-le-Wear having been restored and very largely rebuilt, it has just been reconsecrated. The rebuilding was estimated to cost £3,000. The work has been designed and carried out under the superintendence of Mr. C. Hodgson Fowler, F.S.A., of Durham.

CHURCH, WEASTE.—The foundation-stone of the Queen Victoria Memorial Church, Eccles New-road, Weaste, was laid on the 18th inst. The building, which will accommodate 400 persons, is to cost £3,500. The work is being carried out from the designs of Messrs. Royle & Bennett, of Manchester. **CHURCH, BOOTHLE.**—The foundation-stone of a new Free Church was laid in Merton-road, Boothle, recently. The contractor is Mr. Peter Tyson, of Liverpool; and the architect is Mr. T. T. Rees. The new church, which is to be built of brick, with terra-cotta and red pressed brick facings, will have seating accommodation for between 800 and 1,000 people, and the plans provide for a large and small assembly hall, vestries, classrooms, &c. It will be lighted with electricity, heated with hot water. The total cost will be about £2,500.

CONGREGATIONAL CHURCH, BURY PARK, LUTON.—The tender submitted by Messrs. T. & E. Neville & Co., Luton, amounting to £4,291, has been

accepted for this church, and building operations have been commenced. The architects are Messrs. George Baines and R. Palmer Baines, of London.

MISSION HALL, WHITBY.—A new mission hall is being erected to take the place of the Wharf Hall, Whitby. The room will be 51 ft. by 28 ft. 8 in. The walls will be of brick, with piers on each side up to the eaves. The floor is to be composed of wood blocks. The contractor is Mr. H. Pinder, Mr. J. Kidd doing the masonry work. Mr. E. H. Smales is the architect.

MISSION BUILDING, CAMBERWELL, S.E.—A mission building which has been erected at the corner of Sandover and Kempsham roads, Camberwell, for the United Girls' School Mission, was opened on the 18th inst. It is of red brick with stone dressings, and was designed by Mr. R. Creed, of Finsbury-circus. The roof is temporary, as the entire scheme will not be carried out at present.

MISSION ROOM, SHEFFIELD.—A mission-room is being erected in Farncliffe-street, Sheffield. There will be two floors. The upper one will consist of a room, 50 ft. by 32 ft., capable of seating about 300 people, and for Sunday school purposes this will be divisible by means of movable partitions into three rooms. Underneath there will be a young men's club, kitchen, store-rooms, &c. Provision will be made for heating, lighting, and ventilating. The premises will be of brick with stone facing. The new mission-room will stand at the corner of Cossey-street and Farncliffe-street, and there will be two entrances, one in each thoroughfare. Mr. J. Norton is the architect, and Mr. G. Carr the contractor.

CHURCH, SOUTH LONDON.—The Bishop of Rochester consecrated on the 14th inst. the new Church of St. Bartholomew, which has been erected in Wycliffe-road, Lavender-hill, S.W. The new building is capable of seating 600 persons. The structure has been designed by Mr. G. H. Fellowes Prynn, of Westminster.

RESTORATION OF LANGTOFT CHURCH, YORKSHIRE.—The Archbishop of York visited Langtoft on the 10th inst. for the purpose of reopening the church there after restoration. Mr. Hodgson Fowler, of Durham, was the architect, and Messrs. Thompson & Co., of Peterborough, were the builders. It is about eighteen months since the work was begun by the demolition of the old nave, which has since been entirely rebuilt. The tower, which is of the Norman order, has been thoroughly repaired. It was found necessary to rebuild two or three feet at the top, as well as to provide a new roof, but the new work is a replica of the old. There are two bells in the tower, dated 1600 and 1647, and these have been rehung and the old frames repaired. To ring the bells the ringers stood on the ground at the bottom of the tower, but the restoration includes a new ringing chamber with oak floor. The bottom of the tower has been newly flagged, as, indeed, has the entire church, the present flagging being 6 in. or 8 in. lower than the floor it replaces. The nave is new and has both a north and south aisle, whilst the nave that it replaces was without aisles. At the end of the north aisle a new organ-chamber has been built, with vestry behind and heating-chamber beneath, from which the church is to be heated with hot air. The windows of the aisles are at present plain, but they are to be filled with stained glass. The chancel arch has been repaired, and the chancel has been new roofed. The walls and the stonework of the windows have been repaired, but all the old features have been retained or reproduced. A new carved oak pulpit, with a lectern, also of carved oak to correspond, has been provided. The church has been seated throughout with oak seats. The porch has been rebuilt, and the south door is of oak, and the doorway is surmounted by a moulding with bosses.

WORKMEN'S CLUB, CRAGHEAD, CHESTER-LE-STREET.—At Craghead, near Chester-le-Street, it is intended to build a new club. Plans have been approved by the Council, the estimated cost of the building is about £1,400, and the drawings have been prepared by Mr. George J. Stephenson, architect, Newcastle-on-Tyne. The ground floor consists of reading, smoke, and refreshment rooms, together with kitchen, scullery, and the usual outbuildings, with large cellar accommodation underneath. The first floor embraces a billiard-room, with rooms for the Committee and apartments for the Steward. The whole of the building is of red pressed brick, with stone dressings, and dark green slated roof.

FREE LIBRARY AND TECHNICAL SCHOOLS, NEWTON ABBOT.—The foundation-stones of this building were laid recently. The free library, although forming a part of the whole group, will be practically a separate building from foundations to roof. It will occupy the part of frontage to the left, in Bank-street, and it is to comprise, on the ground floor, a general reading-room, 40 ft. by 20 ft.; a main hall, lavatory, and sanitary provisions, with a magazine-room, 24 ft. square. From the central hall a staircase will give access to the first floor, which will contain the main lending library, 40 ft. by 20 ft. On the main landing will be the borrowers' lobby, with counters and book indicators. There will also be a reference library for students, measuring 24 ft. by 17 ft. 6 in., and beyond this a librarian's room for the repair of books and other purposes. The second or upper floor of the library will contain rooms for the care

taker, and is so designed that access may be given to the technical schools, so that one caretaker may superintend the entire group. It also contains book and newspaper stores, with lift communication to the library floor. A large portion of the original site has been given up to street improvements. The technical schools will comprise, on the ground floor, an entrance lobby and central hall, from which will be approached a general chemical laboratory, 36 ft. by 15 ft., with Principal's and balance rooms opening therefrom. There will be a physical laboratory measuring 28 ft. by 10 ft., a Principal's room, 20 ft. by 13 ft., and a general lecture hall, 30 ft. by 26 ft., with semi-circular gallery seating. In addition to this there will be a dark room for photography, a lavatory, and the necessary sanitary accommodation. From the main hall a staircase gives access to the upper floors, which comprise, on the first floor, six science classrooms for different purposes, measuring from 33 ft. by 20 ft. to 20 ft. by 16 ft., a cookery-room, and for domestic subjects generally, 26 ft. by 18 ft., and a mechanical drawing room, 37 ft. by 10 ft. The second or upper floor is devoted almost entirely to art, and comprises an elementary art room, 37 ft. by 10 ft.; a figure and cast room, 33 ft. by 20 ft.; a modelling room, 20 ft. by 10 ft.; a painting room, 26 ft. by 18 ft.; classroom, 20 ft. by 16 ft.; and an art master's room, 21 ft. by 14 ft. 6 in. At present it is intended to omit the lecture hall, &c., at the back of the building, but it is hoped to complete the scheme at some future time. Mr. Silvanus Trevail, of Truro, is the architect. Mr. Goss, of Torquay, is the builder.

HESWALL TUBERCULOSIS HOSPITAL.—On the 20th inst. the new Tuberculosis Hospital at Heswall was opened. The firms who took part in the erection of the new hospital were as follows:—Architect, Mr. Charles H. Lancaster, Liverpool; clerk of works, Mr. C. P. Green, Heswall; builder, Mr. Thomas Spencer, Aintree; plumbing, Mr. W. Rain, Everton; plastering, Messrs. H. Johnson & Sons, Liverpool; hot-water apparatus, Messrs. Killick & Cochran, Liverpool; heating apparatus, Messrs. Bramham & Sons, Liverpool; general fittings, Messrs. R. Garnett & Sons, Warrington; key for opening by R. C. Oldfield, Liverpool.

MANCHESTER TECHNICAL SCHOOL.—The Manchester School of Technology has just been opened by Mr. Balfour. It has occupied seven years in the equipment and building, and a sum of 300,000l. has been spent upon it. The building has been erected from the designs of Messrs. Spalding & Cross, London, by Messrs. F. Neill & Sons, Manchester. It is constructed of terra-cotta and Accington brick in the French Renaissance style. In addition, a dyeing, bleaching, printing, and finishing house for textile goods, and for the manufacture, dyeing, and finishing of paper, is being erected close to the main building. The chief entrance is in Sackville-street, and beyond is a large entrance-hall, from which the main and two subsidiary staircases lead. The hall has an area of 4,000 sq. ft., and over it is an examination and lecture room, and over that again a chemical laboratory, both of corresponding size. The basement is a workshop for spinning and weaving, mechanical, steam, electrical, and hydraulic engineering, while elsewhere are other laboratories for instruction and research in other departments for one purpose of the school is not only to give instruction, but to facilitate study and investigation.

NEW VARIETY THEATRE, CHELSEA.—The foundation-stone of a new theatre of varieties, in Chelsea, was laid on Wednesday. The building, which is already far advanced, is situated in the King's-road, almost opposite the Town Hall. The theatre will have a seating capacity of about 2,000. It has a frontage of 106 ft. and a depth of 150 ft. The pit floor has been kept on the same level as the pavement in King's-road. The auditorium will be 64 ft. wide, 40 ft. from the front wall to the curtain line, and 30 ft. in height from the pit floor to the ceiling. The dimensions of the stage are 80 ft. by 31 ft., and the proscenium opening is 30 ft. in width. Mr. C. T. Kearley is the builder, and the architects are Messrs. Wylson & Long.

STAINED GLASS AND DECORATION.

NEW WINDOWS, STAINCLIFFE CHURCH.—Three stained glass windows memorial windows have just been erected in the chancel of Staincliffe Church, Dewsbury. The centre window illustrates the Resurrection, and the side windows are filled with groups of adoring angels. The work has been carried out by Messrs. Powell Bros., of Leeds.

WINDOWS AND SCREENS, UNITARIAN CHURCH, ROCHDALE.—New screens and windows have just been placed in this church. The screens are the work of Messrs. Harry Hems & Sons, of Exeter. Messrs. Hems & Sons are also at work upon a floor of coloured marbles for the baptistry, a marble base upon which to raise the archial font itself, and oak panelling, &c. A chancel window and a couple of smaller ones in the body of this church have recently been completed. The figures in the chancel window are 6 ft. in height, and represent Truth, Liberty, Knowledge, and Faith (all in the upper row); and those in the second row, Justice, Prudence, Love (represented as the Christ with pierced hands and feet), and Humanity. The figures are from the drawings of Sir E. Burne-Jones,

but the backgrounds are from the designs of Mr. Dearnley, principal artist to Messrs. Morris, of Merton Abbey, who have executed the three windows. The two smaller windows, the three-light window in the south aisle, contains figures by E. Burne-Jones of Faith, Charity, and Hope. The window at the west end of the south aisle contains figures of Martha and Mary.

ST. JOHN THE BAPTIST CHURCH, HOXTON.—This church was reopened on the 14th inst., having been decorated by Messrs. Campbell Smith & Co., and also restored, under the directions and superintendence of Mr. Reeves. Subscriptions are invited to make up a balance of 1,200l. to defray the total outlay involved, which amounts to 4,000l. The scheme of decoration comprises the painting of the ceiling in compartments with pictures of angels and other figures mentioned in the Apocalypse, upon a background of blue, and of the walls and galleries in a terra-cotta colour, with relief in gold; electrical lighting has also been installed. The church was built in the New North-road, at the corner of Pitfield-street, in 1825-6, and after the "Georgian" manner, for 2,000 sittings, with part of the 100,000l. voted for church building by the Parliament.

ST. PHILIP'S CHURCH, KENNINGTON.—St. Philip's Church, Kennington-road, is undergoing restoration. The interior has been decorated from designs supplied by Professor Beresford Pite. The work has been carried out by Messrs. Love & Co., decorators, Strand.

FOREIGN.

FRANCE.—A committee has been formed in Paris for the purpose of raising a monument to Zola. M. Charpentier has offered to execute gratuitously a statue of the eminent novelist, of whom he produced, two years ago, a remarkable medallion portrait.—A monument to Baudelaire is shortly to be inaugurated in the Mont-Parnasse Cemetery.—A room at the Trocadéro Museum has been devoted to the sale of reproductions of the plaster models in the galleries.—The Museum of St. Germain-en-Laye has acquired a collection of prehistoric drawings made on the bones of animals existing in the stone age.—The Government has voted 300,000 francs towards the restoration fund of Mont St. Michael.—M. Bouguin, architect, of Nantes, has been commissioned to restore the church of Ancenis, at an estimated cost of 400,000 francs.—The interesting Hôtel Maury, at Troyes, has been partially destroyed by fire. It is classed among the "Monuments Historiques." The tower has been entirely destroyed.—The Municipality of Paris is about to undertake, in concert with the Government, the restoration of the frescoes which decorate the porch of the church of St. Germain l'Auxerrois.—In the transepts of the Protestant church of the Oratory of the Louvre some mural paintings have been discovered, which were concealed under a thick layer of whitewash. One of the paintings appears to represent the conversion of St. Paul on the road to Damascus. The paintings appear to date from the seventeenth century.—A large square tower is to be erected on the quay at Bordeaux, intended to carry a marine observatory.—M. Dionis du Séjour, architect to the Government, and expert adviser to the Tribunal of the Seine, has died at the age of 61. He was also architectural inspector to the Odéon Theatre, and some years ago added to the additions to the Magasin du Petit-Saint-Thomas in the Rue du Bac.—The death is also announced, at the age of 84, of M. Jules Richomme, the painter. He belonged to a family of celebrated engravers. Having commenced his career as a portrait painter, he subsequently obtained a fresh success as a painter of historical and genre subjects. Among his numerous works may be mentioned the decoration of the Chapel of St. Vincent de Paul, in St. Severin; and the paintings in the Cour d'Assises of the Department of the Seine. He had received medals at various Salons, and in spite of his advanced age, exhibited two pictures at the Old Salon in the present year.

MISCELLANEOUS.

"EUBOLITH" FLOORING.—We have received a small sample of a flooring material under this name, made by the Eubolith Patent Flooring Co. It appears somewhat like a thin slip of wood laid on and incorporated with a backing of fine concrete. The material really consists, however, of a chemical compound of sawdust or wood "meal"; the top finish is like that of planed and dressed boarding, but it has the advantage of being jointless and free from splinters. The Eubolith Patent Flooring Co. is of opinion from the examination of a small sample, it seems to be a very useful kind of flooring. We cannot speak as to its wearing qualities, but the manufacturers enclose some testimonials, one of them from the owners of a cotton-spinning mill in Germany, which speak well of it in this respect. The testimonials, so far as it is possible to form an opinion from the examination of a small sample, it seems to be a very useful kind of flooring. We cannot speak as to its wearing qualities, but the manufacturers enclose some testimonials, one of them from the owners of a cotton-spinning mill in Germany, which speak well of it in this respect. The testimonials, so far as it is possible to form an opinion from the examination of a small sample, it seems to be a very useful kind of flooring. We cannot speak as to its wearing qualities, but the manufacturers enclose some testimonials, one of them from the owners of a cotton-spinning mill in Germany, which speak well of it in this respect.

THE SCOTTISH PRESBYTERIAN CHURCH, REGENT-SQUARE.—Last week was opened the new organ,

built by Messrs. Brindley & Foster, of Sheffield, which has been erected at a cost—including that of some minor alterations in the interior of the church—of about 1,500l. The church was built in 1824-5, after designs by William Tite, for Edward Irving's congregation, who migrated thither from the "Caledonian Church" established nine years previously in Cross-street, Hatton-garden. The design of the church is conspicuous for its two lofty twin towers, part of the principal front, which, it should be noted, is the west facade of York Minster. The fabric was renovated and enlarged forty-two years ago, when the style of the church was changed from the "National Scots Church" to its present designation.

PROPOSED BOROUGH HALL, LAMBETH.—The General Purposes Committee of the Lambeth Borough Council have opened negotiations for the purchase, at a price of 25,125l., of a site at the corner of Acre-lane, Brixton, and Brixton-hill, for the erection thereon of the proposed municipal buildings, to comprise offices, a council chamber, and a Town Hall, in lieu of their present unsuitable and confined quarters at Kennington Vestry Hall. The Finance Committee recommend that the Corporation should borrow 2,000l. and 1,200l. for the purchase of land in Raikes-parade for technical instruction and public library purpose; 2,300l. and 2,200l. for the erection of a branch reading-room and gymnasium at Revue; 760l. for the construction of a storm water sewer from Whitgate-lane, 4,033l. for works of private street improvements, and 1,000l. to borrow, at 4 per cent., for the purchase of land in Raikes-parade for technical instruction and public library purpose; 2,300l. and 2,200l. for the erection of a branch reading-room and gymnasium at Revue; 760l. for the construction of a storm water sewer from Whitgate-lane, 4,033l. for works of private street improvements, and 1,000l. to borrow, at 4 per cent., for the purchase of land in Raikes-parade for technical instruction and public library purpose; 2,300l. and 2,200l. for the erection of a branch reading-room and gymnasium at Revue; 760l. for the construction of a storm water sewer from Whitgate-lane, 4,033l. for works of private street improvements, and 1,000l. to borrow, at 4 per cent., for the purchase of land in Raikes-parade for technical instruction and public library purpose; 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The jury returned a verdict of "Accidental fire," and regretted that the foreman omitted to take the necessary precautions to see that the fire was taken down in a workmanlike manner.

LIGHTING, HEATING, AND SMOKE ABATEMENT. Lighting, Heating, and Smoke Abatement Exhibition at the Crystal Palace is to be opened on Monday, December 13, for five weeks. Preparations for a representative display were commenced some two months ago, and we are informed that the forthcoming exhibition will cover a much wider area than its precursor of last year, and at the same time include all the latest and most recent improvements in gas lighting and heating. The most important new feature of the exhibition will be the coal smoke abatement section, which is being organised under the patronage of the Coal Smoke Abatement Society; and the Society are offering a prize of 50*l.* for the best domestic open grate which, in the opinion of a jury to be appointed by Sir William B. Richmond, President of the Society, is capable of consuming its own smoke. The exhibition will be situated in the Centre Transept. It is a further space in the building will be set aside for the purpose of completing the various departments in operation. There will also be sections illustrating gas engineering, electricity, and acetylene.

FOREIGN GOODS AND PARCELS RATES.—Messrs. Hale & Wilkinson send us a pamphlet containing a list of the rates for conveyance of goods and parcels to all parts of the world. The principles are abroad are alphabetically arranged under their respective countries.

LANDUDNO PROMENADE SEA DEFENCE WORKS. On the 16th inst. Colonel A. G. Durnford, an Inspector of the Local Government Board, held an inquiry with reference to an application by the Ban District Council of Llandudno for sanction to borrow money for the purpose of completing the sea defence works in Llandudno Bay. Plans and estimates were submitted by the engineer, Mr. E. P. Phipps.

TELESCOPIC SCAFFOLDS.—Several Royal residences and Government buildings have recently been supplied with Heathman's patent telescopic ladder towers, for use as portable scaffolds. Fifty feet in height, they are made of the best material, and are acted after two months' critical examination and testing. At Windsor Castle two sets are in continuous use in one or other of the State apartments for cleaning the decorations on the walls and ceilings.

AUSTRALIAN SOFT WOODS.—The heavy timbers which Australia is so rich to have become famous for their strength and durability, but comparatively little is known outside the Commonwealth of the numerous soft woods admirably adapted for the manufacture of furniture and for other industrial purposes. Such timbers are abundant in New South Wales, and are found principally in the immense brush forests of the south-east. Several of these timbers are of a fine wood grained and marked most beautifully, and capable of receiving the highest polish, while others are fragrantly perfumed. Among the chief varieties of woods of this class may be mentioned the red cedar, the beautiful pod of which is admirably adapted for the finer kinds of cabinet-makers' work. Some of the cedar is of value to the timber trade as much as 2,500 cubic feet of valuable timber having been obtained from one tree. In addition to the cedar may be mentioned tulipwood, yellowwood, maple, myrtle, arbutus, mack, orange, and many others. Besides their use for cabinet-making, many of the soft timbers are of great utility for the rougher kinds of carpentry, while some, both hard and soft woods, are admirably adapted for coach-builders' and coopers' work. The chief description of pine growing in New South Wales is the Moreton Bay white pine, found in the coastal districts, as far south as the Bellingen. It is soft, light, and easily wrought, and suitable for the construction of houses as well as for cabinet-making. The red or black pine is extensively distributed over the Liverpool Plains, and in the Lachlan and Darling River districts, as well as around Berrima. It is beautifully marked in the grain, takes a fine polish, and has an agreeable appearance. There are numerous other varieties of pine, but the most valuable in the main features have been already described. Australian deal is an excellent timber, and is obtained in very large scantling, the tree frequently reaching 120 ft. in height. It is soft, close-grained, easily wrought, and remarkably free from knots.

LUXULION CHURCH BELLS.—Mr. Sylvanus Reval, the architect, has presented a pair of six bells to the Luxulion Church, three of them being one recast, and three new ones, the work of Messrs. Gillett & Johnston, of Croydon. The bells are dedicated on Tuesday, the 14th inst., amid a large gathering of representative people of the neighbourhood.

BOARD OF EDUCATION, SOUTH KENSINGTON.—The results of the examination for admission to National Scholarships (Art) and Free Studentships (Architecture) have been awarded for the year 1902:—National Scholarships—H. C. Smith, Dundee; A. Treganowan, Cambourne; Annie M. Shepherd, Aberdeen; J. Stoope, Belfast; G. Bain, Edinburgh; W. A. Wildman, Manchester, Municipal S.

of A. Free Studentships.—N. R. Hall, Leeds; O. Schwemmer, Manchester, Municipal S. of A.; W. McBride, Dublin; F. P. Brown, Stoke-on-Trent; F. Lightowler, Manchester, Municipal S. of A.; Sidney Boyes, Southampton; G. J. Mitchell, Dundee; J. R. Shea, Burnley; H. A. Budd, Hanley; J. R. G. Exley, Skipton; Annie W. Morton, Edinburgh; W. M. Whitehead, Burnley; J. Gibson, Bury; N. M. Morrow, Belfast; Annie R. Hetherington, Glasgow. A National Scholarship entitles the holder to an allowance of 25*g.* a week for the session of about forty weeks each year for two years, free admission to lectures and one or more of the technical classes, and instruction in one of the four schools of the College. A Free Studentship entitles the holder to free admission for two years to the lectures and instruction in one of the four schools of the College.

NEW ELECTRICITY STATION, WORCESTER.—A new station has been erected for the Worcester Corporation, overlooking Hylton-road, Worcester. The building has been erected from the plans of Mr. A. B. Rowe, and it is estimated to cost, including site and plant, 30,000*l.* The electrical engineer is Mr. Sutcliffe.

PROTECTION OF THE MANSION HOUSE FROM FIRE.—As a result of the Queen Victoria-street and other City fires the Corporation has decided to reorganise the fire protective arrangements at the Mansion House, and Messrs. Shand, Mason, & Co., of Blackfriars, have been entrusted with the work of providing a complete system of fire-mans and hydrants, with hose and all up-to-date accessories. The mains connect with the water company's 10-in. high-pressure supply, and are carried from the basement to the roof of the Mansion House, both at front and rear, with hydrants and hose attachments placed ready for use in case of an emergency on every floor. When the work is finished the Mansion House domestic staff will, no doubt, be thoroughly drilled in the use of the appliances.

"A BUILDING SITE IN BLOOMSBURY."—In reference to the Note under this title in our last issue, Mr. Delissa Joseph writes to say that it is not quite correct that the site is to be let on building leases by the City Corporation; that it has been let on a building lease to a client of his, who is building shops and warehouses from his designs.

LEGAL.

EMPLOYERS' LIABILITY ACT:

WAS A SCAFFOLD NECESSARY?

At Marylebone County Court (London), on Monday, before Judge Stonor and a jury, William George Pearce, a bricklayer, 14, Crawford-buildings, Marylebone, W., brought an action, under the Employers' Liability Act, against Messrs. Robertson & Sons, builders and contractors, 141, Edgware-road, W. The plaintiff claimed damages in respect of personal injuries said to have been caused through negligence on the part of the defendants or their servants.

Mr. W. Given, counsel, appeared for the plaintiff, and Mr. W. Shakespeare, counsel, for the defendants.

Counsel for the plaintiff explained that on May 8 last his client was assisting in removing a large and heavy bressmer from above some stable doors in Wood's-mews, off Park-lane, W. Plaintiff advised the foreman to erect a scaffold so that there might be no danger in lowering the huge bulk of timber, but the reply was, "Don't mind a scaffold—steps will do this job." The plaintiff accordingly mounted a pair of steps and commenced pulling one end of the bressmer, while a man named Tennant, who was acting as foreman on the job, pulled the other end. Suddenly the bressmer "gave a jerk," and plaintiff fell heavily to the ground. For five weeks the unfortunate man was confined to his bed with a broken leg, and for fifteen weeks was unable to do his ordinary work. The plaintiff bore out his counsel's opening statement.

Cross-examined: The bressmer was only about 9 ft. above the ground. He himself had cut away the brickwork before they commenced to remove the bressmer, and for this purpose he used only a pair of steps, which, however, he tied. There was nothing to prevent him tying the steps when they were removing the bressmer, but he did not ask for anything with which to tie them. The steps upon which he had been working did not fall, but he lost his balance. It was not a fact that the crowbar which he was using slipped from his hold and so caused him to fall back.

Mrs. Pearce, the plaintiff's wife, stated that Mr. James Robertson called to see her husband the day after the accident, and in course of conversation said, "That's the worst of Tennant; he won't have a scaffold put up."

Mr. Henry George Blackmore, a builder, Clapham, stated that he had viewed the job in question, and considered that a scaffold was necessary to do the work with safety.

Mr. James Robertson, of the defendant firm, stated that before the plaintiff commenced the work in question witness told him to use all the scaffolding which might be necessary. Witness was superintending the work in question, and not Tennant, who was shop foreman of the joiners.

George W. Tennant, referred to above, said that he was a carpenter, and that the plaintiff was not under him in any way on the job. It was not a fact that the bressmer was jerked.

Alexander Houghton, an apprentice, stated that a lever which the plaintiff was using slipped, causing the man to overbalance.

His Honour submitted several questions to the jury, and their answers gave rise to the question as to which side their verdict was in favour of, and for whom judgment should be entered. His Honour reserved leave for the point to be argued by counsel on another occasion.

CASE UNDER THE LONDON BUILDING ACT.

At the Bow-street Court last week, Samuel Polden, builder, of Woodstock-road, Uxbridge-road, was summoned before Mr. Fenwick for contravening the London Building Act.

Mr. Hayward, who prosecuted for the London County Council, said the defendant was erecting a large building at 116, High Holborn, the basement to be used as shops and the four upper floors as flats. The Act required that in every such building, if it exceeded ten squares in area (1,000 superficial feet), the different parts should be separated by walls and floors of fire-resisting materials, and have staircases and passages constructed in a similar way. In the building in question there was a staircase about 3 ft. wide made of deal. It stood upon a deal post, was some distance from the door, and there was an awkward bend. To bring the building within ten squares the defendant had built up two vaults, but even now it was not within ten squares. He (Mr. Hayward) considered the place a perfect fire-trap. Even with the vaults built up the danger was as great, and he wanted to relieve himself of the responsibility. For the defence it was contended that the building was now within ten squares, but admitted that if a staircase which was to be erected outside was included that measurement would be exceeded.

Mr. Fenwick reserved his decision.

SURVEYORS' FEES.

At the Southwark Police-court, on Friday last week, before Mr. Paul Taylor, Mr. W. R. Hough, builder, of 135, Great Suffolk-street, Borough, was summoned by Mr. Bernard Dicksee, District Surveyor, for the recovery of 1*l.* 10*s.* 6*d.* in respect to surveying a stand erected at 283, Borough High-street, for the purpose of viewing the proposed Coronation procession on June 27. Mr. Pasmore was solicitor for Mr. Dicksee, and Mr. H. Brandon, barrister, defended.

The defendant was before the Court on June 19, on the summons taken out by Mr. Dicksee for failing to give the notice required by the London Building Act, 1894, and the magistrate then decided in favour of the complainant.

Mr. Pasmore was opening when Mr. Brandon was asked by the magistrate what his defence was. Mr. Brandon said he felt that on the last occasion Mr. Paul Taylor was bound to convict. He was now arguing this case on fresh ground—that this was not a proper case in which a District Surveyor might have inspected. Section 5 of the London Building Act, 1894, made it compulsory to apply to the Borough Council for the licence to erect the stand instead of getting it direct from the District Surveyor. This was a small stand, and they had to deposit the plans with the Borough Council, who passed them; and they had to pay the fees to them before they would grant the licence. Then the District Surveyor came along and demanded his notice, so that the poor builder was like a rope, the Borough Surveyor pulling at one end and the District Surveyor at the other. It could not be a proper case for a District Surveyor to inspect a stand in a shop window with accommodation for about fifty persons when it had already been tested by Mr. Harrison, civil engineer, who was the Surveyor to the Southwark Borough Council. The case came within the words of the Lord Chief Justice in the City of Westminster v. Watson and Others, 1902:—"If in a proper case a District Surveyor, for a good cause on information received, had a duty to inspect in order to see whether any contravention of the Act had been infringed, he would be entitled to his fees, but he did not suggest that the District Surveyors would be entitled to claim fees in respect of every one of these structures because they had certain duties under the Act." Mr. Justice Channell said: "If in any case the surveyor did inspect properly, and not go for the purpose of getting his fee, he would be entitled to his fee." In this case he, Mr. Brandon, suggested that it was not a proper case, and that the District Surveyor inspected for the purpose of getting his fee.

Mr. Pasmore said that the only duties of the London County Council which were handed over to the London Borough Councils under the London Building Act, were those in connection with the licences of wooden structures, and in the section giving them that power no mention whatever was made of the District Surveyor. The District Surveyor had just the same powers as formerly, and the Act of Parliament very distinctly said that he should inspect in all cases where he had received

notice or made a discovery. In this instance the Magistrate had made an order for the defendant to give Mr. Dicksee notice. Mr. Dicksee was bound to inspect, and surely he was entitled to his fees.

Mr. Paul Taylor: I cannot refuse to make the order for payment without nullifying my decision in June last.

Mr. Brandon argued that the magistrate had power to do so because it had been decided in the case referred to that it did not follow that because a District Surveyor had received notice he was entitled to his fees.

Mr. Dicksee, in giving evidence, said that when he inspected the stand, three weeks after the plans had been passed by the Borough Council, he found that the supports to the seats were resting upon the floor parallel with the joists instead of upon them, so that the whole thing was liable to crash through the floor. He pointed this out to Mr. Hough, and the matter was remedied.

Mr. Paul Taylor said that it had been suggested that the proper way for the London County Council to meet the difficulty was to reduce the scale of fees in certain cases. Mr. Justice Channell said: "The proper way for the County Council to meet the case was that, as the operation of taking away the licence from them was very greatly to diminish the duties which would likely fall on the District Surveyors, the County Council should make a direction, under Section 154 of the Act, imposing a smaller fee to be given to the District Surveyor in cases where the structure was licensed by the County Council. It must not be forgotten that if the Surveyor was not entitled to his fees he would lose a very considerable part of his income by reason of the provisions of an Act of Parliament which never in so many words authorised the creation of the Borough Surveyor. At present he was of opinion that the contention of Mr. Pasmore, that the Borough Council in appointing the Borough Surveyor to test wooden structures were going beyond the powers conferred upon them, was a sound one. He was of opinion also that every case of a wooden structure was a proper one for inspection by the District Surveyor, unless it was of an obviously trumpery, trivial nature. He would enforce payment of these fees, and would go on doing so until it was proved that the District Surveyor is doing that which he has no power to do.

Mr. Brandon asked the magistrate to state a case. Mr. Paul Taylor said that the only point upon which a case could be stated was whether or not within the meaning of the judgment in the City of Westminster v. Watson and others this was a proper case. He, however, was distinctly of opinion that this was a proper case.

Mr. Brandon: Although he had previously paid a fee?

Mr. Paul Taylor: If it is necessary to find it I find as a fact that it is a proper case.

Mr. Pasmore pointed out that if the London County Council reduced the scale of fees they would have to grant the District Surveyors compensation.

Mr. Paul Taylor ordered the defendant to pay 12. 10s. fees and 3d. 3s. costs.

MEESON v. HANDOVER.

THIS case was tried at Marylebone Police-court on the 21st inst., before Mr. Plowden.

Upon receiving a complaint, the District Surveyor for Paddington on the 16th inst. discovered that Messrs. W. H. Handover & Son were constructing in the great and small halls at the Paddington Baths floors for winter entertainments. These floors and the framings for their support occupied the space of the swimming baths usually filled with water, the floors being level with the side walks. The defendant had been instructed not to give notice to the District Surveyor, who now sought a penalty for neglect of notice.

Mr. Miller Jutsum, for the District Surveyor, contended that the works were floors of a public building, and under Section 78 were to be constructed in the manner approved by the District Surveyor.

For the builders, it was said that the erections were governed by the case of Venner v. McDonnell, which had reference to seating at the Agricultural Hall, and the District Surveyor was not entitled to notice.

The magistrate approved the distinction drawn by Mr. Jutsum between the floors of the baths and the seating of the Agricultural Hall, and thought the case too clear for argument. He fined the defendants 10s. and 2s. 2s. costs.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

12,764.—A KILN FOR DRYING AND BURNING BRICKS: G. Oakland, E. Oakland, and S. Oakland.—There are two rows of chambers that are joined with openings and have a main flue between them; the openings are closed for the drying process. Heated air is drawn through a pipe beneath the floor, and thence through branch pipes into the chambers, and also through other pipes joined to the main flue.

12,773.—AN ELECTRICITY-ENERGY METER: Y. Baile and J. Bueno.—In order to reduce the loss of energy the eleven coils forming two paths of the long drum armature of a commutator motor meter have brushes at 90 deg. apart, to furnish a four-pole armature in the fields of two rectangular main current coils, whereof the sides are disposed symmetrically about the armature. A German-silver resistance between the supply mains connects the silver brushes in series. The segments of the silver commutator are secured with hot shellac and threads to a hard fibre tube, which is put together with two ebonite discs that carry the armature windings upon a copper tube fastened upon a steel spindle. A copper disc that moves in the field of a permanent magnet retards the turning of the spindle, which has a sapphire bearing, and is joined by two worm gears to a counter, of which the parallel number-discs are joined with spur-gearing. Brass holders carry the field coils, which, as well as other parts of the meter, are sustained in a frame of aluminium alloyed with 10 per cent. of copper, and fitted with a cover of zinc.

12,797.—DRYING KILNS: T. Larkin.—In the case of kilns for drying meat, the inventor separates the drying-chamber from the heating-chamber, and supplies heated air to the former through pipes that traverse the latter and have openings into the space beneath the perforated floor of the drying-chamber.

12,835.—LIFTING APPARATUS FOR USE WITH CRANES: Stohrer & Co. K. Stohrer.—A friction clutch connects the winding drum to the shaft, which is worked with electrical power, and a magnet, which is regulated by the lever that controls the motor serves for the working of the clutch, which should be after the coil kind. The circuit is closed by the first motion of the motor lever; when the magnet is de-energised, a spring opens the clutch again.

12,869.—SAFETY APPLIANCES FOR LIFTS, HOISTS, MINE-CAGES, &c.: J. F. Lee and H. Graves.—Two projections are formed upon segmental bodies arranged in the sides of the well or shaft. In each instance one projection is set higher up than the other, so that as the bottom of the cage wipes over the tapered surface up to the higher projection, the contrivance will be turned to cause the lower projection to extend underneath the cage and hold it up in the event of an accident. The inventors describe the contrivance as being especially available for automatically-detaching apparatus used in mines.

12,877.—A HAND MORTISING MACHINE: J. Bradbury and J. Bradbury, T. Bradbury and G. E. Bradbury.—For adjusting the bolt-hole to meet differences in the thickness of the wood it is worked with a rack upon the slide and a pinion which is joined to the hand lever; the axis of the pinion carries a plate from which are projections that engage with notches cut in a vertical slot in the machine frame which, together with the projections, serve for the setting of the slide at the height desired.

12,896.—ELECTRICAL COUPLINGS: W. G. Stokes.—The clamp that holds the conductor is held by the cover of the rose in such a manner as to enable one to adjust the length of the conductor of a hanging lamp and to afford relief for the electrical connexions from the pull upon the conductor; the parts of the clamp, being of some non-conducting materials, are rivetted or bolted to one another, and the bolt and wire serve to prevent disconnection between them.

13,001.—PREPARATION OF LIME: C. J. Haines.—Chalk or some such binding material is mixed with calcium carbonate derived as a by-product in processes for softening water, and with coke or furnace breeze, in parts of about 8, 90, and 2 per cent. respectively. The compound is then ground and dried, and burned in a rotary kiln, or as though it were a cement, or is fashioned into blocks to be burned in a lime-kiln.

13,008.—CONSTRUCTION OF WALLS: A. Lugino.—Temporary supports which constitute recesses or grooves for the finishing-coat of plaster are devised for the erection of walls of concrete or mortar in position. In one adaptation are employed metallic plates, having handles and tapered rhomboid-shaped projections, which are bolted at their corners on to slotted uprights. In another form a flexible screen is built up with parallel iron bars secured to one another by wires, and is laid between the ceiling-joists and the floor.

13,015.—CRAMPS FOR USE BY JOINERS AND OTHERS: A. Markart.—A clamp for use in fixing flooring-boards and similar purposes has a screw on which is mounted a pressing-head to be adjusted with a nut provided with ratchet teeth for engagement with the pawl of a lever-handle, spiked hooks secure a piece to the joist or other member, and the nut is caused to press against the piece.

13,019.—AN APPLIANCE FOR TRAPS, MANHOLES, &c.: W. Gregory and W. E. Mortimore.—The inventors contrive that a box shall be hung in the frame by means of its flange which is suitably sealed, for purposes of ventilation they provide apertures in the sides of the box and fit flap-valves against the openings.

13,025.—A DOUBLE-JOINTED SPRING HINGE: E. Bommer.—In order to obviate sagging is devised a hinge having two spiral-spring joints and with a webbed connexion between the barrels, the flaps being secured to the jamb and the door respectively, and also to the pintles, a link whereof the length

equals the distance between the pintles, joins together the upper corners of the flaps, whereby sagging is prevented, and only one joint of the hinge will be in play at any one time.

13,028.—AN AUTOMATIC ARRANGEMENT FOR DOORS AND GATES: P. Sesino and L. Zamboni.—As one treads upon a spring he will open the door or gate that is to be closed with a spring. For double doors a wedge which is joined to the free end of the plate, forces a sliding bar aside as the weight depresses that end of the plate; racks upon the bar are set in gear with pinions upon the pivot of the door which will thus be opened; then the spring as it draws back the bar closes them, the wedges force the bar in opposed directions, a tread-plate being set on each side of the doors.

13,035.—FLOOR, STAIR, AND SIMILAR TREADS: J. S. Gabriel.—For a renewal of any part of the tread is employed a slotted clamping-plate and trough-shaped and T-bars, which retain wedge-shaped leaden bars in position. In another form rods that are clamped between plates screwed on to the floor or stair hold leaden lengths, the first row of the latter being held with a nosing or strip.

13,036.—PLASTERING: J. S. Macdonald and J. Macdonald.—A plunger, worked with cam gear double pressure to the plastic clay or dust, whilst a plunger beneath ejects the tile, being worked with an eccentric that is pivoted on to a slotted and sliding link, a slotted lever which is pivoted to the rod of the plunger being moved by the link, springs press the upper plunger against the cam. An eccentric and a bell crank lever operate the plunger and the rocking beam that is linked to the sail mechanism by means of a cord. Under normal conditions the sails are at work, but as water flows from the tank into the receiver the beams will be tilted and the sails will be turned into the non-working position.

13,152.—MEANS OF HEATING AND VENTILATING BUILDINGS: J. S. Macdonald and J. Macdonald.—The invention, covering several modifications, consists in the use of air which is heated in a chamber by coils of hot-water pipes, the water flowing downwards, and of fibrous material wetted with steam-jet carried by water-troughs which moisten the air. In one form the chamber contains three helix-coils joined to pipes that lead to the upper and lower water-ports of the boiler. The troughs act as a safety-pipe or for relief of pressure, as well as for the escape of steam or air. The bands of fibre which moisten the hot air as it flows upwards through the heater are laid around tanks in the heating-chamber, and are disposed underneath tanks in the water.

13,154.—LIME AND CEMENT SHAFT-KILNS: W. J. H. Roberts.—A shaft-kiln has an inner calcining-chamber, the lower cooling-chamber shaped so as to be wider downwards and then contracted; draw-holes with hanging-bar gratings are set around a cone at the bottom of the kiln which has a hood made of bars covered with metal lathing coated with mortar. At the base of the hood are the charging-holes, and the body of the kiln has the wall has an air-space. In order that the calcining-chamber may be readily reined, fireclay blocks are laid in courses whereby one can renew the lining upon one side of a course at a time. The fuel is fed in a layer into an annular trough of slats without taking up the middle of the kiln or touching its walls.

13,173.—BATHS (DOMESTIC) AND THEIR FITTINGS: J. Shanks.—In one corner of the bath outside the canopy which carries the spray-tubes is arranged a recessed chamber for the outlet, which is enclosed by a flange that acts as a socket for the flange of the trap. In another form a spigot that enters a socket upon the trap is provided. On the socket is bolted a flanged ring which compresses the packing. Confer also No. 25,704 of 1899 for the bath, of which the tops of the sides are sloped.

13,226.—STAGING AND SCAFFOLDING: S. Mingau.—The sections of the uprights are joined endwise together by means of flat iron bars clamped in grooves in the sections with screws inserted through straps. Perforated bars pivoted on to adjustable screws and telescopic struts fasten the uprights to the wall out of the way, or they may be fastened with chains. Brackets that slide in guides in the uprights, and are hoisted with tackle, carry a movable platform or stage, and have projection teeth to obviate displacement of the put-logs.

13,237.—MANUFACTURE OF CEMENT PIPES: G. Neuhaus.—For making pipes with embedded mesh-work a layer of the cement is poured into the mould, a groove is stamped in the layer for taking the meshing, and then a forked stamper that will project over the mesh-work is used for stamping in the further supply of cement on the sides of the iron mesh-work.

13,271.—SCHOOL-ROOM PARTITIONS: H. Addison.—On the floor level is a rounded rail that carries central lever rollers for the running sections of leaves of the partitions that are also supported with upper rollers that run upon rails of moulding secured to a girder, roller-brackets joined to the sections with screwed pivots enable one to fold

sections against the wall, and when they are swelled the rollers will pass by slots in the mouldings which are pressed against by guide-rollers fastened on to the sections.

13384.—SPIGOT-AND-SOCKET JOINTS AND PIPE COUPLINGS. S. C. BULLION. Of a pair of tubular interlocking pieces the spigot-piece is fashioned with projections that engage with a groove around the socket-piece, the joint is packed with a ring of rubber or a cup-leather in the groove in the socket, a bend in the ring serving for the passage of the filling. For completing the joint one turns the pieces round and pulls them lengthwise when the spigot has been inserted until engagement is effected between stops and the projections from the spigot-piece.

MEETINGS.

FRIDAY, OCTOBER 24.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. A. W. Harris on "Water: Composition, Pollution, and Purification." 7 p.m.

Institution of Junior Engineers.—Annual general meeting at the Westminster Palace Hotel. Council's report and accounts, election of officers, &c. 8 p.m.

SATURDAY, OCTOBER 25.

The Craft School, Globe-road, E.—Mr. H. H. Coughane, F.R.S., on "The Art of Enamelling," with practical experiments. 8.30 p.m.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at Southwark and Vauxhall Waterworks, Hampton.—2.30 p.m.

MONDAY, OCTOBER 27.

London Institution.—Right Hon. Lord Avebury, F.R.S., on "The Scenery of England and the Causes to which it is Due." Illustrated. 5 p.m.

TUESDAY, OCTOBER 28.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. H. R. Kenwood on "Elementary Statistics." 7 p.m.

WEDNESDAY, OCTOBER 29.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—1. Inspection at L. C. C. Common Lodging House, Parker-street, Drury-lane, W.C. 3 p.m. 2. Mr. J. Wright Clarke on "Details of Plumbers' Work." 7 p.m.

THURSDAY, OCTOBER 30.

Institution of Builders.—Dinner, "Walnut Rooms," Grand Hotel, Charing Cross. 6.30 p.m.

Institution of Junior Engineers.—Visit to the headquarters of the Electrical Engineers (R.E.) Corps of Volunteers: Demonstration with searchlight apparatus, &c.

Sanitary Institute (Lectures for Sanitary Officers).—Demonstration of Book-keeping as carried out in a Sanitary Inspector's Office: (Parkes Museum), by Mr. A. Taylor. 7 p.m.

FRIDAY, OCTOBER 31.

Architectural Association.—Conversation, Royal Academy of Painters in Water-Colours, Piccadilly, W. 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor R. E. Smith on "Building Materials." 7 p.m.

Institution of Mechanical Engineers.—An extra meeting on the discussion upon the following paper will be continued: "Oil Motor Cars of 1902," by Captain C. C. Longridge. 8 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

October 1.—By STEPHENSON & ALEXANDER (at Cardiff).
 Vynnybywl, Glamorgan.—The Vynnybywl Inn and 2 a. 3 r. 12 p. f. £2,900
 Freehold shop and o. a. 1 r. 12 p. f. 300
 The Old Mill, with house and o. a. 1 r. 7 p. f. 220
 Brynffynon-ter, &c., &c. 4 a. 4 r. 19 p. 5 d. re-versions in 938, 910, and from 95 to 71 yrs. (in lots) 1,262
 October 9.—By CHESHIRE, GIBSON, & CO. (at Birmingham).
 Temple Balsall, Warwick.—Balsall Farm, 25 a. 2 r. 20 p. f. 1,475
 Two cottages and 3 a. 1 r. 25 p. f. 360
 Five freehold enclosures, 10 a. 0 r. 29 p. 785
 Two freehold fields, 5 a. 0 r. 22 p. 785
 Freehold cottage and o. a. 1 r. 22 p. 570
 Henley-in-Arden, Warwick.—74, High-st. (S), f. 360
 By STEPHENSON & ALEXANDER (at Pontypriid).
 Llanwit Vardre, Glamorgan.—Cross Inn and blacksmith's shop adjoining, u. 31 yrs., g. r. 12, 12 a. 6 d. 500
 The Fox and Hounds Inn, u. 32 yrs., g. r. 14 108, y. r. 101 500
 Pontypriid, Glamorgan.—The Trillwyn, The Ivor Arms p-h, u. 28 yrs., g. r. 41 48, y. r. 1204 4,000
 Trillwyn, The Bunch of Grapes Hotel, u. 18 yrs., g. r. 51 108, y. r. 1204 3,250
 Trillwyn, The Llanover Arms p-h and shop adjoining, u. 5 yrs., y. r. 1204 500
 Penryn, Glamorgan.—The White Rock Hotel, u. 84 yrs., g. r. 134, y. r. 1204 6,150
 Treaham, Glam.—The Treaham Hotel, u. 62 yrs., g. r. 34 128, 10 d., y. r. 2001 8,700
 October 10.—By MORRIS, MANMALL, & POOLE (at Bishop's Castle).
 Churchstoke, &c., Montgomery.—The Pentre Farm, 23 a. 1 r. 30 p. f. 4,650
 Enclosure of arable, 7 a. 3 r. 21 p. f. 150

Hill pasture land, 29 a. 0 r. 38 p. f. 4,360
 Church Sretton, Salop.—Queensbatch Corn Mill and 9 a. 3 r. 25 p. f. 1,100
 Mainstone, Salop.—Hatfield Cottages (two), with workshops and land, &c., &c. 3 r. 20 p. f. 600
 Worthen, Salop.—New Mills House and 13 a. 3 r. 23 p. f. 510
 Bishop's Castle, Salop.—High-street, house and business premises, &c., &c. 3 r. 20 p. f. 140
 October 11.—By STRENUM & ALEXANDER (at Cardiff).
 Llanwit Vardre, Glam.—Maesteg Farm, 30 a. 2 r. 12 p. f. (including minerals) 2,500
 Llantrisant, Glam.—Tafelod, two building sites, 5 a. 0 r. 10 p. f. 405
 October 13.—By L. CAVY & CO.
 Notting Hill—25, Silchester-rd. (S), u. 60 yrs., g. r. 71 78, y. r. 451 130
 Paddington—2, Brindley-st. (S), u. 42 yrs., g. r. 61 66, w. r. 341 45 8d. 170
 Kensal Town—162, Prince of Wales-rd. (S), u. 45 yrs., g. r. 51, y. r. 451 365
 By WHITLEY & CO.
 St. Pancras—27, Werrington-st., u. 47 yrs., g. r. 104, w. r. 145 385
 October 14.—By COCKERT & HENDERSON.
 Broadstairs, Kent.—North Foreland, North Foreland Lodge and 5 a. 3 r. 30 p. f. 5,630
 By LUBERMAN, TWEED, & CO.
 Westminster—43, Old Queen-st. (S), f. y. r. 701 1,900
 South Woodford—Woodford-rd., Trefula and 2 a. 0 r. 12 p. f. 4,500
 By KNIGHT, FALK, & RUTLEY.
 City of London—25, Silver-st. (business premises), f. y. r. 601 1,010
 Gray's Inn-rd.—No. 52 (business premises), f. p. 4,250
 By MULLITT, BOOKER, & CO.
 Paddington—13, Westbourne-ter., North, u. 56 yrs., g. r. 101, y. r. 501 400
 October 15.—By BAXTER, PAYNE, & LEPHER.
 Heston, Kent.—Main-rd., three plots of land, 3 a. 0 r. 7 p. f. 300
 New-rd., two plots of land, 1 a. 3 r. 32 p. f. 140
 By HAROLD GRIFIN.
 Gray's Inn-rd.—9 and 10, Wyllie-st., u. 16 yrs., g. r. 111, y. r. 1051 730
 Wimbledon—306, Haydon-rd. (S), u. 86 yrs., g. r. 101, y. r. 501 480
 By DOUGLAS YOUNG & CO.
 Clapton—196, Brooke-rd., f. y. r. 461 780
 Tottenham—32, The Avenue, u. 701 yrs., g. r. 128, y. r. 321 225
 Walthamstow—34 to 52 (even), Castlebury-rd., u. 962 yrs., g. r. 441, w. r. 2831 8s. 1,760
 October 16.—By CHESTERTON & SONS.
 Crouch End—2, The Pavement (S), f. y. r. 601 840
 Balham—2, Grand Parade (S), f. y. r. 801 1,560
 Putney—4, Railway-ter. (S), f. y. r. 1001 2,220
 156, High-st. (S), f. y. r. 1201 3,010
 Hackney—Mar-st., The Flying Horse p-h, freehold rental of 1201, reversion in 25 yrs. 145 and 147, Mare-st., a freehold building site. 640
 Kensington—3, Berkeley-gdns., f. y. r. 1001 2,010
 26, Holland Villas-rd., f. y. r. 1401 2,500
 Bethnal Green—24, Bethnal Green-rd. (S), f. y. r. 2501 4,000
 47, Bethnal Green-rd. (S), f. y. r. 1401 2,500
 Baywater—121, Westbourne-gr. (S), f. y. r. 371 7,510
 City of London—7, Charterhouse-st. (business premises), u. 52 yrs., g. r. 801, y. r. 2801 2,600
 Crouch End—Palace-rd., range of stabling, yards, &c., u. 61 yrs., g. r. 151, e. r. 951 460
 By VINCENT S. LEIGH.
 Hackney—20 to 22 (even), Trearavest, and 58 to 76 (even), Temple-st., w. r. 4301 also i. g. r. 31, u. 3 yrs., e. r. 561 360
 Tottenham—378, West Green-rd., u. 20 yrs., g. r. 41, y. r. 361 110
 By F. G. WHARTON & SONS.
 Fulham—9, The Broadway (S), u. 601 yrs., g. r. 251, y. r. 2751 4,500
 Stratford—High-st., i. g. r. 561, u. 73 yrs., g. r. 331 330
 By DEARSON & PENNY.
 Kensal Rise—66, Greyhound-rd., u. 79 yrs., g. r. 51 18, w. r. 351 161 205
 Harlesden—1 to 15 (odd), Mordant-rd., u. 91 yrs., g. r. 301, w. r. 2181 8s. 1,260
 70 to 80 (even), Carlyle-av., u. 97 yrs., g. r. 301, w. r. 2181 8s. 1,260
 56, 58, 60, and 78, Buckingham-rd., u. 80 yrs., g. r. 201, w. r. 1741 48 1,005
 17, Bolton-rd., f. y. r. 361 400
 138, Manor Park-rd., u. 84 yrs., g. r. 61 108, y. r. 341 315
 13, 15, 17, 19, 29, and 31, Greenhill-pk., u. 75 yrs., g. r. 431 108, y. r. 241 2,265
 Willesden—38 and 40, Bourne-rd., u. 81 yrs., g. r. 101, w. r. 581 108 325
 110 and 112, Minet-av., u. 88 yrs., g. r. 121, y. r. 821 670
 37, Haver-rd., u. 86 yrs., g. r. 51, y. r. 421 315
 22 and 24, Queen's-rd., u. 84 yrs., g. r. 81 8s., w. r. 621 8s. 315
 Harlesden—14, Bramshill-rd., u. 83 yrs., g. r. 74, y. r. 401 380
 By NEWSON, EDWARDS, & SHEPHERD.
 Islington—St. Paul's-rd., &c., i. g. r. 1101, u. 21 yrs., g. r. 111 8s. 6d. 1,330
 15, Compton-ter., u. 15 yrs., g. r. 111, y. r. 601 405
 Highbury—24, Aberdeen-rd., u. 55 yrs., g. r. 91, y. r. 501 815
 Kensal Town—77, Dartmouth Park-rd., u. 701 yrs., g. r. 61 128, y. r. 651 560
 21, Dartmouth Park-av., u. 541 yrs., g. r. 101, y. r. 551 600
 Marylebone—25, Great Portland-st. (S), u. 29 yrs., g. r. 501, y. r. 1301 920
 53, Bolsover-st., u. 29 yrs., g. r. 101, y. r. 1001 1,100
 10, 17, and 18, Bolsover-st., u. 2 and 3 yrs., g. r. 81, w. r. 471 18s. 6d. 425
 62 and 63, Bolsover-st., u. 2 yrs., g. r. 301, w. r. 2171 31 260
 City-road—17, Duncan-ter., f. y. r. 601 1,010
 Kings Cross—28 and 30, Carabell-st., u. 29 yrs., g. r. 81, w. r. 621 8s. 450
 50 to 56, London-st., u. 31 yrs., g. r. 81, w. r. 981 108 625

Soho.—28, Portland-st. (S), f. y. r. 901 4,205
 Marylebone.—Upper Gloucester-pl., i. g. r. 371 161 460
 Tottenham—1, 2, 3, 6, 7, 8, 10 to 15, Eagle-av., u. 82 yrs., g. r. 761 141, y. r. 3361 2,830

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i. g. r. for improved ground-rent; g. r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. r. for estimated rental; w. r. for weekly rental; y. r. for yearly rental; u. r. for unexpired term; p. s. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; ft. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; g. r. for grove.

PRICES CURRENT OF MATERIALS.

* * * Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.
Hard Stocks	13 0 0
Rough Stocks and Grates	11 0 0
Facing Stocks	12 0 0
Shippers	2 5 0
Flettons	1 8 0
Red Wire Cuts	1 12 0
Best Farcham Red	3 12 0
Best Red Pressed	5 5 0
Rushton Facing	5 5 0
Best Blue Pressed	4 5 0
Do., Bulinoise	4 11 0
Best Stourbridge	4 8 0
Fire Bricks	4 8 0
GLAZED BRICKS.	
Best White and Ivory Glazed	13 0 0
Stretchers	13 0 0
Quoins, Bulinoise, and Flats	12 0 0
Double Stretchers	12 0 0
Double Headers	12 0 0
One Side and two Ends	12 0 0
Two Sides and one End	20 0 0
Splays, Chamfered, Squints	20 0 0
Best Dipped Salt Glazed Stretchers and Headers	12 0 0
Quoins, Bulinoise, and Flats	14 0 0
Double Stretchers	15 0 0
Double Headers	14 0 0
One Side and two Ends	15 0 0
Two Sides and one End	15 0 0
Splays, Chamfered, Squints	14 0 0
Seconds Quality Whitened Dipped Salt Glazed	8 0 0
Thames and Pit Sand	7 0 0
Thames Ballast	6 0 0
Best Portland Cement	31 0 0
Best Ground Blue Lias Lime	22 0 0
NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.	
Grey Stone Lime	108. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 27s. 6d. per ton at rly. dpt.	

STONE.

	£ s. d.
Ancaster in blocks	11 11 per ft. cube, deld. rly. depot
Bath	1 7
Farleigh Down Bath	1 8
Beer in blocks	1 6
Grinshill	1 10
Brown Portland in blocks	2 2
Darley Dale in blocks	2 4
Red Corsehill	2 5
Cloesburn Red Freestone	2 12
Red Mansfield	2 4
YORK STONE.—Robin Hood Quality.	
Scappled random blocks	2 10
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3 per foot super.
6 in. Rubbed two sides	2 2
6 in. Rubbed two sides	2 6
6 in. Sawn two sides slabs (random sizes)	0 12
6 in. Sawn two sides side slabs (random sizes)	0 71
6 in. Sawn two sides side slabs (random sizes)	0 6
BEST HARD YORK.—Scappled random blocks	3 0 per ft. cube
6 in. sawn two sides landings to sizes (under 40 ft. sup.)	2 8 per ft. super.
6 in. Rubbed two sides	2 7
6 in. Rubbed two sides	2 2
6 in. self-faced random flags	0 5
Hopton Wood (Hard Bed) in blocks	2 3 per ft. cube, deld. rly. depot
6 in. sawn both sides landings	2 7 per ft. super. deld. rly. depot
6 in. do.	1 21

[See also page 381.]

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Designs for University Buildings, Cape of Good Hope	Agnt.-Gen. for Cape of Good Hope	400l., 200l., 100l.	Jan. 31
*Church in Wavertree	do.	50l.	No date

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., supplied by	Tenders to be delivered
Alterations, St. Michael's Ch., Arlecdon, nr. Cockermouth	Tynemouth Corporation	J. H. Martindale, Architect, Viaduct Chambers, Carlisle	Oct. 25
Paving Brickburn and other Streets, East Howden	Aston Guardians	J. F. Smille, Borough Surveyor, Lymington	do.
Sanitary Works, Wixhoe, Gravely Hill, nr. Birmingham	Harrow-on-the-Hill U.D.C.	C. Whitwell, Architect, 23, Temple-row, Birmingham	do.
Road Works, Hindes-road	Colpoie Sandys	J. P. Bennett, Engineer, Council Offices, Harrogate	do.
Stabling, &c., Hawkehead, Kendal	Mr. J. Harding	J. Banks, Surveyor, Kendal	do.
Eight Houses, Workington	Padstow (Cornwall) U.D.C.	J. Harding, 33, Fisher-street, Workington	do.
Waterworks	Crewe Town Council	W. H. Pope, Council Offices, Padstow	do.
Additions to Hospital	Swiddon Corporation	G. E. Bonshaw, Architect, 189, Lord-street, Southport	do.
Water Main, Wroughton	Willesden District Council	R. Lloyd, Town Hall, Swiddon, Wills	do.
Schoolroom at St. John the Baptist Church	West Ham Union	J. Kirk & Sons, Architects, Dewsbury	do.
*425 feet Brick Culvert, &c., at Harlesden	do.	Engineer to the Council, Public Offices, Dyne-rd., Kilburn, N.W.	do.
*Making up Roads & Paving Open Spaces around Bldgs.	Poole (Dorset) U.D.C.	Clerk's Office, Union Workhouse, Leytonstone, N.E.	Oct. 29
*Preparing, Staining, & Polishing Pitch Pine Flooring.	Witnnington U.D.C.	do.	do.
Road Works, Alexandra-road, Upper Parkstone	Rotherham R.D.C.	A. H. Mountain, Civil Engineer, Town Hall, Wingham	do.
Street Works	Stockton R.D.C.	W. Burton, Surveyor, Bilingham	do.
Sewerage Works, Tinsley	Litherland (Lancs) Corporation	A. H. Carter, Surveyor, 25, Sefcon-road, Litherland	do.
Paving Works, &c., Eaglescliffe	Messrs. R. Johnson & Sons	B. S. Jacobs, Architect, Bowdley-lane, Hull	do.
Road Works	London County Council	Parks Department, 11, Regent-street, S.W.	do.
Business Premises, Lowgate, Hull	Dumfries Town Council	J. S. Stout, Civil Engineer, 38, Lowther-street, Whitehaven	Oct. 30
Road Materials, Finebury Park	Glasgow Corporation	W. C. Oliver, Architect, Barnstaple	do.
Five Houses, Beckermat, Cumberland	Peterborough Town Council	W. A. Carter, Civil Engineer, 5, St. Andrew's-square, Edinburgh	do.
Sewers, Newport, near Barnstaple	Ramsgate Corporation	J. Lindsay, City Chambers, Glasgow	do.
Sewerage Works	Salford Corporation	W. W. Walshaw, City Surveyor, Guildhall, Peterborough	do.
Underground Convenience, Springburn-road	Selgofield R.D.C.	T. G. Taylor, Borough Surveyor, Town Hall, Ramsgate	do.
Brick Wall at Schools, The Elms	Bedford (Essex) School Board	Borough Engineer, Town Hall, Salford	do.
Paving Works	Llangyfelach Mawr School Board	D. Balfour & Sons, Civil Engineers, Newcastle-on-Tyne	do.
Sewerage Works	Hereford Guardians	C. M. Shiner, Architect, Grays, Essex	do.
Alterations to schools	Middleton (Lancs) Corporation	W. Davies, Architect, 97, Gorse-lane, Swansea	do.
Schools, Penclyn, Wales	Sudbury (Suffolk) Corporation	C. Eaglesfield, Architect, Maryport	Oct. 31
Two Houses, Ellenborough, Cumberland	Nedging & Naughton School Bld.	J. Jackson & Fox, Surveyors, Halifax	do.
Paving Works, St. Peter's	Guildford Town Council	W. H. Hill & Son, Architects, Cork	do.
Rebuilding No. 52, South Mall, Cork	Bedwellty School Board	W. W. Robinson, Architect, 10, King-street, Hereford	do.
Alterations to Premises	Llangatock School Board	F. G. Cooke, Architect, 2, Hyde-garage, Bournemouth	do.
Staircases, &c., at Workhouse	Woodford U.D.C.	F. Entwistle, Town Hall, Middleton	do.
Rebuilding Lomas and Norman streets	Uckfield Water Company	T. W. A. Hayward, Civil Engineer, Town Hall, Sudbury	Nov. 1
Destructor Buildings, Ballington-street	Belfast Harbour Commissioners	C. G. Mason, Civil Engineer, Town Hall, Huddersfield	Nov. 2
Additions to schools, Bideston, Suffolk	Eggin Town Council	James & Morgan, Architects, Cardiff	Nov. 3
Stoneware Drain Pipes, &c.	Ware U.D.C.	H. Waters, Architect, Waengoch, Beaufort	do.
Schools, Aberbargead, Wales	Metropolitan Asylums Board	W. Farrington, Surveyor, Council Offices, Woodford Green	do.
Additions to schools, Beaufort Hill	Chislewick U.D.C.	J. Lewis, Engineer, Maresfield, Sussex	do.
Sewer, Back Hill, Woodford Bridge	Trinity House Corporation	J. Belfast, Harbour Commissioners, Belfast	do.
Waterworks, Hempstead, Sussex	Glyncorrwg U.D.C.	A. Hogg, Surveyor, 24, Academy-street, Elgin	do.
Setts, &c. (500 tons)	Mayor R.D.C.	Bailey-Denton & Co., Civil Engineers, Palace Chambers, S.W.	do.
Road Metal, &c.	Middlesex County Council	J. Baker, Civil Engineer, 75, High-street, Slough	do.
Borehole, &c.	Epsom E.D.C.	G. & P. Hodson, Architects, Loughborough	Nov. 4
Sewers, &c., Landowne Estate, Slough	Hampton U.D.C.	C. R. Walker, Civil Engineer, 23, Victoria-street, S.W.	do.
Cast-iron Water Main	Worcester County Council	Engineer to the Council, 14, High-street, Watford, Herts.	Nov. 5
Sewage Disposal Works	Metropolitan Asylums Board	F. J. C. May, Civil Engineer, Town Hall, Brighton	do.
*Wrought-iron Fencing, &c.	Chislewick U.D.C.	Rev. J. Rees, Cwmilyfelli, Glyn	do.
Alterations to Pavilion, Palace-place	Trinity House Corporation	V. Davidson, 7, Market-place	do.
Chapel, Cwmilyfelli, Glamorgan	Glyncorrwg U.D.C.	Office of the Board, Embankment, E.C.	do.
*Villas at New Maiden	Mayor R.D.C.	Surveyor to the Council, Town Hall, Chislewick	do.
*Isolation Hospital at Leavesden Asylum, nr. Watford	Middlesex County Council	Trinity House, E.C.	Nov. 6
Street Improvement Works	Epsom E.D.C.	W. P. Jones, Surveyor, Cymmer, Port Talbot	Nov. 10
*Fog Signal House, &c., Nash Point, Glamorgan	Hampton U.D.C.	R. Thomas, Queen's Hill, Newport, Mon.	Nov. 11
Street Works, Blaengwynn, Wales	Worcester County Council	H. D. Scaries Wood, 157, Wool Exchange, Coleman-street, E.C.	do.
Road Works, Llanmartin, Wales	Metropolitan Asylums Board	Surveyor to the Council, Public Offices, Hampton Wick	do.
Additions to Polytechnic, Priory Park-rd., Willesden	Chislewick U.D.C.	Clerk to the Visiting Committee, Shirehall, Worcester	Nov. 15
*Clean Sewerage	Trinity House Corporation	The County Architect, Middlesex Guildhall, Westminster	Nov. 18
*Fifty-five Cottages at Roschill Estate	Glyncorrwg U.D.C.	S. G. Inacker, 90, High Holborn, W.C.	Nov. 19
*New Lunatic Asylum, Barnsley Hall, nr. Bromsgrove	Mayor R.D.C.	Newman & Newman, 31, Tooley-street, London Bridge, S.E.	No date
*New Master's Quarters, Eoking	Middlesex County Council	The Secretary, Iron Company's Offices, Rhydyfelin	do.
*Additions to West Hill Boys School	Epsom E.D.C.	W. Wrigley, Architect, 4, Westgate, Walsley	do.
*Female Attendants' Home, Darenth Asylum	Hampton U.D.C.	C. P. Whiteley, Architect, 22, Queen-street, E.C.	do.
Masonry Works, Bargoed	Worcester County Council	T. C. Burn, Main-street, Cockerthorpe	do.
Two Houses, Denby Dale-road, Wakefield	Metropolitan Asylums Board	T. Miller, Civil Engineer, 9, Thorough-lane, Ipswich	do.
Farm Buildings, &c., Pethmarsh, Bures, Essex	Rhydyfelin Iron Co.		do.
Works at Chapel	Cockermouth Burial Board		do.
Dredging Works at Harbour	Harwich Conservancy Board		do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Clerk of Works	Acton District Council	Not stated	Oct. 28

Those marked with an asterisk (*) are advertised in this Number. Competition, p. iv. Contracts, pp. iv. vi. viii. x. & xxii. Public Appointment xviii.

PRICES CURRENT (Continued).

SLATES.			
In.	£ s. d.	Per 1,000 of 1200 sq. ft. dep.	
10 best blue Bangor	12 5 0	per 1,000 of 1200 sq. ft. dep.	
12 " "	13 5 0		
10 best seconds	11 15 0		
12 " "	12 15 0		
8 best	6 17 6		
10 best blue Portman	11 7 6		
12 " "	12 7 6		
10 best blue Portmadoc	6 5 0		
12 " "	7 5 0		
10 best Eureka un-			
fading green	15 0 0		
12 " "	16 10 0		
10 " "	13 10 0		
12 " "	14 10 0		
10 " "	7 10 0		
12 " "	8 10 0		
10 permanent green	10 10 0		
12 " "	11 10 0		
10 " "	6 5 0		
12 " "	7 5 0		

TILES.			
In.	£ s. d.	Per 1,000 of 1200 sq. ft. dep.	
10 plain red roofing tiles	42 0 0	per 1,000, at fly. dep.	
12 " "	43 7 6		
10 Broseley tiles	50 0 0	per 1,000	
12 " "	51 6 0		
10 Ornamental tiles	52 6 0		
12 " "	53 6 0		
10 Hip and valley tiles	4 0 0	per doz.	
12 " "	5 0 0		
10 Rubion Red, brown or			
brindled Do. (Edwards)	6 6 1,000		
12 " "	7 6 1,000		
10 Hip tiles	60 0 0		
12 " "	61 0 0		
10 Valley tiles	3 0 0		
12 " "	3 0 0		
10 Red or Mottled Staf-			
fordshire Do. (Peak)	51 0 0	per 1,000	
12 " "	52 0 0		
10 Ornamental Do.	54 6 0		
12 " "	55 6 0		
10 Hip tiles	4 1 0	per doz.	
12 " "	5 1 0		
10 Valley tiles	3 8 0		
12 " "	4 8 0		

WOOD.			
BUILDING WOOD—YELLOW.			
At per standard.	£ s. d.	At per standard.	£ s. d.
als: best 3 in. by 11 in. and 4 in.	15 10 0	15 10 0	16 10 0
by 11 in. and 11 in.	15 10 0	15 10 0	16 10 0
als: best 2 in. by 9 in. and 8 in.	14 10 0	14 10 0	15 10 0
and 3 in. by 7 in. and 8 in.	11 10 0	11 10 0	12 10 0
and 3 in. by 7 in. and 8 in.	11 10 0	11 10 0	12 10 0
als: best 2 in. by 6 in. and 3 in. by 6 in.	10 10 0	10 10 0	11 10 0
als: seconds	7 10 0	7 10 0	8 10 0
als: thirds	6 10 0	6 10 0	7 10 0
als: fourths	5 10 0	5 10 0	6 10 0
als: fifth	4 10 0	4 10 0	5 10 0
als: sixth	3 10 0	3 10 0	4 10 0
als: seventh	2 10 0	2 10 0	3 10 0
als: eighth	1 10 0	1 10 0	2 10 0
als: ninth	0 10 0	0 10 0	1 10 0
als: tenth	0 10 0	0 10 0	0 10 0
als: eleventh	0 10 0	0 10 0	0 10 0
als: twelfth	0 10 0	0 10 0	0 10 0
als: thirteenth	0 10 0	0 10 0	0 10 0
als: fourteenth	0 10 0	0 10 0	0 10 0
als: fifteenth	0 10 0	0 10 0	0 10 0
als: sixteenth	0 10 0	0 10 0	0 10 0
als: seventeenth	0 10 0	0 10 0	0 10 0
als: eighteenth	0 10 0	0 10 0	0 10 0
als: nineteenth	0 10 0	0 10 0	0 10 0
als: twentieth	0 10 0	0 10 0	0 10 0

WOOD.			
BUILDING WOOD—YELLOW.			
At per standard.	£ s. d.	At per standard.	£ s. d.
als: best 3 in. by 11 in. and 4 in.	15 10 0	15 10 0	16 10 0
by 11 in. and 11 in.	15 10 0	15 10 0	16 10 0
als: best 2 in. by 9 in. and 8 in.	14 10 0	14 10 0	15 10 0
and 3 in. by 7 in. and 8 in.	11 10 0	11 10 0	12 10 0
and 3 in. by 7 in. and 8 in.	11 10 0	11 10 0	12 10 0
als: best 2 in. by 6 in. and 3 in. by 6 in.	10 10 0	10 10 0	11 10 0
als: seconds	7 10 0	7 10 0	8 10 0
als: thirds	6 10 0	6 10 0	7 10 0
als: fourths	5 10 0	5 10 0	6 10 0
als: fifth	4 10 0	4 10 0	5 10 0
als: sixth	3 10 0	3 10 0	4 10 0
als: seventh	2 10 0	2 10 0	3 10 0
als: eighth	1 10 0	1 10 0	2 10 0
als: ninth	0 10 0	0 10 0	1 10 0
als: tenth	0 10 0	0 10 0	0 10 0
als: eleventh	0 10 0	0 10 0	0 10 0
als: twelfth	0 10 0	0 10 0	0 10 0
als: thirteenth	0 10 0	0 10 0	0 10 0
als: fourteenth	0 10 0	0 10 0	0 10 0
als: fifteenth	0 10 0	0 10 0	0 10 0
als: sixteenth	0 10 0	0 10 0	0 10 0
als: seventeenth	0 10 0	0 10 0	0 10 0
als: eighteenth	0 10 0	0 10 0	0 10 0
als: nineteenth	0 10 0	0 10 0	0 10 0
als: twentieth	0 10 0	0 10 0	0 10 0

WOOD.			
BUILDING WOOD—YELLOW.			
At per standard.	£ s. d.	At per standard.	£ s. d.
als: best 3 in. by 11 in. and 4 in.	15 10 0	15 10 0	16 10 0
by 11 in. and 11 in.	15 10 0	15 10 0	16 10 0
als: best 2 in. by 9 in. and 8 in.	14 10 0	14 10 0	15 10 0
and 3 in. by 7 in. and 8 in.	11 10 0	11 10 0	12 10 0
and 3 in. by 7 in. and 8 in.	11 10 0	11 10 0	12 10 0
als: best 2 in. by 6 in. and 3 in. by 6 in.	10 10 0	10 10 0	11 10 0
als: seconds	7 10 0	7 10 0	8 10 0
als: thirds	6 10 0	6 10 0	7 10 0
als: fourths	5 10 0	5 10 0	6 10 0
als: fifth	4 10 0	4 10 0	5 10 0
als: sixth	3 10 0	3 10 0	4 10 0
als: seventh	2 10 0	2 10 0	3 10 0
als: eighth	1 10 0	1 10 0	2 10 0
als: ninth	0 10 0	0 10 0	1 10 0
als: tenth	0 10 0	0 10 0	0 10 0
als: eleventh	0 10 0	0 10 0	0 10 0
als: twelfth	0 10 0	0 10 0	0 10 0
als: thirteenth	0 10 0	0 10 0	0 10 0
als: fourteenth	0 10 0	0 10 0	0 10 0
als: fifteenth	0 10 0	0 10 0	0 10 0
als: sixteenth	0 10 0	0 10 0	0 10 0
als: seventeenth	0 10 0	0 10 0	0 10 0
als: eighteenth	0 10 0	0 10 0	0 10 0
als: nineteenth	0 10 0	0 10 0	0 10 0
als: twentieth	0 10 0	0 10 0	0 10 0

PRICES CURRENT (Continued).

WOOD.			
Prepared Flooring—	£ s. d.	Per square.	£ s. d.
1 in. by 7 in. yellow matched and	0 11 0	0 11 0	0 11 0
beaded or V-jointed boards	0 11 0	0 11 0	0 11 0
1 in. by 7 in. do. do. do.	0 14 0	0 14 0	0 14 0
3 in. by 7 in. white do. do. do.	0 10 0	0 10 0	0 10 0
1 in. by 7 in. do. do. do.	0 11 6	0 11 6	0 11 6
6 in. at 6d. to 9d. per square	less than 7 in.		

JOISTS, GIRDERS, &c.			
In London, or delivered	£ s. d.	£ s. d.	£ s. d.
Railway Vans, per ton.	8 2 6	9 5 0	
Rolled Steel Joists, ordinary sections	6 5 0	7 5 0	
Compound Girders	8 2 6	9 5 0	
Angles, Tees and Channels, ordi-			
nary sections	7 17 6	8 17 6	
Fitch Plates	8 5 0	8 15 0	
Cast Iron Columns and Stanchions,			
including ordinary patterns	7 2 6	8 5 0	

METALS.			
Per ton, in London.	£ s. d.	£ s. d.	£ s. d.
IRON—			
Common Bars	7 15 0	8 5 0	
Staffordshire Crown Bars, good	8 5 0	8 15 0	
merchant quality	8 5 0	8 15 0	
Suffordshire "Marked Bars"	10 10 0		
Mild Steel Bars	9 0 0	9 10 0	
Hoop Iron, basis price	9 5 0	9 10 0	
" " galvanised	16 0 0		
" " And upwards, according to size and gauge.			
Sheet Iron, Black—			
Ordinary sizes to 20 g.	10 0 0		
" " 20 to 24 g.	11 0 0		
" " 24 to 26 g.	12 10 0		
Sheet Iron, Galvanised, flat, ordi-			
nary quality—			
Ordinary sizes 6 ft. by 2 ft. to			
3 ft. to 20 g.	12 15 0		
" " 22 g. and 24 g.	13 5 0		
" " 26 g.	14 5 0		
Sheet Iron, Galvanised, flat, best			
quality—			
Ordinary sizes to 20 g.	16 0 0		
" " 22 g. and 24 g.	16 10 0		
" " 26 g.	18 0 0		
Galvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 15 0		
" " 22 g. and 24 g.	13 5 0		
" " 26 g.	14 5 0		
Best Soft Steel Sheets, 6 ft. by 2 ft.			
to 3 ft. by 20 g.	12 0 0		
and thicker	13 0 0		
" " 22 g. and 24 g.	13 0 0		
" " 26 g.	14 5 0		
Cut nails, 3 in. to 6 in.	9 5 0	9 15 0	
(Under 3 in. usual trade extras.)			

LEAD, &c.			
Per ton in London.	£ s. d.	£ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	13 7 6		
Pipe in coils	13 7 6		
Soil Pipe	16 7 6		
Compo Pipe	16 7 6		
ZINC—Sheet—			
Vielle Montagne	25 0 0		
Silesian	24 10 0		
COPPER—			
Strong Sheet	0 10 0		
Thin	0 11 0		
Copper nails	0 12 0		
BRASS—			
Strong Sheet	0 0 9		
Thin	0 0 10		
TIN—English Ingots	0 2 3		
SOLDER—Plumbers'	0 0 6 1/2		
Thinner's	0 0 6 1/2		
Blowpipe	0 0 9 1/2		

ENGLISH SHEET GLASS IN CRATES.			
15 oz. thirds	25d. per ft. delivered.		
" fourths	16d. "		
21 oz. thirds	33d. "		
" fourths	24d. "		
26 oz. thirds	44d. "		
" fourths	35d. "		
31 oz. thirds	55d. "		
" fourths	46d. "		
Fluted sheet, 15 oz.	34d. "		
" 21 oz.	45d. "		
Hartley's Rolled Plate	13d. "		
" 21 oz.	24d. "		
" 31 oz.	24d. "		

OILS, &c.			
£ s. d.	£ s. d.	£ s. d.	£ s. d.
Raw Linseed Oil in drums or barrels	per gallon		
" " in pipes or barrels	0 2 8		
Boiled " in pipes or barrels	0 2 8		
" " in drums	0 2 10		
Turpentine, in barrels	0 3 2		
" in drums	0 3 4		
Genuine Ground English White Lead	per ton	21 0 0	
Red Lead, Dry	30 0 0		
Best Linseed Oil Putty	per cwt.	8 6 0	
Stockholm Tar	per barrel	12 10 0	

VARNISHES, &c.			
Per gallon.	£ s. d.	£ s. d.	£ s. d.
Fine Pale Oak Varnish	0 8 0		
Pale Copal Oak	0 8 0		
Superfine Pale Elastic Oak	0 10 6		
Fine Extra Hard Church Oak	0 10 6		
Superfine Hard-drying Oak, for Seats of			
Churches	0 14 0		
Best Elastic Carriage	0 12 6		
Superfine Pale Elastic Carriage	0 16 0		
Fine Pale Maple	0 16 0		
Finest Pale Durable Copal	0 18 0		

PRICES CURRENT (Continued).

VARNISHES, &c.			
Per gallon.	£ s. d.	£ s. d.	£ s. d.
Extra Pale French Oil	1 1 0		
Eggshell Flattening Varnish	0 18 0		
White Copal Enamel	1 4 0		
Extra Pale Paper	0 18 0		
Best Japan Gold Size	0 10 6		
Best Black Japan	0 16 0		
Oak and Mahogany Stain	0 9 0		
Brunswick Black	0 16 0		
Berlin Black	0 16 0		
Knotting	0 10 0		
French and Brush Polish	0 10 0		

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursday. N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is underlined, unless in some exceptional cases and for special reasons.]

* Denotes accepted. † Denotes provisionally accepted.

ABER-BARGOE (Mon.).—For the erection of fifty houses. Mr. Geo. Kenshole, architect, Station-road, Bargoe:—

H. R. Paul	£9,000 0	W. Morris	£8,147 10
Thomas & Co.	8,950 0	Colin Sora	8,000 0
R. Jones	8,875 0	Thomas & Hughes	7,875 0
J. Williams	8,550 0	Williams & Sons,	8,550 0
F. Davies	8,350 0	New Tredegar	7,737 10
James & Son	8,250 0		

BEXHILL (Sussex).—For the supply and delivery of granite and Kentish rag macadam, for the Urban District Council. Mr. Geo. Ball, C.E., Town Hall, Bexhill:—

A. & A. R. Lang, Gourock*	13 3 0	Granite.	Rag.
W. Hudson, Brighton*</			

MARGATE.—For the supply of pit flints and broken granite, for the Town Council. Mr. E. A. Borg, Borough Surveyor, Town Hall, Margate:—
Pentel Granite (500 tons).

	Per ton, delivered.
Jas. Runnalls, "Penzance".....	22s.
<i>Pit Flints (1,500 yards).</i>	
Thos. Tobia, Margate.....	6s.

NEWPORT (Monmouthshire).—For the erection of the Newport Borough Lunatic Asylum, at Caerleon, Monmouthshire. Mr. A. J. Wood, architect, 22, Surrey-street, Victoria Embankment, W.C. Quantities by Messrs. Widdell & Trollope, 29, Tophill-street, Westminster, S.W.:—
 J. McCormick.....£123,888
 Kerridge & Shaw.....118,410
 Chas. Wall.....117,000
 Watkin Williams.....116,900
 D. W. Davies.....115,000
 Johnson & Co.....110,850
 Morgan & Co.....110,500

	Revised Tenders.
Linton & Co.....	£97,900
Willcock & Co.....	96,895
<i>Electric Plant.</i>	
Bertram Thomas, Manchester.....	£3,433
<i>Wiring and Fittings.</i>	
Lowdon Bros. & Co., Dundee.....	£2,500

PAIGINTON.—For proposed alterations and additions to 3 and 5, Victoria-street, Paiginton, for the Wilts and Dorset Banking Co., Ltd. Messrs. Bridgman & Bridgman, architects, Torquay and Paiginton. Quantities by Mr. Vincent Catermole Brown, Paiginton:—
 Laphorn & Co.....£1,150
 Mitchell & Sons.....1,975
 P. A. Stacey.....1,900
 J. C. & W. Watson.....1,750
 Hugh Mills.....1,724
 C. & R. E. Drew.....1,700

PAIGINTON.—For alterations and additions to Halcon, Paiginton, for Dr. C. Hyde Cosens. Messrs. Bridgman & Bridgman, architects, Torquay and Paiginton:—
 E. Westlake.....£21,100
 C. & R. Drew, Paiginton.....£198 4 6

REIGATE.—For the erection of an extension to business premises, 74, Lebourne-road, Reigate, for Messrs. Spencer & Son. Mr. C. E. Salmon, architect, Bell-street, Reigate:—
 T. Bushby & Son.....£159
 Nightingale & Sons.....£136
 Bagaley & Sons.....155
 G. Martin, Redhill.....117

RUSHDEN.—For villa residence and stable, &c., to be built at Rushden, for Mr. Geo. Selwood. Quantities by Mr. Harry Knight, Rushden:—

		Extra for stone bay.
C. E. Bayes.....	£1,050 0 0	0
T. Willmott.....	1,023 0 0	0
G. Johnson.....	1,010 18 0	£16
H. Sparrow.....	1,003 0 0	12
Hackley Bros.....	975 0 0	13
T. Swindall.....	935 0 0	0
J. Titmus.....	891 15 6	14
W. Packwood, Rushden.....	875 10 0	12

B. NOWELL & CO.
 STONE MERCHANTS & CONTRACTORS.
 Chief Office.—*Warwick Road, KENSINGTON.*
 Norway, Guernsey, and Leicestershire Granite, Kerb, Pitching, and Yorkshire Stone.

ESTIMATES GIVEN FOR EVERY DESCRIPTION OF ROAD MAKING.

SHIRLEY (Southampton).—For the construction of roads, sewers, and wood fencing on the Alexandra Park Estate, for the County of Hants Land and Building Society, Ltd. Mr. William Burrough Hill, surveyor, Southampton:—

	Roads and Sewers.
H. J. Hood.....	£1,994 0 0
S. Saunders.....	2,480 0 0
Plascott & Son.....	2,395 0 0
J. C. Trueman.....	2,399 0 0
J. Nichols.....	2,352 0 0
	Southampton.....2,110 18 3
	(Surveyor's protecting estimate, £2,175.)

	Wood Fencing.
Luton Bros.....	£270 11
Plascott & Son.....	270 0
F. Osman.....	266 0
	G. Sandy.....222 0
	(Surveyor's protecting estimate, £215.)

SOUTHAMPTON.—For the supply of granite setts for the Corporation. Mr. J. A. Crowther, Borough Engineer, Municipal Offices, Southampton:—

	Coarse Grained Setts.
A. & F. Manuelle, London.....	s. d.
	29 6 per ton.
	Fine Grained Setts.
Brundritt & Co., Liverpool.....	s. d.
	31 3 per ton.

TORQUAY.—For proposed alterations and additions to Nos. 79 and 81, Union-street, Torquay, for the Torquay Co-operative Society, Ltd. Messrs. Bridgman & Bridgman, architects, Torquay and Paiginton. Quantities by Mr. Vincent Catermole Brown, Paiginton:—
 Hawkins & Son.....£3,595 0 0
 J. Smerdon.....3,390 0 0
 Yeo & Sons.....2,999 11 3
 S. Blatchford.....2,884 0 0

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Deptford Municipal Buildings: Second Premiated Design By Messrs. S. B. Russell and C. E. Malloes.
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Bridges.



SINCE man first conceived the idea that streams and similar obstructions to locomotion might be spanned, the art of bridge construction has steadily advanced, and is only within recent times that the principles underlying this useful art have been correctly appreciated. Some structures going to this day testify to the practical skill of early architects and engineers, and the whole history of bridge-building shows the intellectual art of the designer has always been of great help to the practical work of the builder. The case serves to illustrate the value and the limitation of scientific treatment when it was little more than the unaided expression of constructive work evolved from the practice of the artisan. Unless the natural laws governing bridge construction were dimly realised by early builders, and so stability and symmetrical proportion were secured. It must be remembered, however, that artistic or picturesque form may exist independently of harmony between inherent strength and exterior force, which is an essential of scientific construction. So far, therefore, as the bridges of early times failed to exhibit the perfect combination of the grace derived from art, with the knowledge gleaned from science, so far they failed to present artistic construction as we know it.

Bridge construction is undoubtedly a branch of architecture, using the term in the widest sense, although it has now become within the province of the engineer. We need not go far to seek the reason for this transference. In the first place, the design of an ordinary building does not involve any peculiarly difficult constructive problem; almost every point in connexion with it is easily determinable by the aid of ascertained rules and established precedents. So the architect is to a large

extent free to devote his thoughts to the development of artistic design. In the second place, the marvellous progress of engineering science within the last hundred years has been accompanied by the continual presentation of new and complex problems in construction as well as in other branches of engineering work. Hence the engineer is necessarily a man who is trained to find acceptable solutions for more or less novel problems, and his energies must primarily be occupied in the production of scientific design. In the third place, the comparatively recent advent of iron and steel as materials of construction has tended to take something from the confidence formerly felt by the architect in his absolute mastery of constructional work, and has excluded him from dealing with iron and steel construction on a comprehensive scale. The general result is that, while the average architect may be admirably qualified as a judge of artistic details and architectural treatment, he cannot be expert in the primary design of a modern bridge. On the other side, while the engineer may be competent to appreciate the scientific features of a bridge and to produce designs strictly suitable for any given statical and dynamical conditions, he cannot claim to be an expert in that architectural treatment, which is a necessary adjunct to scientific design in some bridges.

Here we may add that an "engineer" is not necessarily competent as a "bridge designer," for the design and construction of really good bridges can only be satisfactorily carried out by engineers who are specially qualified for such work.

It is, therefore, to the "bridge engineer" as a specialist that we must look for the solution of the many difficult problems presented by modern bridge design.

So far as the work of the engineer is concerned, we must observe that the laws governing bridge construction are in themselves conducive to artistic forms, and in many bridges the addition of any external adornment would be utterly incongruous. The parallel beam, in its simplest form, is the instrument by the aid of which the key to scientific bridge design has been wrought.

A simple geometrical figure, such as that exemplified by the parallel beam, is unobjectionable in itself, and may be employed with appropriate effect in certain situations. Yet, as a form of bridge construction, the parallel girder is not of perfectly scientific design, for its outline is only maintained to an approximate degree by strenuous opposition to natural laws. The bending moments at different sections of such a beam have different values, and if the beam is to be of ideally correct design its resistance must be proportioned to the bending moment at every section. It follows, then, that a beam of uniform section must be unnecessarily strong at some places if it is to be strong enough at the place where the maximum bending moment has to be resisted. A little reflection will show that before the section of a beam can be regulated properly, some precise knowledge is required as to the variation or graduation of force to be resisted at all cross sections. The first essential of scientific bridge design is, therefore, the determination of bending moments for all possible conditions of loading, and to those who desire information on the subject we commend the classical treatise on Bridge Construction written by Professor Claxton Fidler.* This comprehensive work includes much relating to the subject that cannot possibly be discussed in an article such as the present, but we may say that a careful perusal of its pages will enable the reader to form some idea of the theoretical and practical problems involved in the art and science of bridge construction. Our attention will merely be directed to such parts as refer to the general question of bridge design. For the purpose of providing adequately for a perfect appreciation of the general theory, the author devotes four preliminary chapters to necessary definitions of terms, to the opposition and balance of forces, to bending strains, and to the graphic representation of bending moments. The last of these is not only useful to all who may be concerned in the application of beams to any class of

* "A Practical Treatise on Bridge Construction: A Text-book on the Design and Construction of Bridges in Iron and Steel." By T. Claxton Fidler, M.Inst.C.E. Third Edition. London: Charles Griffin & Co. 1901.

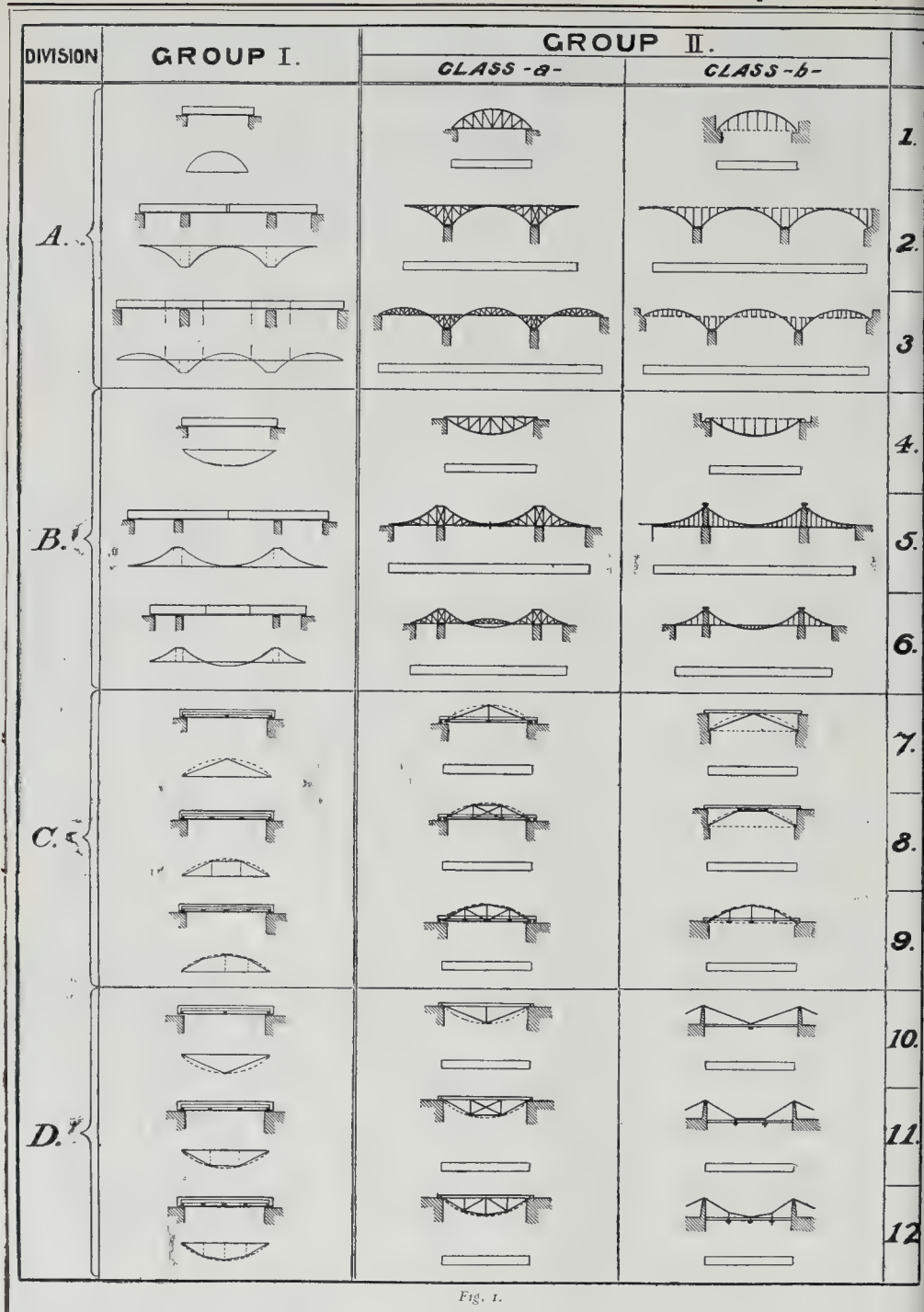


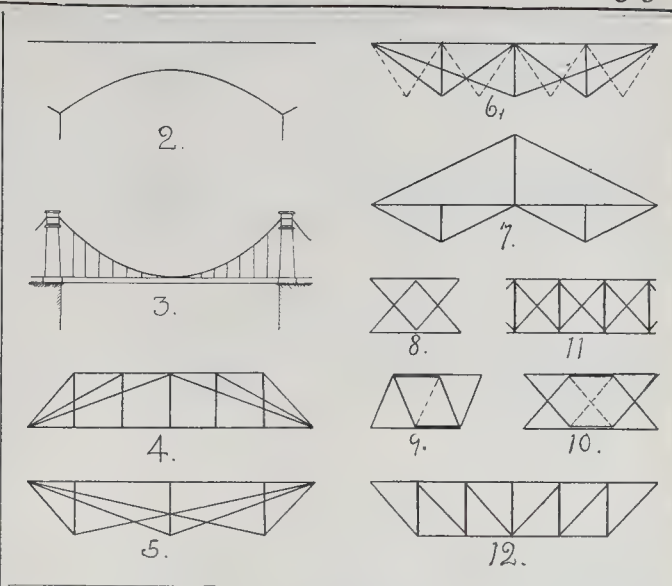
Fig. 1.

structure, but it demonstrates the diagram of bending moments to be an essential aid to all bridge design. As a diagram of bending moments varies in outline according to the magnitude and distribution of the load, it is obvious that such a figure must be of the utmost value to the designer in settling the general form and details of a bridge, and it should be added that it is applicable to every possible form of bridge that can be suggested. Diagrams of bending moments throw light upon the comparative economy of different types; they indicate the figure to be adopted in certain types; the stress to be provided for; and the sectional area required to ensure uniform stress at all points in parallel girders, or the variations of stress in girders of uniform section. Professor Fidler classifies different forms of bridge construction according to the distinctive mechanical features of their

structure. To illustrate the two main groups into which bridges of all kinds may be divided, we will first consider the case of solid beam under uniform load, as on the first line of group I of fig. 1. The diagram of bending moments will then be of parabolic form, as represented below the beam. Then, using Professor Fidler's words: "If the girder is formed with straight parallel flanges, or if the depth of the girder is uniform, the flange stress will be everywhere proportional to the bending moment, and we may take the diagram of moments as representing, on a certain scale, a diagram of flange stress." Next, we will consider the case of a parabolic girder proportioned to the diagram of moments mentioned above. Such a girder is illustrated in line 1 of group II, and the diagram of bending moments is represented below the girder. It follows, as the author says, that "the horizontal stress in each flange will be uniform throughout the length of the girder."

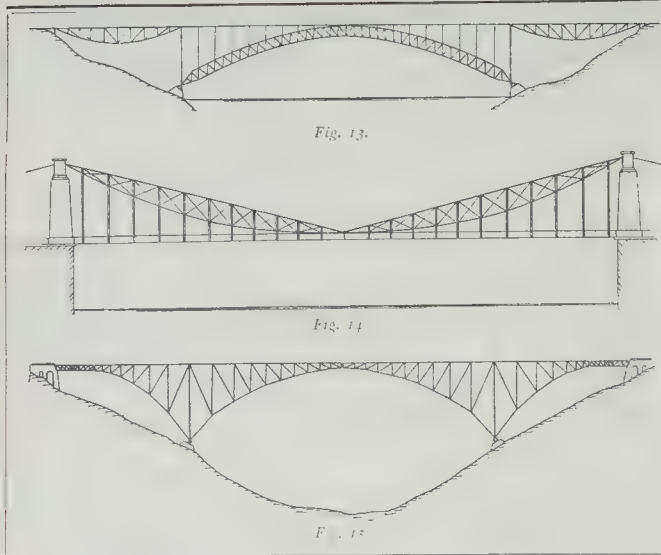
It should now be clear why the diagram of moments is said to be the key to bridge design. By varying the distribution of the load and by increasing the number of the supports, an endless variety of diagrams may be obtained, suggesting outlines for an equally infinite number of bridges, wherein the depth of girder will be everywhere proportional to the bending moment, and the flange stress will be uniform throughout the length of the girder. The classification adopted by Professor Fidler in the chapters headed "The Comparative Anatomy of Bridges" shows very clearly how different designs can be deduced from the diagrams of bending moments, and the plates with which the chapters are illustrated are extremely serviceable. In his classification there are five divisions, each comprising three groups, the divisions being the following:—(A) Structures affording continuous support to the uniform load; (B) structures of Div. A, inverted; (C) structures supporting bearers which carry the uniform load; (D) structures of Div. C, inverted; and (E) "composite" and "combined" structures. On looking into this system of classification we find that the two characteristic groups, to which reference has been made, are insufficiently emphasised, but this disadvantage can readily be overcome by a slight rearrangement of the essential forms described by the author. Thus, if we make two main groups, the second of which is divided into two classes, and if each of the three classes so obtained comprises divisions corresponding with (A) to (D) of the author's classification, we have the following scheme:—

Group I.—Bridges of uniform section.
Group II.—Bridges of uniform strength.
Class *a*.—Proportional girders.
Class *b*.—Arches and suspension bridges.
The Divisions A to D are those of Professor Fidler. Division E, covering combinations which may exhibit the attributes of either Group I. or Group II., should be considered separately. For the purpose of making clear the grouping of different forms of bridge design, we reproduce in fig. 1 a selection from the illustrations contained in the four plates of the work by Professor Fidler, but the arrangement is that indicated by the revised grouping. Below each of the figures is a diagram of the bending moments, or a stress-diagram if we decide to so regard it, which suggest the derived forms belong-



ing to Classes *a* and *b* of Group II. All the diagrams here given refer to the uniform load only. In Division A of Group I, the uniform load, continuously supported by the main structure, gives different diagrams according to circumstances. On line 2, each half of the bridge is a cantilever independent of the other for support, this condition being clearly suggested by the diagram of moments below. On line 3 we have a cantilever bridge with a central girder connecting the projecting ends of the cantilevers, and if the two vertical lines were omitted, the figure would also serve to illustrate a "continuous girder" bridge. The next three lines of Group I. show parallel girders which are the same as those in lines 1, 2, and 3, but the diagrams of moments are drawn in the inverted position for comparison with the other designs on the same lines. Glancing now at the figures in Class *a*, Group II., we see that each bridge takes the form indicated by the stress-diagram of its prototype. Horizontal stress in the flanges of the "bowstring" girder, line 1, is uniform from end to end; tension throughout the tie being entirely due to the thrust of the bow, or, conversely stated, compression of the bow is due entirely to the pull of the tie. The same conditions are present in the parabolic cantilever bridge, line 2, and the cantilever and bowstring bridge, line 3. In structures of this class the web neither transmits stress to the flanges nor is called upon to resist shear, the two principal members would constitute the complete bridge if no roadway were required, and the web is quite superfluous for the support of the uniform load. This leads us up to Class *b*, Group II., of which the figure on line 1 is a typical example, where the thrust of the bow is received by abutments, so that the structure becomes an "equilibrated linear arch," which is in equilibrium because its curve corresponds with that of the diagram of moments. It should be observed that the resisting couple here consists of the horizontal stress of the arch, and a horizontal force acting along the line of an imaginary tie, as shown by a dotted line in the figure. A similar

effect is produced in the cases indicated by the figures on lines 2 and 3, and, as Professor Fidler says, "the curve of moments for any given load represents the figure of a linear arch which would be in equilibrium under that load." In the three examples mentioned the roadway has no direct stress under the uniform load, and it may be at any desired level. The first two of these diagrams are particularly interesting because they directly explain the general theory of the masonry arch. Thus, if we add a roadway to the diagram on line 1 we have at once the familiar design outlined in fig. 2. In connexion with masonry bridges, it should be noted that the traditional error of building arches with voussoirs of uniform depth was first corrected by Rennie, an engineer who left, in London Bridge, a permanent demonstration of the fact that science is the essence of truly artistic design. Inversions of the structures in Division A give designs of different appearance, as in lines 4, 5, and 6, and the character of the stress is reversed, so that the straight members become struts instead of being ties, and the curved members are in tension instead of in compression. In Division B the suspension bridge takes the place of the arch in Class *b*, and the equilibrium of the chain or cable is due to the correspondence of its figure with that of the curve of the inverted diagram of moments, which, as the author says, "for any given load, represents the figure which would be assumed by an equilibrated flexible chain under that load." A variation of the diagram on line 4 gives a suspension bridge without side spans, as shown in fig. 3. Looking next at the remaining illustrations of Group I., we notice that the concentration of the uniform load at one or more points along the main structure changes the diagram of moments from the parabolic to the polygonal form, the number of sides varying with the number of points at which the load is applied. As before, arches are derived in Class *a* from the upright diagram of moments, and suspension bridges in Class *b* from the inverted diagrams, reversal of stress again occurring in the inverted forms.



Some of the diagrams given by Professor Fidler represent purely ideal designs, evolved from stress diagrams, but each one is merely a solitary example of the innumerable variations that can be produced in a similar manner. An interesting modification of Group II. is the bow-and-chain, or Saltash, girder, so called after Brunel's well-known bridge. The "hog-backed" girder is a form intermediate between the parallel and the parabolic types, and cantilevers may be similarly modified with great advantage. Intermediate forms permit the adjustment of stress intensity to suit the special conditions of any case, and enable the engineer to qualify theory by the teachings of practical experience. The chapter in which Professor Fidler treats of his Division E is worthy of careful study. This division includes "composite" and "combined" structures, with the first of which we are chiefly concerned. The composite truss is a structure where elementary figures, such as those in lines 7 and 8 in Class A, are used to carry the loads, and to exert force at the ends of one base common to all the figures. The truss then possesses attributes which resemble those belonging to the simple forms of which it is composed. An early bridge truss of this kind is shown in fig. 4 where the primary figures are trapezoid with the exception of the centre panel. The Bollman truss, fig. 5, consists of any required number of triangular trusses; and the Fink truss, fig. 6, is composed of primary, secondary, and tertiary systems of triangles.

By applying upright and inverted truss systems on opposite sides of the common base, as in fig. 7, stress in the horizontal member will be reduced, because it will then act as a tie for one system, and as a strut for the other. Again, triangular truss forms may be used in the upright and the inverted position, as in fig. 8, so as to form a lattice girder, the upper flange of which is the base of the inverted system, and the lower flange is the base of the upright system. The bending moments and flange stresses are then calculable by the methods adopted in the case of ordinary beams, but it must be remembered that flange stresses are communicated, step by step, through the web

bracing. Trapezoidal truss forms may be similarly employed, as in figs. 9 and 10, in each of which two trapezoids, one upright and one inverted, are shown in full lines, and others completing the bracing are in dotted lines. Vertical posts may be added to all such combinations of triangular and trapezoidal trusses, as illustrated in fig. 11. By methods such as these all the familiar forms of latticed bracing are produced. An important difference between English and American ideas of the braced girder is pointed out by the author. "In England," he says, "the simple beam was refined into a plate girder, and the plate web was improved by the substitution of diagonal bracing. But in America bridge construction was at first very largely carried out in timber, or in combinations of timber and wrought-iron, and these materials were framed together in various forms of truss, from which the wrought-iron trusses of the Linville, Whipple, and other types have been developed." Fig. 12 is a diagram of the Linville truss in a simple form. Although the forms of lattice girder so developed are very similar in both countries, the American engineer still calls his girder a "truss," and specially considers each member as performing a distinct function. In tension members he makes free use of pin-connections, while in England the engineer generally prefers riveted joints, and strives to make the riveted girder as much like a rigid plate girder as he possibly can. One result is that American bridges cost proportionately less, and can be erected far more rapidly than English bridges. Some bridge engineers in this country have already recognised this advantage of the American system, but in a general way it is still looked upon with a certain amount of suspicion.

We must now reluctantly pass by several chapters devoted by Professor Fidler to "Deflection," "Continuous Girders," and "The Strength of Materials," the last-named being treated in a manner that should commend it as much to architects as to bridge engineers. "The Design of Bridges in Detail" is a subject which takes up nearly all the remaining chapters of the treatise, and in them the author deals successively

with "The Load on Bridges," the "Calculation of Stresses due to the Movable Load," and then approaches the detailed consideration of "Parallel Girders, Parabolic Girders, Polygonal Trusses, and Curved Girders," "Suspension Bridges and Arches," of flexible and rigid construction, and "Continuous Girders and Cantilever Bridges." The last chapter of all relates to the most important subject of "Wind-Bracing." As may naturally be expected, most of the matter presented in the chapters mentioned refers to construction pure and simple, but there is a good deal that relates to design, which, of course, is inseparable from construction. There are also data which will be found extremely useful to anyone who may be called upon to express an opinion as to the choice of a design in cases where alternatives are available. To a brief consideration of the latter features our attention will now be confined. A reliable estimate of the weight of a bridge is a matter of much importance. It serves to indicate the comparative cost of different designs, and it may govern the choice of design by showing that some forms of construction would be difficult, impracticable, or impossible under certain conditions. All calculations of the strength and dimensions of different members must be based upon estimated stresses due to (1) the unknown weight of the main girders; (2) the ascertained weight of the roadway or platform; and (3) the rolling or live load. The method formerly adopted for arriving at the probable weight of the main girders was that of trial-and-error, a roundabout and unscientific procedure that is rendered unnecessary by newer modes of computation. Professor Fidler explains at some length his system of calculation, by the aid of which the necessary sectional areas of metal for tension and compression members may be estimated by one direct computation, applicable with approximate accuracy for calculating the weight of the main structure in nearly every form of bridge. The formula and tables given by the author make it possible for any one to calculate the approximate weight of the main structure for any width of span, depth of girder or dip of span, and weight of load. A modification of the same formula also serves to indicate the theoretical limit of length for any similar bridge. As Professor Fidler's work was originally written at a time when the use of steel was less prevalent than it is in the present day, many of the calculations relate to wrought-iron bridges. This is not altogether a disadvantage, because it enables the reader to compare the weights of various well-known wrought-iron and steel bridges. In order that it may be easy to make comparison between different types of design, we have summarised some of the results in tabular form. Table 2 shows the weights of various bridges of certain spans, and Table 3 shows the theoretical span limit for different types. In parallel girders economy is chiefly effected, in long spans by the weight of the main girders, and in small spans by the weights of the platform, wind bracing, and the live load. The percentage of waste material is much greater when the tension members are riveted, as in European practice, than when they are pin-connected, as in American practice. This point will be made clear by comparing Nos. 1 and 2 of Table 2, where it is shown that if the Ohio

Bridge had been made on the European system, the cost would have been increased by nearly 36 per cent. So far as design is concerned, it appears that different types of parallel girder do not vary largely in cost, and that no single type can be considered as the best for general use. Speaking generally, economy is promoted by the adoption of liberal depth in proportion to length, but it is impossible to fix a ratio applying to all cases. With regard to the limiting span, it should be mentioned that it would be practically impossible to build a parallel girder bridge 802 ft. long, because, as the author remarks, "the amount of metal required to carry any useful load would be infinite." Parabolic girders, polygonal trusses, and curved girders may be treated on the same principles, but it should be remembered that no vertical shear is resisted by the diagonals under a uniform load, and that their function is to resist vertical shear due to irregular loading. With regard to weight, the figures stated on line 3,

it affords a yielding support to the roadway. The weight given in Table II. does not include backstays or side spans, nor the towers or end pillars. It would be impossible to state any general rule for estimating the comparative economy of the suspension bridge as a whole. In many situations it would not be an economical type, especially in spans of moderate width. In spans of much greater width than 500 ft. the girder type would of course become impracticable.

Various devices, most of them unsatisfactory, have been adopted for the purpose of stiffening and staying flexible suspension bridges. Professor Fidler rightly advocates the construction of rigid arches and suspension bridges, in which no deflection shall be possible beyond that due to the elasticity of the material. This ideal may be attained by designing the arch or suspension rib as a deep and stiff girder. In each case provision must be made for expansion and contraction by suitable hinging

cally fixed by the introduction of hinges in suitable positions, all complication is removed and the structure becomes a cantilever bridge of the type outlined on line 3 of Table I. A fine example of cantilever construction is afforded by the new viaduct over the Viar, in France, of which Fig. 14 is a diagrammatic representation. Here, the cantilevers are supported on rocking bearings, they are joined at the centre by a hinged connexion, and the side spans are anchored at the abutments. The centre span is about 720 ft. wide, and the side spans are each 310 ft. wide. The figures quoted in Table II. as to the weight of cantilever bridges are those given by Sir B. Baker in his work on "Long Span Bridges."

Referring to the relative economy of different forms of bridge construction, Professor Fidler expresses the opinion that there is no form of bridge that can be regarded as the most suitable for all situations. It will, of course, be evident by reference to the tables that the various forms of girder bridge are out of the question for very wide spans, when the suspension of cantilever types are the only alternatives. For moderate spans there appears to be little difference between the cost of different forms of construction. Therefore, unless some urgent practical requirement or constructional difficulty be evidenced, there is no reason why an ugly or inharmonious design should be selected when a more pleasing one could be adopted. The engineer may be able to point to two or more types as equally suitable, or he may sometimes have to say that a certain type of design is the only possible one. In the former case the architect may be able to show that of two alternatives one is the more suitable, or that one of them is absolutely inappropriate, and in either case there may be features which must be considered from a purely æsthetic standpoint. In the earlier part of this article, we suggested what are probably the modes of thought most natural to the two professions, whose relations may be compared to those existing between brother and sister. However much the architect may enjoy the practical details of his calling, he cannot neglect still

TABLE II.—*Estimated Weights of Main Structures of Bridges*
(Suspension bridges are exclusive of towers, backstays, and anchorages).

Description.	Span in feet.	Span ÷ depth.	Load per foot span.	Weight per foot span.	Remarks.
<i>Frought Iron—</i>			Tons.	Tons.	
Lattice Truss (American system)	515	10	1 35	1 80	Ohio Bridge.
" " (European ")	515	10	1 35	2 44	
Bowstring Girder	500	10	1 70	2 40	
" " " " " " " " " "	500	8	1 70	1 78	
Bow and Chain Girder	500	8	1 70	{ 1 75	- platform.
				{ 1 60	"
Flexible Suspension	500	10	1 70	{ .53	"
				{ 1 00	"
Rigid " " " " " " " "	500	10	1 70	{ .76	"
				{ 1 52	"
Flexible " " " " " " " "	1,000	10	3 40	{ 2 70	"
				{ 3 75	"
Rigid " " " " " " " "	1,000	10	3 40	{ 4 10	"
				{ 5 15	"
<i>Steel—</i>					
Rigid Suspension	1,500	8	3 2	{ 3 94	- "
				{ 4 80	"
" " " " " " " "	2,000	8	3 2	{ 7 50	"
				{ 8 50	"
" " " " " " " "	3,000	7	3 2	{ 31 40	+ "
				{ 32 00	+ "
Cantilever	1,500	—	—	7 60	{ Complete with platform, end pillars, and bracing.
" " " " " " " "	2,000	—	—	13 20	
" " " " " " " "	3,000	—	—	21 25	

TABLE III.—Theoretical Span Limits for different Bridges (factor of safety = 4).

Type.	Span ÷ depth.	Theoretical Limit.
Parallel Girder W.I.	10	ft. 802
Parabolic " " " " " "	8	960
" " " " " "	4	1,000
Flexible Suspension " "	10	2,100
" " " " " "	8	2,560
Rigid " " Steel	10	2,700
" " " " " "	8	3,250
" " " " " "	5	3,550
" " " " " "	6	4,000

of Table II., do not include the platform, but as the load is greater there is not much difference on the score of economy between this example and the Ohio bridge. From Table III. it may be inferred that the parabolic girder must be more economical than the parallel type in spans of more than 500 ft., and it is the fact that the advantage secured by increasing the ratio of depth to length is much more marked. The chain or cable suspension bridge is the most economical form of construction possible, but it is always under the disadvantage that

—at each end, at each end and at the centre, or near one end. Fig. 12 is a diagram of the Niagara Falls rigid arch bridge, and fig. 13 is taken from the author's work to illustrate the rigid form of suspension bridge. By reference to Table II, it will be seen that the rigid suspension bridge compares favourably with other types of bridge design, although there would probably be no saving in a span of 500 ft. For wider spans the superiority of the suspension type over any form of girder is abundantly demonstrated. For a span of 1,000 ft. the weight of two suspension bowstring ribs would not be more than that of a 500-ft. bowstring girder, and while the weight of a suspension span without towers and backstays would be about 515 tons per ft., the weight of a bowstring girder, as estimated by Sir B. Baker, would be 46 tons per ft. if it were possible to build such a structure. The last type of bridge construction to be noticed is that embodying the continuous girder and the cantilever. In the continuous girder the stresses and points of "country flexure" are only to be found by abstruse calculations, but if there are points be mechanical

state. He is attracted primarily by the beauty of external form, while the engineer at once seeks the skeleton upon which the form is based, and finds enjoyment of another sort in studying the principles underlying its construction. In creative work the same difference is inevitable. The architect has ever before him the problem of reconciling practical requirements with pure art, while the engineer is chiefly concerned in finding practical solutions for scientific problems. Many engineers undoubtedly possess a true appreciation of fine art, but that is a natural gift, which is rarely encouraged or cultivated by professional training. Therefore in connexion with bridge construction occasions may arise when the art of one profession may usefully supplement the science of the other in the proper rendering of the auxiliary features of a generally good and artistic engineering design. Further, admitting that any bridge must be in good taste that is designed in accordance with natural laws, it does not follow that it would be good taste to place such a structure where it would be out of keeping with its surroundings, and so

far as æsthetic considerations of this kind are involved, the architect is clearly entitled to be heard. As to the general subject of bridge construction, it is manifest that neither the average architect nor the average engineer is qualified to be a bridge designer, for the practice of this particular department of mechanical science demands men who are fitted for it by mental aptitude, and, above all, by special training and experience.

NOTES.

Electric Railways. It seems highly probable that there will soon be several different systems of electric traction in use for railway work in this country. From the point of view of "standardization," it is a pity that electrical engineers can invent an almost infinite number of systems, the relative advantages of which are most difficult to measure accurately. Company promoters come too often to Parliament and ask for powers to construct electric railways, ordinary gauge or mono-rail, the technical details of which have hardly been attacked. Fortunately, other countries are now supplying us with experimental data of the greatest value. At the opening meeting of the American Institution of Electrical Engineers Mr. Lamme described the new single phase railway equipment of the Westinghouse Co. which is being applied to a full gauge railway, thirty-one miles long, connecting Washington and Baltimore. The Company has adopted this as their standard system after elaborate experiments, and it differs in almost every detail from the ordinary direct-current trolley railways. The line is designed for short trains running at speeds of over forty miles an hour, and the test-room results given by Mr. Lamme are most promising. In Germany, Siemens and Halske have been experimenting with electric locomotives on the high speed experimental railway near Berlin. Speeds of 100 miles an hour have been obtained, and if the line had been laid with heavier rails, still higher speeds would have been possible. Siemens use three-phase alternating current at 10,000 volts, which is led direct to the motors by means of three trolley bows and no transformers or other pressure-reducing devices are used. The safety of the passengers so far as shock is concerned, is almost absolute, as everything in the trailer cars is in direct connexion with the earth. It is found that forced lubrication has to be adopted at high speeds. These high speeds are possible only on straight lines, they would be quite impossible on most of the railways in this country owing to their curvature. Siemens and Halske are now preparing for a series of tests on heavier and better-fixed rails, and as the latest locomotive is about thirty per cent. lighter than the older one with which the high speeds were obtained, much better results should be shown.

Oil Motor-cars. In a paper read recently before the Institution of Mechanical Engineers, Captain Longridge discusses various technical points connected with the manufacture of oil motor-cars, in which engineers know that there are many features admitting of improvement. Ordinary users of the highway have also arrived at a similar conclusion, and the paper in question should therefore be of

general interest. Some hopelessly impossible people would like to see motor-cars improved off the face of the earth altogether, but reasonable human beings would be satisfied with an autocar capable of travelling quietly without leaving a comet-like tail of perfume in its track, and of standing still or moving slowly without external manifestation of that suppressed excitement which at present characterises these latter-day vehicles. Something has already been done towards the attainment of these objects, and Captain Longridge makes several useful and practical suggestions in the same direction. He believes that the motor itself can be improved by assimilating it more to the character of the steam-engine, and that steady running will be secured by giving one impulse to every revolution. There is very probably room for a new engine constructed on this principle, which should greatly facilitate steady action at slow speeds. Silencers at present in use are considered to be too small, and it is tolerably certain that they are capable of much improvement. Referring to the fly-wheel, the author attributes to the inertia of this part a great deal of the vibration in a motor-car. So far as we are aware, the only satisfactory method by which excessive vibration can be eliminated is by using two fly-wheels running in opposite directions. This principle has been applied with good results to one or two makes of English and French cars. Experimental inquiry is clearly to be desired with regard to oil-motors, and the suggestion is worth consideration that the Institution might be well advised in extending the scope of the existing Gas-Engine Research Committee to the investigation of the many problems now surrounding and impeding the progress of the petrol-engine.

Foretelling Thunderstorms. We suggested a few months ago that the newly-discovered radio-active substances might be useful in connexion with lightning conductors, as they have the property of making all the air surrounding them an excellent conductor for electric discharges. We pointed out, however, that these substances would probably lose their properties if continually exposed to the weather, and so their use might be limited to the periods when a thunderstorm is actually approaching or is threatening. In overhead traction or power transmission systems, there are always engineers in attendance who can take the requisite precautions during storms, but for lightning conductors for buildings if special appliances have to be put in the circuit an hour's notice at least would be requisite beforehand. Now M. Turpain, in *L'Eclairage Electrique* for last month, gives a complete account of a highly ingenious method he has invented for foretelling thunderstorms which has been successfully employed in practice. The tests were made under the auspices of the Agricultural Syndicate of Saint-Emilion, who have practised for more than two years the method of cannonading thunder clouds to prevent the formation of hailstorms in the wine districts. M. Turpain places several coherers similar to those used in wireless telegraphy in connexion with a copper wire run up a small mast. These coherers are of different degrees of sensitivity, the most sensitive giving signals when

a storm is 250 miles off, and the least sensitive only acting when it is nearer than fifty miles. Recording instruments are used, so that the times that the various coherers come into action give valuable information as to the progress of the storm and the speed with which it is advancing. Since it has been set up there have been three storms which were duly foretold four, three, and two hours and a half before they came. It seems to us that the apparatus of M. Turpain would be of great value in meteorological stations, and would make possible the use of special methods of protecting buildings during thunderstorms.

St. Bartholomew-the-Great, West Smithfield. A FUND has been opened for rescuing the remains of the western cloister which stand in Bartholomew-close on the southern side of the site of the nave of the Augustinian Priory Church, and have been used during late years as Scriven's forge, and as stables. Some interesting views of the cloisters will be found in J. W. Archer's "Vestiges of Old London," 1851, and in the Archer collection at the British Museum. They are plotted on a plan made by J. Carter, the "Architect" of the *Gentleman's Magazine*, in 1791, which belonged to Britton: see vol. I. of Britton and Lekeux's "Church Architecture," 1838, and the plan, of about 1530, published in our columns on May 8, 1886. The south side of the cloisters, which were arcaded as was the chapter-house, was destroyed by a fire in 1809; each side, being of late fourteenth or early fifteenth century date, had eight bays with, it is conjectured, a ninth bay beyond; the east side and its Transitional processional door leading into the nave fell into ruins on August 8, 1834; over it was a gallery. The sides measured 15 ft. in width, the cloister-garth being about 100 ft. by 95 ft. To the south lay the refectory, buttery, and kitchen; to the west an outer parlour and, it is believed, the prior's lodgings; to the east the south transept (burned in 1830) latterly the "green churchyard," the chapter-house, and the common room, with dormitory, 120 ft. by 30 ft., above it, through which passes Middlesex-passage to the Little Close. The vaulting of the cloister consists of chalk and rubble in mortar with stone groyne springing from clustered shafts on either side, and with carved bosses at the intersection of the ribs. The groining, albeit simple, is good masonry, and the preservation of the remains should form a fitting complement to the precedent labours for the reparation of the church which we owe in the first instance to the initiation in 1790-1 of Thomas Hardwick, who examined, and reported upon, the fabric, and whose set of beautiful drawings is preserved in the library of the Society of Antiquaries. The work of restoration was continued from time to time, as the funds allowed, by John Blyth (1837), Richard Carpenter, William Slater, and Professor T. Hayter Lewis (1863), and completed, as our readers will recall, in 1885-97 under Mr. Aston Webb's guidance and supervision with the reinstatement of the choir and apse, transepts, lady-chapel, and crypt.

Portman Market. THIS newly-erected market, which was reopened on April 18 of last year for the sale of meat, fish, and vegetables, is again offered for sale. The present buildings, planned

and designed by Mr. H. T. Gunton, of the firm of Messrs. Gordon & Gunton, for Portman Market, Ltd., extend over an area of 13,426 ft. superficial. They comprise 160 stalls divided by eleven diagonal and straight avenues, a space for cold storage, or a garage for motors, beneath the central dome, and twenty-eight shops with a frontage to Church-street, and other main entrances in Salisbury and Carlisle streets. The estimated rental amounts to from 7,000l. to 10,000l. per annum, and there is a separate installation of electric light. The company had been formed for taking a lease of the site from Lord Portman for fifty-eight years from Lady Day, 1899, at a present ground rent of 1,030l. per annum. The vendor, Mr. John Baker, fixed the purchase-price of the lease and market rights at 40,000l. The cost of the new buildings, with offices and equipment, was calculated not to exceed 5,000l. The market was established on its present site in Church-street, in the parish of St. Marylebone, in pursuance of an Act 11 Geo. IV., cap. 71, additional powers being obtained under an amending Act of 2 and 3 William IV. cap. 113, and stands immediately opposite the goods terminus of the Great Central Railway.

At the Fine Art Society's Gallery is a collection of landscapes in water-colour by Mr. Hugh L. Norris. We should say that Mr. Norris had been somewhat influenced by the style of Mr. J. W. North; his works at last exhibit somewhat the same kind of titter of light and colour, in which detail is rather suggested than fully made out. The colour in the sky seems in some cases rather dead, but there is a great deal of beauty both of colour and composition in many of the drawings. Among them may be specially mentioned "A New Forest stream" (14); "All the Air a Solemn Stillness Holds" (33); and "A Field of Poppies" (5). In some of the drawings—"Ibsley ridge," for instance (50), there is a generally charming effect of colour but the texture of everything seems too much broken down to a conventional surface which does not convey the effect of Nature. However, there is much to like in the collection; among others two flower-garden objects, "An Autumn Border" and "A Summer Border" (25 and 51) are very bright pieces of crowded detail, painted with more incisive touch than the general landscapes. In the same Gallery is a small collection of exceedingly spirited war sketches by Mr. Inglis Sheldon-Williams (late of Hampton's Horse, I.Y.), who has served through the war, so to speak, with rifle in one hand and pencil in the other. They are mostly drawings of mounted troopers, sketchy though (especially the horses), but full of spirit and action.

An architect sends us an advertisement from a provincial paper asking for tenders for a house, which are to be sent in to a gentleman who defines himself as "architect and coal merchant." This seems a new professional development. It would be interesting to know which occupation came first; the advertiser a coal merchant who for a special occasion has blossomed into an architect? Or is he an architect who has taken to speculating in the coal trade as a

means of adding to his income? At all events, the idea suggests further possibilities of development.

AMENDMENT IN PATENT LAW.

In our issue of May 25, 1901, we adverted to the published Report of a Committee which the Board of Trade had appointed to inquire, within certain limits, into the working of our Patent Acts of 1883-1901. Following upon that inquiry, a Bill was prepared and introduced by Mr. Gerald Balfour, the Attorney-General, and the Solicitor-General during the current Session, and, as amended by the Standing Committee on Trade, &c., was read last week for the third time in the House of Commons. Should the measure be passed by the House of Lords, it will bring about a considerable change in the scope and administration of the existing Patent Act of 1883, and will involve, besides, an increase of the technical staff, which has already assumed large proportions, together with a diminution of the annual surplus derived from fees. To meet in part the losses of revenue due to the expected decrease of income, the Bill prescribes that an additional fee not exceeding 1l. shall be payable upon the sealing of the patent.

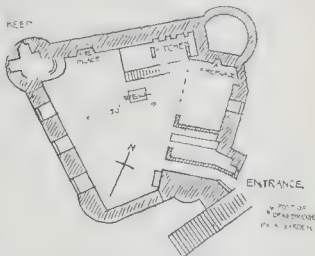
The principal provisions of the Bill relate to the adoption for the first time in this country of an organised system of inquiry by the authorities into the "novelty" of the claims set forth in applications for the protection of letters patent as soon as the completed specifications are severally deposited by applicants. On and after January 1 of next year the examining and expert staff will be required to supplement the inquiries which they now make in respect of the form, contents, and other particulars of the specifications, with "a further investigation for the purpose of ascertaining whether the invention claimed has been wholly or in part claimed or described in any specification (other than a provisional specification not followed by a complete specification), and deposited in the Patent Office pursuant to any application for a patent made in the United Kingdom within fifty years next before the date of the application." If it should then appear that the invention has been wholly or in part claimed or described in any such specification the applicant is to be informed thereof, and he may within a time to be prescribed amend his specification, and his amended specification will be again investigated and reported upon as before. The Bill declares that an invention shall not be deemed to have been anticipated by reason only of its publication in a specification deposited in the Patent Office pursuant to an application made not less than fifty years before, and excludes publication in a provisional specification of any date not followed up with a complete specification. Thereupon the Comptroller of the Patent Office will notify his acceptance of the specification in the event of his being satisfied that no objection obtains therein upon the ground of precedent anticipation, and in the absence of any other lawful hindrance or ground of objection. But if he is not so satisfied, the Comptroller will accord the inventor a hearing, and, unless the objection is removed by an amendment to his satisfaction, will determine whether a reference to any, and if so, what, prior specifications ought to be made in the specification by way of notice to the public. A right of appeal will lie from the Comptroller's decision to the Law Officer. The new investigations and reports will not be held in any way to guarantee the validity of any patent; moreover, the Board of Trade and their officers are expressly to be exempted from any liability as arising out of such investigation and report. We may here observe that in Germany, Austria, and notably in the United States of America, a search into novelty is undertaken by the Government, and an anticipatory claim to the invention, or even its prior publication in a form other than that of letters patent, will operate adversely to the applicant. In France, and, we believe, in Italy and Belgium, no initial examination is instituted in that behalf.

Other clauses of the Bill concern an amendment of the existing law which relates to the grants of compulsory licences by the Board of Trade whereby, in future, that Department will consider any petition addressed to them by an interested person who alleges that the reasonable requirements of the public in the matter

of a patented invention have not been satisfied, and prays for the grant of a compulsory licence or, in the alternative, for the revocation of the patent. If the parties do not come to an arrangement between themselves the Board of Trade, should they deem that a prima facie case has been made out, will refer the petition to the Judicial Committee of the Privy Council, but if they are not so satisfied they may dismiss the petition. The Bill declares that the reasonable requirements of the public shall not be deemed to have been satisfied if, by reason of the default of the patentee to work his patent or to manufacture the patented article in the United Kingdom to an adequate extent, or to grant licences on reasonable terms, (1) any existing industry or the establishment of any new industry is unfairly prejudiced, or (2) the demand for the patented article is not reasonably met. The new procedure as to compulsory licences will affect patents granted before as well as after January 1 next, and the Judicial Committee may order the patentee to grant licences on such terms as they may think just, or they may on the other hand revoke the patent if they think that the grant of licences will not meet the reasonable requirements of the public.

DUNSTAFFNAGE CASTLE, CO. ARGYLL.

At the instance of the Duke of Argyll a subscription list is opened at Coutts's Bank for the proposed reparation of Dunstaffnage Castle, in Lorn, an ancient stronghold of the clan Campbell, and, as is believed, of the Pictish kings, until their overthrow by Kenneth MacAlpine, who carried thence the coronation stone to Scone. Having defeated the MacDougals, Lords of Lorn, in 1305, Robert Bruce laid waste the lands of Argyll, and, as Barbour chronicles, captured Dunstaffnage, which with the mains thereof he bestowed upon Sir Arthur Campbell. In 1436 James I. gave it to Dugald, son of Sir Colin Campbell of Lochawe, in whose descendants, the titular chiefs of Argyll, as hereditary keepers it has since remained. The castle, built in or about 1250, stands upon a promontory at the mouth of Loch Etive; its walls rise sheer up from the steep faces of the rock. The enceinte forms an irregular quadrangle, with its longer diagonal north and south. Two towers, facing the sea at the eastern and western angles, are



Sketch Plan of Dunstaffnage Castle.

rounded on their exterior, but squared to the courtyard. The main entrance is in a projecting bay that faces the east, and the south-west angle is rounded. The north-western tower or keep, measuring about 28 ft. by 25 ft. over all, occupies the highest part of the rock; a stair on its outside rises 6 ft. or 7 ft. to the ground floor, whence a circular stair in the thickness of the wall gives access to the middle floor; the top floor, about 6 ft. wider than the ground floor, is entered from the battlements. The walls have arched recesses internally, and some of the narrow loops retain their original wide splays. The curtain-wall, some 100 ft. long, and from 9 ft. to 11 ft. in thickness, from the keep to the north-east tower, rises to nearly 60 ft. from the base, whilst the parapet walk is not more than 25 ft. above the courtyard. In the angle of the curtain and the north-east tower is a house bearing a date "1725," and letters "E.C." and "J.C." over the door in the upper floor, which is entered from an exterior stone stair; the house contains the older garde-robes, sinks, and windows of the curtain-wall, and the fireplace; in front lies the well. In the south and squared wall of the adjoining and

HOUSE AT WESTCLIFF
ON SEZ. FOR W. HARMON
MR. J. AN EQ. M.D.



rained tower is a fireplace; another large fireplace in the curtain, near the keep, seems to indicate that the great hall occupied the northern side of the court. On the east side the front is 100 ft. in length. The principal entrance is embodied in a four-storied residence; there are remains of the drawbridge, but an outside staircase against the south-eastern face of the enceinte now gives access to the ground floor. The pointed arch, about 10 ft. in span, of the gateway has been contracted to a narrow, round-arched doorway carried through the wall. A similar pointed arch, 9 ft. wide, at the remoter end of the long passage, has likewise been built up with a lintelled doorway. Two quaint shooting-holes lead from the basement floor into the passage, which also has a small guard-room. The southern and western sides of the enceinte, about 68 ft. and 112 ft. long respectively, have mural enclosures in their curtains. The chapel, 160 yards distant south-west, is co-eval with the castle, and is distinguished for a beautiful chancel arch (since built up) with beaded angle-shafts and elaborated mouldings and dog-tooth carving continued on the jambs and arch. The same enrichments will be noticed in some of the high narrow and very widely splayed lancet-windows of the nave; two pairs have banded shafts 6 ft. 9 in. high and 5 in. thick, with Early English bases and carved caps. The west window in the south wall is round-headed, without shafts. The chapel, roofless and ivy-grown, 90 ft. 7 in. by 26 ft. 6 in., retains its west gable, with angle-shafts in the corners; the east gable and door are modern. The nave forms a burial-ground for Oban; the walled-in chancel is reserved for private interments.

WESLEYAN CHURCH, BUCKLESHAM, SUFFOLK.—Memorial stones of a new Wesleyan church were laid at Bucklesham recently. The new building has been designed by Messrs. Eade & Johns, of Ipswich, the contractor being Mr. C. Green, of Ipswich.

• These measurements, and some other structural particulars, we take from Messrs. McGibbon & Ross's book upon the castles of the Kings of Scotland.

DOCTOR'S HOUSE, WESTCLIFF.

THE walls of this house are of red brick, and the roof is of red tiles. The hall is panelled, and the floor paved with black and white marble. Messrs. Cross Brothers, Hutton, Essex, are the builders, and Mr. W. J. Tapper, of London, the architect.

THE ST. LOUIS EXHIBITION.

AN Exhibition is to be held at St. Louis, U.S.A., in 1904, to commemorate the centenary of the purchase by Louisiana from the French. The Exhibition was planned for 1903, which is the real centenary (Louisiana having been purchased by the United States Government in April, 1803), but the opening of the Exhibition has been postponed to 1904, we presume in order to gain more time for adequate preparation. Judging from small illustrations which have been forwarded to us, the temporary buildings for the Exhibition will be of a dignified architectural character, though they do not emulate the originality and picturesqueness of those of the Paris and Glasgow Exhibitions.

We extract from a mass of hyperbole in regard to the beauties of the forthcoming Exhibition (in the style which is unfortunately usual in connexion with American enterprises of this kind) the following information:—

The St. Louis Exhibition will spread over two square miles, and include fifteen large buildings for industrial and other purposes, varying in size from 1,300 to 140 ft. long, and from 830 to 200 ft. wide. The Exhibition is planned in the shape of a fan. At the narrow end of the design is the lagoon and cascade. The Festival Hall and the Terrace of States (a screen in classic form fitted with statues allegorical of the different States taking part in the Exhibition) serve as a background. As is the case with nearly all the large buildings, the Palace of the Liberal Arts is being built of "staff," of an old-ivory white colour. The staff is affixed to a framework of timber. Messrs. Barnett, Haynes, & Barnett, St. Louis, are the architects, and the building contract, although the structure is temporary in character, has been let to the Conrad Keller-

man Construction Co. for 95,000l. Throughout the Exhibition the buildings, as a rule, are Renaissance in style. In the Liberal Arts building, the architects' endeavours have been to conceive a palace of industries, in which the three arts, architecture, sculpture, and painting, join hands. Ornate detail has been avoided, the idea being to depend largely upon sculpture for decorative effect. A semicircular colonnaded vestibule will form the main entrance to the building, with a ceiling decorated with frescoes on a gold ground. The building will have an internal court with a cloister, and decorated with fountains and sculpture; the walls of the loggias are to be decorated with frescoes.

The "Varied Industries" building is designed by Messrs. Van Brunt & Howe, of Kansas City, and is decorated with an Ionic order. It will present a facade of 1,200 ft. on the north, and 525 ft. on the east, and will have a large tower 400 ft. high, flanked by two smaller towers 200 ft. high, as features of the main facade. The towers are being so constructed as to permit of grand displays of electric light illumination. At the re-entering angle of the south front of the building is a dome 160 ft. in height. Two large open courts are planned in the centre of the building; these will form, as it were, a miniature village of exhibits. A central passage way, or corridor, runs through the centre of the building from north to south. The contractors for the building are the Rountree Construction Co., St. Louis, their tender for the work being 604,000 dol., or over 120,000l. The building is temporary in character, and is being built of staff over a frame of timber.

The Electricity building, of which Messrs. Walker & Kimball are the architects, will be surrounded by water, and will be lit by hundreds of lamps, which will be seen reflected in the water. The Palace of the Fine Arts, because of its more permanent character, will be the most costly of the buildings, and at the close of the Exhibition is to be handed over to the city as a permanent museum building. It is divided into three sections, with a plan of E-shape. The main or central building is of buff brick, whilst the wings, or annexes, are of brick, timber, and staff. The

main building occupies 340 ft. long by 160 ft. wide, and is separated from its two annexes by open courts 44 ft. wide. The cost of construction is set down at about 200,000l. The building will stand on a plateau 60 ft. above the sea, and be surrounded by a terraced garden. Mr. Cass Gilbert is the architect. The main hall, 157 ft. long and 94 ft. wide, is the central chamber in the centre building, and is a sculpture gallery, lighted from skylights. Studios, offices, and workrooms are placed in the second story. In the basement are jury-rooms, packing-rooms, and space for heating apparatus. The annex buildings, so far as architecture is concerned, follow the style of the main portion, the walls being brick decorated with stucco.

We may add that exhibit space is free, and at a limited quantity of power is to be applied gratuitously for the exhibition of processes of manufactures. The offices for the United Kingdom for the St. Louis Exhibition are at Sanctuary House, Tothill-street, and the resident representative is Mr. George F. Barker.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

THE first meeting of the current session of the Discussion Section of the Architectural Association was held at 56, Great Marlborough-street, W., on the 15th ult., Mr. G. I. Smith in the chair. Mr. Noel F. Barwell read a highly interesting paper on "Some Recent Theories concerning Saxon and Early Norman Architecture in England," in the course of which he summarised the propositions of the leading authorities on pre-Conquest architecture. Dealing first with Professor Baldwin Brown's theory, the author pointed out that all Saxon work could be classified under two broad heads—(1) the Continental type that built under Roman influence, including cruciform buildings, or those of the basilican plan, and (2) those of a Celtic origin derived from the stone oratory, whether apsidal or square ended. Coming then to the theory advanced by the Rev. W. Myles Barnes, that Saxon work was the production of a guild or body of freemasons, originating from the Comacine guild (a descendant of the Roman "collegia"), Mr. Barwell pointed out the weakness of the evidence to support this, the principal item of which was the universal presence of the convoluted ornament known as the Comacine knot. Thirdly, the author took up Mr. E. S. Prior's carefully thought out articles, in which he deals with his subject in a masterly way, through the medium of sculptured ornament. His classification groups pre-Conquest work into three divisions—(1) that directly introduced from Byzantium, or with Byzantine influence strongly marked; (2) the Viking school, wherein we see Norse influence most strongly impressed; and (3) the Carolingian, derived from Italy either through Germany or through Gaul. Having drawn his own conclusions on the preceding theories, Mr. Barwell concluded his paper by showing a large number of interesting lantern slides bearing on the subject.

The discussion was opened by Mr. Louis Ambler, and sustained by Messrs. Watson, Lucas, Ernest Radford, E. W. Hudson, and others, and Mr. Francis Bond (who attended as Special Visitor), in summing up, contributed some interesting and important remarks from his own experience and research. He pointed out the difficulty of classification by plan, because of the extraordinary diversity of even the simplest and earliest buildings; that we at present scarcely realise the high state of civilisation reached by the Romans at the time of the fall of their empire; and, finally, gave an important list of the features most prevalent in pre-Conquest architecture, such as the apse, the triple arch or colonnade between chancel and nave, the transepts, long and short work, mid-wall shafts, pilaster strips, herring-bone work, circular and triangular arches used alternately. Mr. Bond broadly divided Saxon work into (1) School, which does not show the usual characteristics of Anglo-Saxon work (no long and short work, no mid-wall shafts, and so on), a list of which he gave; (2) That showing a direct knowledge of Norman work, as exemplified by Bradford-on-Avon; and (3) the remaining examples not included in divisions 1 and 2.

The vote of thanks was heartily emphasised, and the Special Visitor specially thanked for

his valuable contribution to such a successful discussion.

The next meeting of the section will be held on November 5, at 7.30 p.m., when Mr. H. M. Cautley will give his views on "The Buildings about a Farm."

ARCHITECTURAL SOCIETIES.

ARCHITECTURAL ASSOCIATION OF IRELAND.—The second general meeting of the session took place at the Grosvenor Hotel, Dublin, on Tuesday evening, the 21st ult. The President, Mr. F. G. Hicks, occupied the chair. After the usual routine business had been transacted, Mr. Arnold Mitchell, of London, delivered a lecture entitled "Some Interests of Mediaeval Architecture." In the course of the lecture he dealt with the characteristics of the Earlier and Middle Gothic construction and ornament. The buttress and pinnacle were directly the outcome of the arcuated system of construction which was the essence of Gothic work. He described the method by which the builders of old time obtained the effects which they sought—the use of small stones (because they were carried up the scaffolds on men's backs, the time of weight-lifting machinery not yet having arrived), and the making of this compulsory use of small stones a means for good effect, the ceasing of arches in thick walls and consequent beautiful effect of light and shade. The lecturer then went on to point out several instances in which the thoughtfulness of the mediaeval builders was very evident—the raising of the bases of columns to the inner arcade in the triforium at Westminster and elsewhere, and the carving of the round-arched spaces over door heads, where, as occurs in many places, the door proper is covered by the lintel, while there is a semi-circular arch over, projecting beyond this out to the general face of the wall. He drew attention to the great difficulty of designing figure carving in such a way as to fill properly a space like this, and the still greater difficulty of doing so when of necessity a number of horizontal and vertical stone joints crossed the design, and pointed out how successfully these difficulties had been overcome in the instances shown on the screen. It was particularly noticed how the wings and draperies of the figures had been disposed to suit the joints, with the very best effect. The lecturer showed and described many examples of carving to bring out the fact that all the old ornament had its meaning and interest. This was emphasised in the photograph showing a number of heads, forming stops to label mouldings in a nave arcade, where it seemed probable that these heads were likenesses of the various monks who took part in the work of building the church. The lecturer also drew attention to the possibility of obtaining a very rich and beautiful effect by mouldings alone, without the assistance of sculptural decoration; he instanced this by a reference to Salisbury Cathedral, where the only occurrences of carving—as apart from moulding—are in the brackets carrying the ribs of the nave vault. He closed with a reference to the principle which actuated mediaeval builders in the later days in their carving—that they did not actually copy natural forms, but used them as a motive and suggestion for their work, and suited the refinement and character of the work to the nature of their material.—Mr. Charles Ashworth proposed a very hearty vote of thanks to the lecturer. He spoke in the highest terms of the lecture, and of Mr. Mitchell's kindness in coming so far to give it. Count Plunkett seconded the motion, and made some remarks as to the surface colour decoration of Gothic interiors.—The next meeting will be held on November 4, when Mr. C. J. McCarthy (the City Architect) will read a paper on "Three Weeks in Normandy."

COMPETITIONS.

BOARD SCHOOLS, CLACTON-ON-SEA.—Mr. A. W. S. Cross, F.R.I.B.A., the assessor, has reported on the designs for the Holland-road School, received in competition by the Great Clacton School Board. He places the designs in the following order of merit:—(1) "Lux," Mr. T. H. Baker (of Baker & May), Colchester and Clacton-on-Sea; (2) "Crowstone," Messrs. Smees, Mence, & Houchin, 12, West Smithfield, E.C.; (3) "Picturesque," Mr. S. Jackson, 65, Fenchurch-street, E.C.; (4) "Utility with Economy," Messrs. Greenhalgh & Brockbank, Southend; (5) "Compact," Mr. S. J. Adams,

Southend; (6) "Experience," Messrs. Scott & Hanson, 10, Basinghall-street, E.C. The Board has adopted the award, and instructed Mr. Baker to proceed with the work. Thirty-one designs were sent in, and the school is for 800 children.

MUNICIPAL BUILDINGS, BIDEFORD.—The first premiated design in the competition for municipal buildings and library, Bideford, was that submitted by Mr. Alfred J. Dunn, 36, Colmore-row, Birmingham. The second premiated design was by Mr. J. E. Forbes, Colmore House, 21, Waterloo-street, Birmingham; and the third by Messrs. Buckland & Farmer, 25A, Paradise-street, Birmingham.

COLONY FOR IMBECILES AND EPILEPTICS, LANGHO.—The Chorlton and Manchester Joint Asylum Committee have just exhibited at the Chorlton Town Hall the designs they have received in connexion with the colony for imbeciles and epileptics proposed to be erected at Langho, near Blackburn. There are thirty-four designs in all, and premiums have been awarded to three—200l. to Messrs. Giles, Gough, & Trollope, architects, 28, Craven-street, Charing Cross, London; 150l. to Messrs. Edward Page Howard, Curstion-street, Chancery Lane, London; and Ernest R. Dolby, architect, Westminster; and 100l. to Mr. Joseph Smith, of Messrs. Cheers & Smith, and Messrs. Frederick John Parkinson and Walter Stirrup, joint architects, Richmond-terrace, Blackburn. The designs which gain the first award provide for a total accommodation at first of 700, but provision has been made to extend the accommodation without interfering with the existing buildings to bring up the number of patients to 1,200. There is a central administrative block. To the east there will be homes for males in separate villages, and to the west villages for females and children, the village for sane epileptic children being away from the rest in the south-west corner of the site. There will be a laundry for sane epileptic women, and workshops for sane epileptic men, and the homes of this class of patient will be separated from the homes for imbeciles. Provision has been made for a chapel and a recreation hall, and the architects recommend that the two farmsteads on the site should not be removed, for they might eventually be adapted as a dairy farm, and the homestead of the farm steward and bailiff. The estimated cost is 187,316l. The second scheme provided for 698 patients with a view to further accommodation for 504, and the third scheme for 710 patients with extensions for another 500.

ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—By permission of the Bridge House Estates Committee the members of this Institution recently paid a visit to the London Bridge Widening Works, and had the opportunity of witnessing the erection of the last girder of the temporary footbridge. The resident engineer, Mr. W. B. Cole, Assoc.M.Inst.C.E., assisted by Mr. Lynton and Mr. Hugh Critwell showed the party over. The works are being carried out with the object of widening the footways of London Bridge from the present width of 9 ft. 6 in. to a width of 14 ft. Advantage will be taken of the opportunity of increasing the width of the roadway also from 34 ft. 6 in. to 37 ft. giving an additional 2 ft. 6 in. The existing width between parapets is 53 ft. 6 in., the new width will become 65 ft. The extra width will be carried on granite corbels or cantilevers projecting from the outer spandrel walls of London Bridge, the bed for these corbels being that of the existing central course. It is intended to place refuges at intervals over the Bridge, and to light the bridge from standard lights fixed on these refuges. In order to carry out the work it is necessary for the footways to be closed. For the convenience of foot passengers, temporary footbridges are under course of construction on both the east and west sides of London Bridge. Each footbridge consists of five spans of steel work, one span 157 ft. 7 in., and four spans 146 ft. 5 in., which are supported from the piers by steelwork trestles, and at the abutments by timber trestles built up from the stairs leading down to the river, the intervals between the ends of the steelwork and the footway levels at the ends of London Bridge being filled in by timber work. The clear width of the temporary footbridges is about 11 ft. 2 in., and the length from end to end is about 1,000 ft. On the top booms of the

Mr. Cousins moved that the recommendation be referred back. It was a proposal which would seriously affect quantity surveyors and the Council's building work, and from the public point of view the proposed step would be a wrong one. It was desirable that some force should be interposed between the Council's Architect and the builder—some independent person to act as a check. It would be said that the Council had excellent officers and nothing could go wrong; but it was desirable

showing how the remainder of the site may be utilised for five-story block dwellings and shops. The accommodation proposed to be provided is as follows:—

101 two-room tenements..... 202 rooms,
144 three-room tenements ... 432 rooms,

634 rooms,

accommodating 1,268 persons. There will thus be a total accommodation for 1,325 persons, as against 997 displaced by the scheme. In addition, there would be ten shops and a store for administrative purposes in the rear. The cost is estimated at 70,176*l*. The rent proposed to be charged for the lodging-house is 6*d*. per night for the single cubicles, and 9*d*. per night each for the three double cubicles, which will be suitable for a woman and her daughter, or two sisters or friends. The rents if the tenements would average 3*s*. 1*d*. per room per week. This, although somewhat high, compares favourably with the rents at the borough-road dwellings and the Green-street and Gun-street dwellings, which average 3*s*. 8*d*. and 3*s*. 1*d*. per room per week respectively.

The Report was not considered.

The Theatres Committee and Theatres.—On the Report of the Theatres and Music Halls Committee,

Sir Algernon West, the Chairman, took the opportunity of offering some remarks on recent criticism of the Committee's action in dealing with London theatres. The Council were responsible for public safety in 850 houses, capable of accommodating 400,000 people. They were working under difficulties; on the one side they were attacked as being too rigorous in their exactions, and on the other side they were asked to be stricter. The Council had received the *damnum hereditas* of theatres wedged and jammed between ordinary dwelling-houses, which were quite unfitted for the purposes for which they were built. If he wanted any proof of the risk from fire that existed in some of these theatres, he might point to the fact that the insurance companies charged very much higher premiums for those houses than for ordinary ones. It was this class of place that the Council was trying to make safer for the public, and he denied that their requirements were excessive. In this matter it was impossible to get finality, but this he could say, that in no theatre constructed under the Council's conditions had the managers been called upon to deal with any requirements which involved any large expenditure. On behalf of the safety of the people, the Council could not swerve an inch to the right or left, and that being secured, they would endeavour to the utmost to secure the co-operation of the theatre managers.

The Report was received.

The Railways.—The Parliamentary Committee reported upon the withdrawal of the London United Company's Bill for the construction of a tube railway from Hammersmith to Charing Cross, and upon the general position of the tube question. They recommended that it be referred to the Parliamentary, Highways, and Finance Committees to at once consider the advisability of the Council promoting in the next Session of Parliament a Bill on the subject of underground railways in London.

Mr. Shepherd moved the adoption of the Report. He expressed an opinion that if the Council controlled the tube railways, instead of the companies doing so, there would be no delay in construction as at present, whilst financially there would be a very large saving, because the Council could get money at 3½ per cent., and the companies had to pay 6½ per cent. That meant a saving of 200,000*l*. on each 10,000,000*l*. invested, and as it was estimated that the total cost of these railways in London would be 50,000,000*l*., it could easily be seen how large the total saving would be.

Mr. Sidney Low moved an amendment to add the words "and to further consider the advisability of urging His Majesty's Government to appoint a Royal Commission or Select Committee to consider the whole question of London underground locomotion."

Mr. Phillimore seconded the amendment, and expressed the hope that the inquiry would not be confined to tube railways, but would also include shallow tramways.

Mr. Cornwall pointed out that between 1884 and 1901 twelve Acts were passed authorising the construction of tube railways, and in the

cases of seven of them no work at all had been executed. In 1901 eleven new Bills were introduced, and not a single one was passed; and in 1902 thirty-three Bills were introduced, and practically none of them had been agreed to. This was a serious state of affairs for London, and he thought they should call upon the Board of Trade to adopt the opinion of both Houses of Parliament, that these Bills should be dealt with by a special tribunal.

After some further discussion, the amendment was rejected by a show of hands.

Mr. Dew suggested that the Housing of the Working Classes Committee should be included in the reference, and this being agreed to, the Committee's recommendation was amended accordingly.

The Council then divided on the amended recommendation, when the numbers were:—For, 70; against, 13.

The recommendation was therefore carried. Other business was disposed of, and the Council adjourned.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Dwelling-houses on Low-lying Land.

Poplar.—(a) That the resolution granting a licence under Section 122 of the Act, for the erection of fifty-two houses on low-lying land situated at British-street and Cahir-street, Millwall, be rescinded. (b) That the solicitor do prepare a licence to Messrs. W. G. Wells & T. B. Benton, for the erection of fifty-five houses on low-lying land situated at British-street and Cahir-street, Millwall (Mr. W. Clarkson).—Consent.

Greenwich.—(a) That the resolution with reference to the formation or laying out of a new street for carriage traffic, to lead from Toddman's-lane to Woodlands Park-road, Greenwich, and in connexion therewith the widening of a portion of Toddman's-lane and Woodland-place, be rescinded. (b) That an order be issued to Mr. L. Sandilands sanctioning the formation or laying out of a new street for carriage traffic, to lead from Toddman's-lane to Woodlands Park-road, Greenwich, and in connexion therewith the widening of a portion of Toddman's-lane and Woodland-place (for Mr. D. G. Horlock).—Consent.

Lines of Frontage and Projections.

Lewisham.—Projecting balconies over the entrances to forty-two dwelling-houses on the west side of Stanodon Park, Lewisham (Mr. E. Tompkins).—Consent.

Marylebone, West.—A porch at the entrance to No. 42, Portman-square, St. Marylebone (Mr. E. Hoole for the Earl of Northbrook).—Consent.

Bermondsey.—A one-story shop on part of the forecourt of No. 134, Long-lane, Bermondsey (Mr. S. Kippes for Mr. H. Thomas).—Refused.

Marylebone, East.—A balcony at the first-floor level in front of No. 6, Duchess-street, Portland-place, St. Marylebone (Mr. W. H. White for Mr. R. H. Tebb).—Refused.

Westminster.—A portico in front of Block I, Rutland-court, High-road, Knightsbridge (Mr. D. Joseph for Mr. H. Lovatt).—Refused.

Width of Way.

Linehouse.—One-story building on the west side of Glamis-road and north side of Hunt's-mews, Shadwell, with the external walls of such building at less than the prescribed distance from the centre of the roadway of Hunt's-mews (Messrs. Waterman & Abrahams for Messrs. Meredith & Drew).—Consent.

Width of Way, Lines of Frontage, and Projections.

Southwark, West.—Two-story bay windows in front of four houses on the site of Nos. 7, 9, 11, and 13, Hayles-street, St. George's-road, Southwark (Messrs. Waring & Nicholson for the trustees of the Hayles Charity estate).—Consent.

Wandsworth.—The rebuilding of the Horse and Groom beerhouse, Mitcham-road, Tooting, and the erection of a sign to project therefrom (Messrs. Chart, Son, & Reading for the Tooting Brewery, Ltd.).—Consent.

Lines of Frontage and Construction.

Clapham.—An additional story on the flat roof of the existing porch in front of Branscombe, Queen's-road, Clapham (Messrs. G. Candler & Sons for Mr. T. Hancock).—Consent.

Poplar.—Deviation from the plans approved by the Council for the erection of an overhead transporter across East Ferry-road, Poplar, so far as relates to the omission of the iron roof over such transporter (Mr. F. E. Duckham).—Consent.

Wandsworth.—A wood and glass addition on the projecting landing at the rear of Blandfield, Nightingale-lane, Wandsworth, to abut upon Blandfield-street (Mr. L. S. Rogers for Mr. J. Heard).—Refused.

Width of Way and Space at Rear.

Hampstead.—That the application of Mr. H. Marnham for an extension of the period within which the erection of residential flats on the west side of Grove-place and the south side of Christchurch-road, Hampstead, was required to be completed, be granted.—Agreed.

Width of Way and Deviation from Certified Plans.

Hackney, North.—Certain deviations from the plan certified by the District Surveyor, under Sections 13 and 43 of the Act, so far as relates to the proposed rebuilding of the Beehive beer-house, Retreat-place, Upper Clapton (Mr. G. W. King for Messrs. Whitbread & Co., Ltd.).—Consent.

Formation of Streets.

Lewisham.—That an order be issued to Mr. R. Stewart refusing to sanction the formation or laying out of new streets for carriage traffic on part of the St. Germans estate, Hither Green, Lewisham, westward of Torridon-road, and southward of Braidwood-road (for Mr. A. Cameron Corbett, M.P.).—Agreed.

Cubical Extent.

Fulham.—A building on a site on the east side of Townmead-road, Fulham, and abutting on the river Thames, with four divisions of a one-story portion of such building each to exceed in extent 250,000 cubic feet but not 450,000 cubic feet, and to be used only for the purposes of a biscuit manufactory (Mr. W. T. Hamman for Messrs. Macfarlane, Lang & Co.).—Consent.

[Dwelling-houses on Low-lying Land.]

Woolwich.—That the solicitor do prepare a licence under Section 122 of the Act, to Mr. A. Sales, for the erection of twenty-eight buildings on low-lying land at Griffin Manor-way, Plumstead (for Mr. A. B. Hills).—Consent.

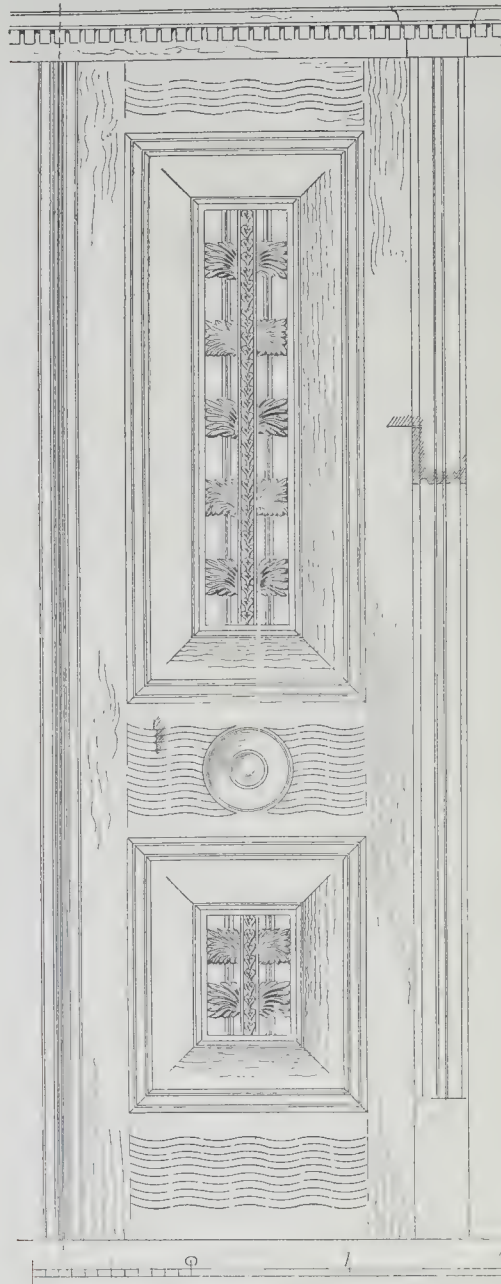
* * * The recommendation marked † is contrary to the views of the Local Authority.

"DIRECTORY OF THE BUILDING TRADES."

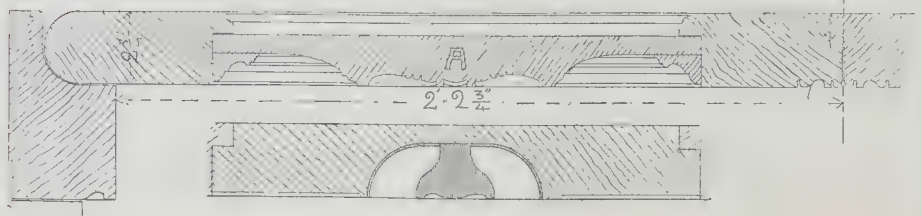
THE "Directory of the Building Trades, 1902," which has just been issued by Kelly's Directories, Ltd., High Holborn, is the ninth edition of a well-arranged and carefully edited work. According to the title page, it comprises "every trade and profession in any way connected with architecture and building throughout England, Scotland, and Wales, and the principal towns in Ireland, the Channel Islands, and the Isle of Man." We have had in frequent use previous editions of the work, and we can vouch for the accuracy of the information it contains—information which is easy to find, as the directory is so admirably arranged. There are 2,599 pages in the work, exclusive of advertisements, compared with 2,314 in the last edition, and the price is 1*l*. 7*s*.

In the preface to the directory we read that the amount of timber, mostly used in building, which was imported into this country during the year 1900 was as follows:—Hewn: Fir, 2,787,945 loads (4,299,518*l*.); oak, 173,800 loads (1,018,829*l*.); teak, 63,080 loads (786,066*l*.); unenumerated, 96,323 loads (358,312*l*.). Sawn: Fir, 6,401,636 loads (17,856,360*l*.); unenumerated, 231,074 loads (829,999*l*.). House frames, fittings, joiners' and cabinet work (1,195,314*l*.). These figures, compared with the totals for the year 1898, show a considerable increase in every description of timber imported, especially in fir timber. The totals are exclusive of mahogany and hardwood, 192,134 tons, of the value of 1,177,459*l*., and of lead (pig and sheet), 195,380 tons, of the value of 3,321,574*l*. It must be remembered also that the above figures are independent of the home productions, such as ash, elm, oak, birch, &c., of which there are no records, but which amount to something considerable. In addition to the above, there was imported into this country from abroad stone, marble, and slate to the total of 946,040 tons, of the declared value of 1,132,851*l*., the principal item of which consisted of 344,054 tons imported from the Channel Islands, of the declared value of 196,631*l*. The above items show an increase of 472,122*l*. over the figures of 1898.

The exports of articles used in building are also considerable; among the most important may be mentioned the following:—Cement, 359,944 tons, value 673,162*l*.; lead—rolled sheet, &c., 18,510 tons, value 382,496*l*.;



Elevation of Front Door, Standard, and Transom



Section through Panel and Lock Rail, to Larger Scale.

painters' colours, value 2,053.945*l.*; slates, 23,740,600 tale, value 147,800*l.*

There are no published accounts showing the amount of stone quarried in this country, but the total estimated value of stone of all kinds raised is between seven and eight millions, and of slate and slate slabs, produced under the Metalliferous Mines Act and under the Quarries Act, amounted to 585,859 tons, of the value of 1,528,336*l.*

In the present edition the publishers have included the names in the principal towns in the Channel Islands.

Illustrations.

NEW FRONT, BUILDER OFFICE.

THE owners of the *Builder* premises have been compelled to set the front of the buildings 3 ft. 6 in. back, in order to conform to the new street line for the east side of Catherine-street. It was not thought worth while to put up again the materials of the old front, and as the materials must be new, the opportunity was taken to erect a new design.

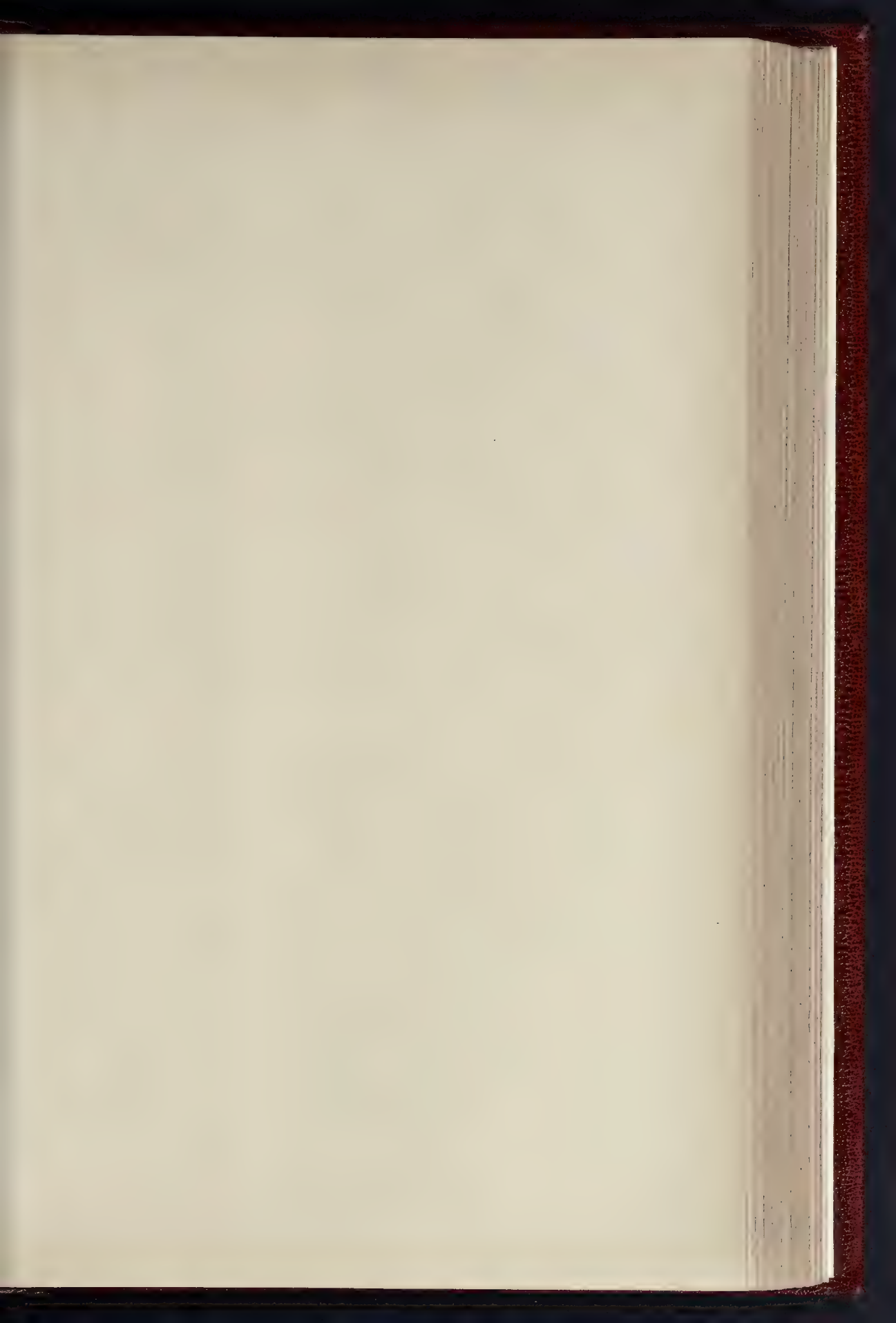
As the offices of the *Builder* consist of a high and narrow building which at present is standing isolated with no support on either side, there was a certain degree of risk in removing the cross wall in front; and the first thing I had done was to place barks of timber across from wall to wall at each floor, over each other, at about 3 ft. back from the ultimate front line, and shore the walls outside at the same point, so that they were gripped between the two. This being done, the operation of taking down the old front wall and building the new one was carried out without any injury to the building or any interruption to the office work.

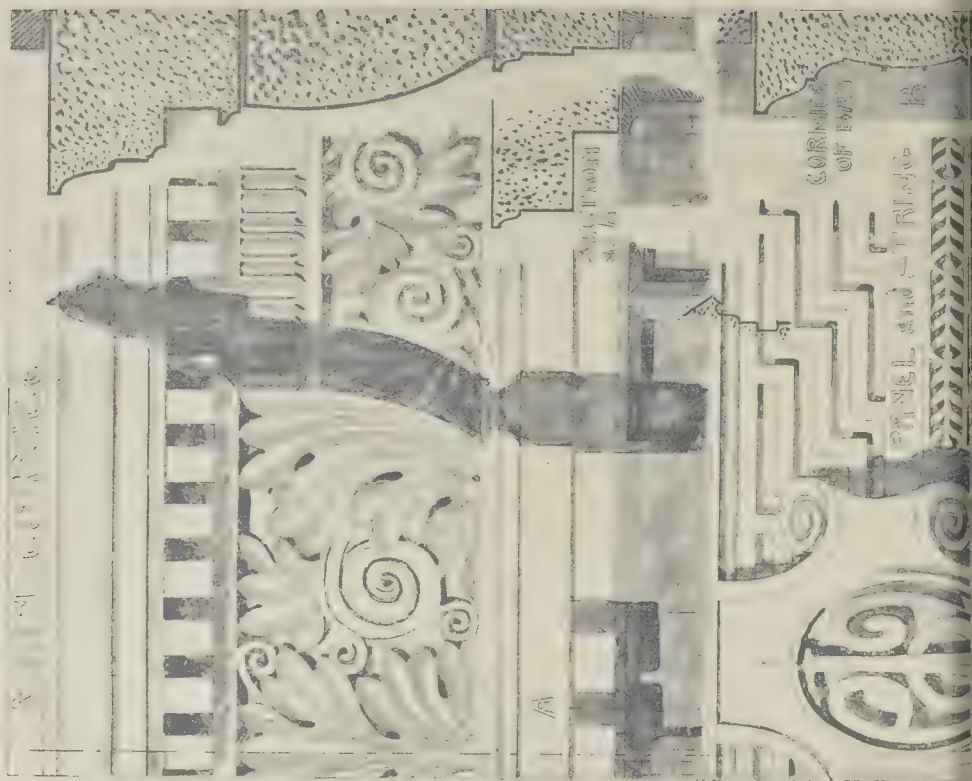
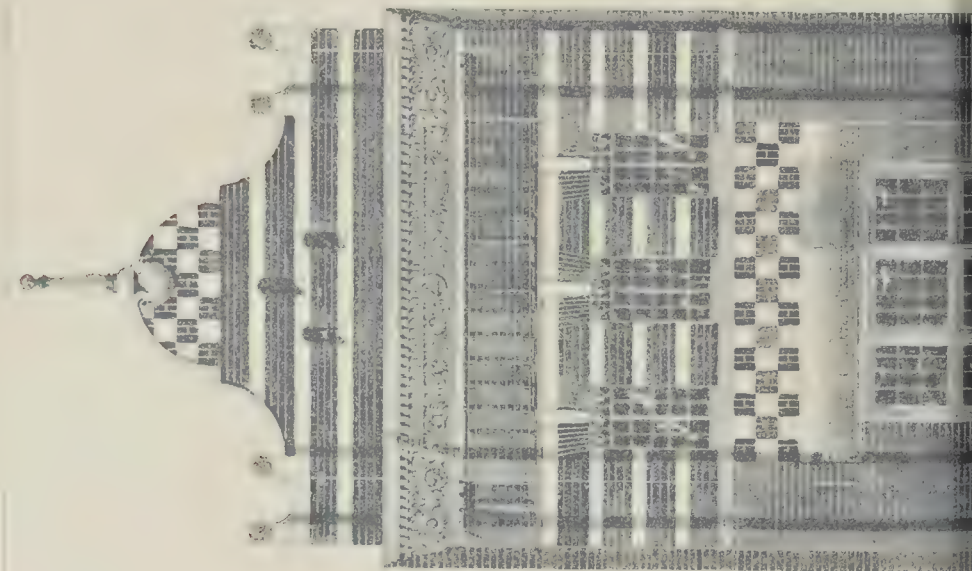
An entirely stone front was too costly, so that I had to endeavour to get a certain degree of effect with a front largely constructed in plain brick. The bricks are Bracknell red, of medium colour; the stone, selected white Portland. The front doors and woodwork of the ground story are in wainscot oak; it was intended to use English oak, but it is curious to record that it was impossible in all London to get English oak, at the moment, in sizes sufficient for the purpose; and as the work had to be carried out by a certain date, the English oak had to be abandoned, though some fairly fine wood was obtained in lieu of it.

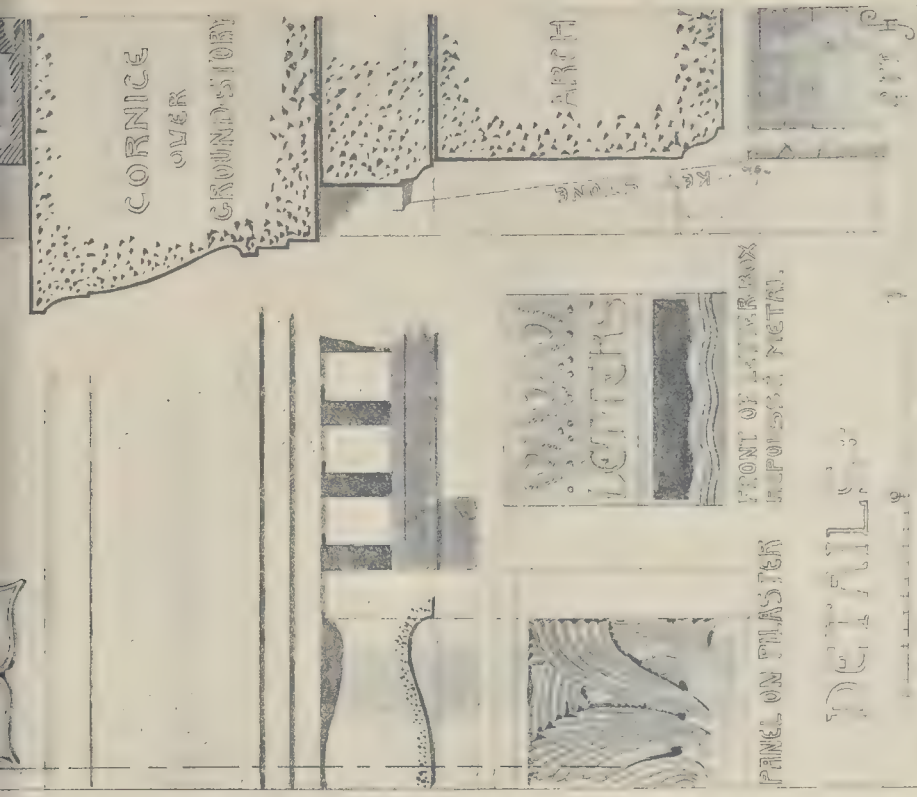
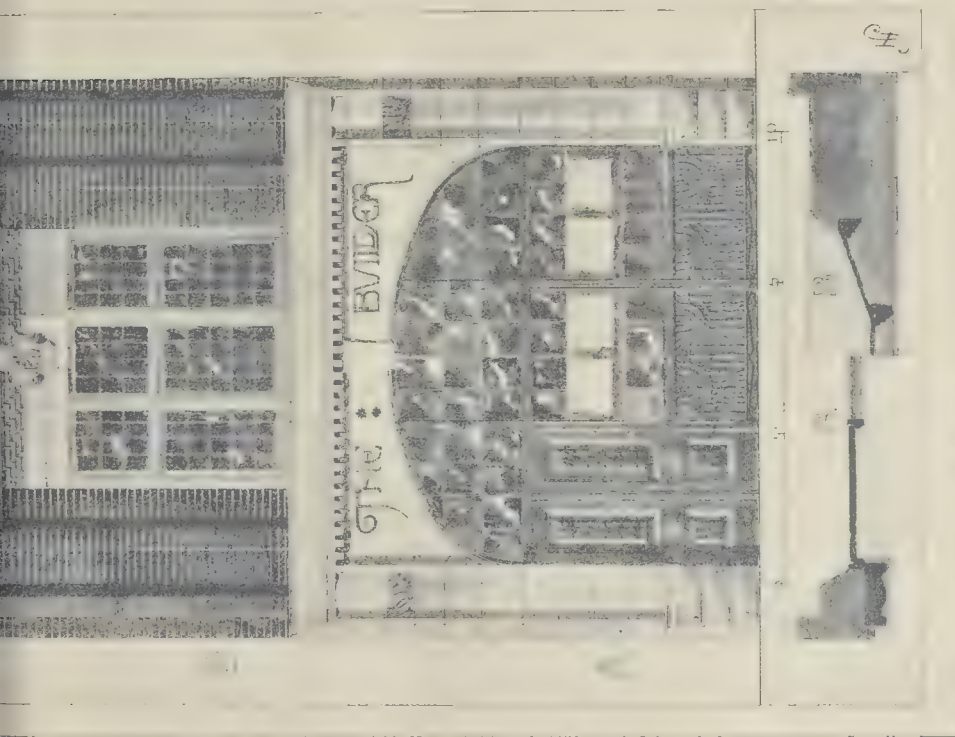
The attempt has been made to give some



Enrichment at A.



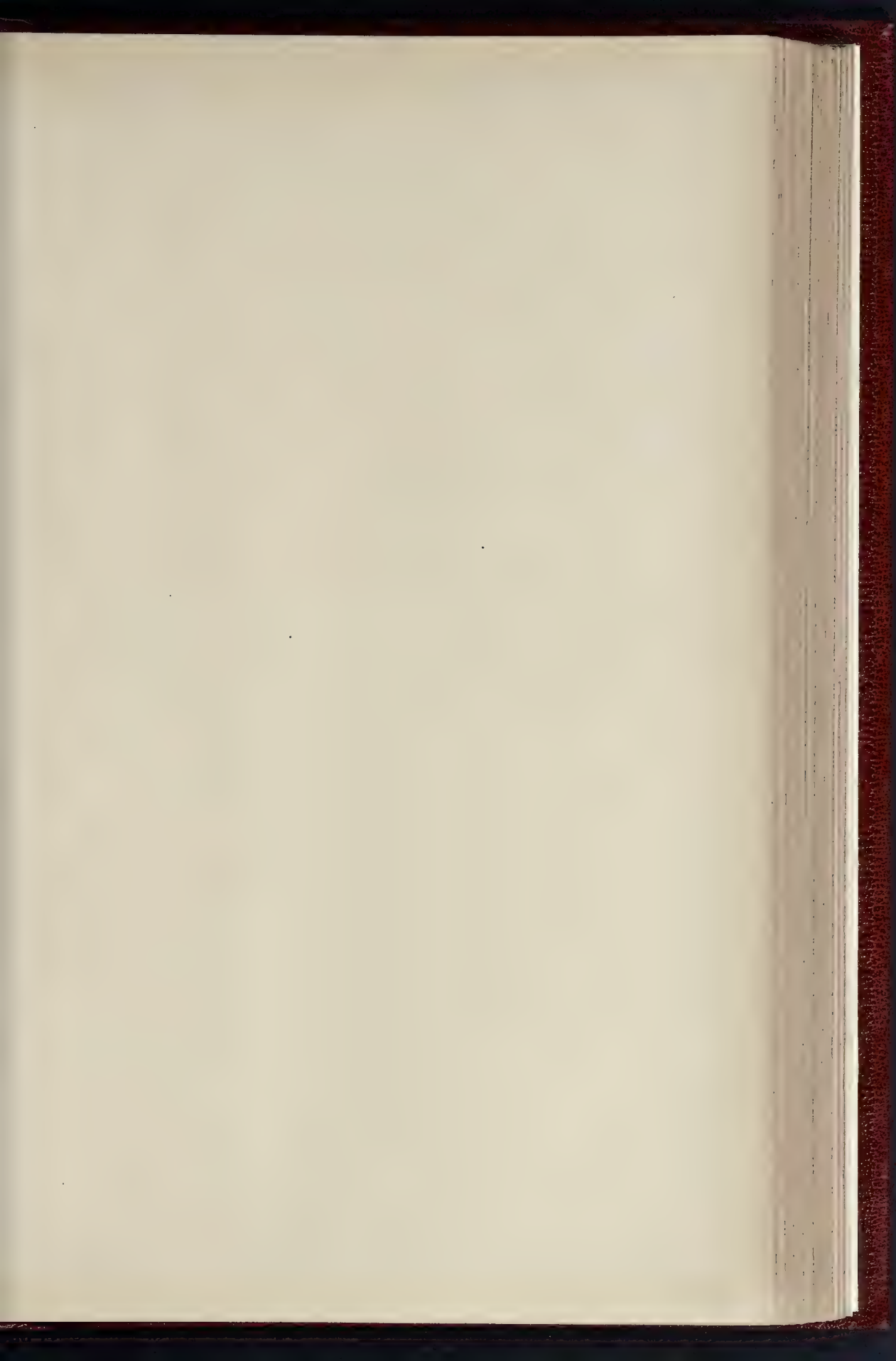


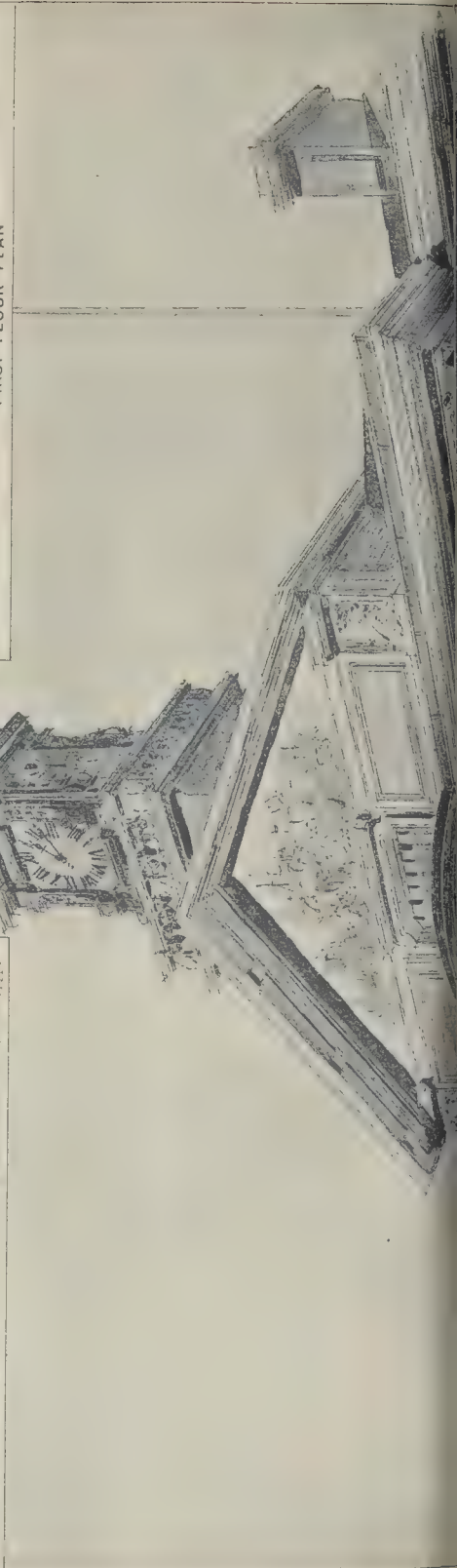
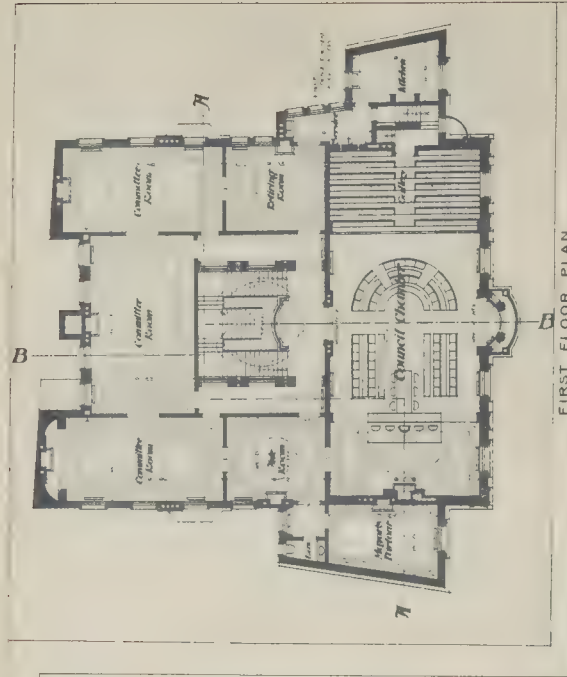


PANEL ON PLASTER
FRONT OF LAMBRACK
ALFORD STREET.

DETAIL

NEW FRONT, BUILDER OFFICE, CATHERINE STREET MR H H STADAM, F.R.B.A. ARCHTCT

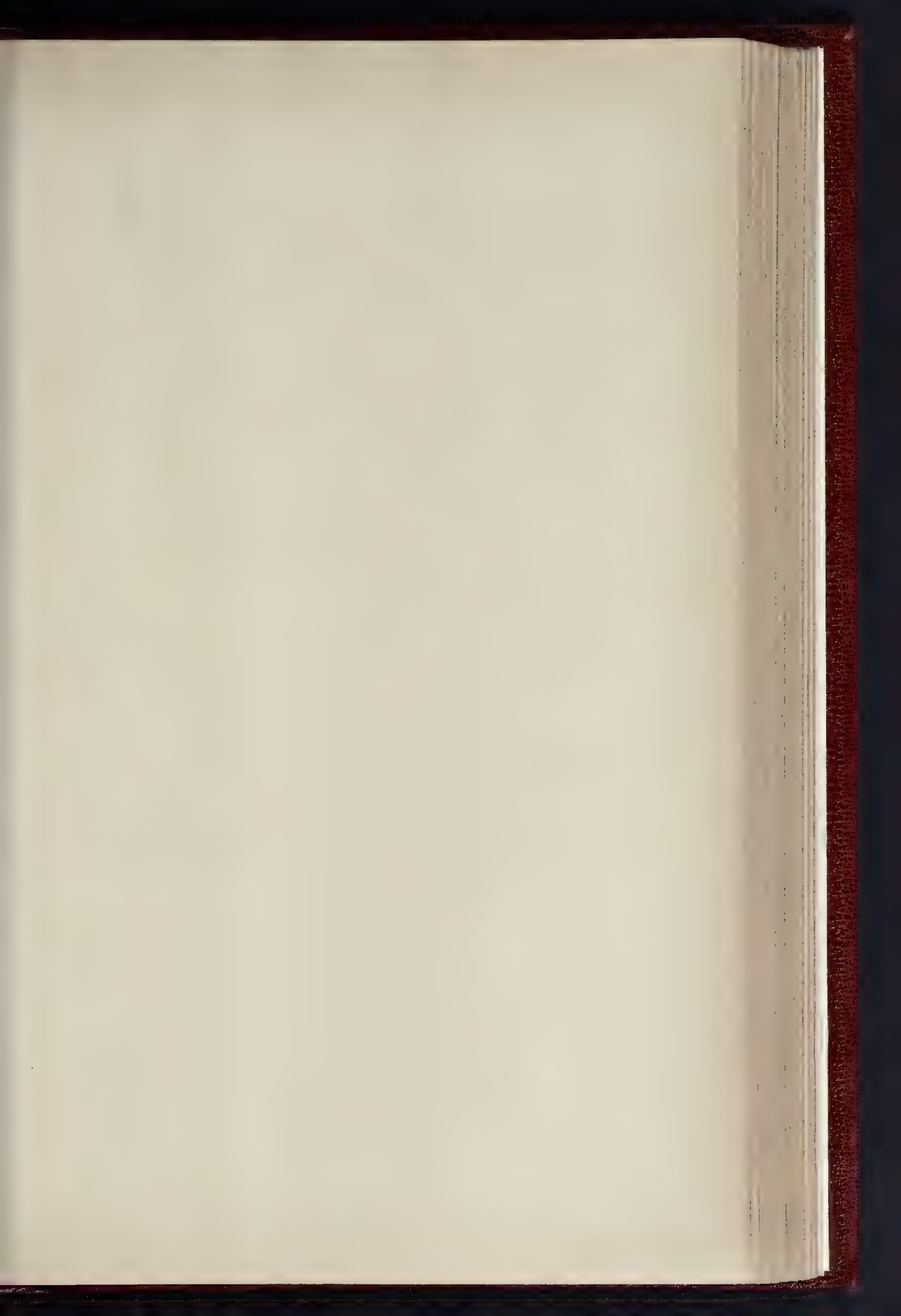






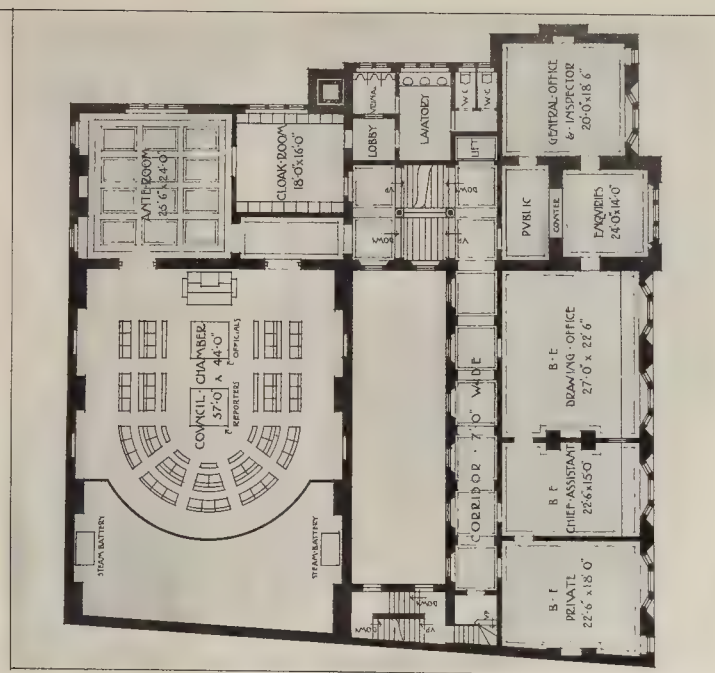
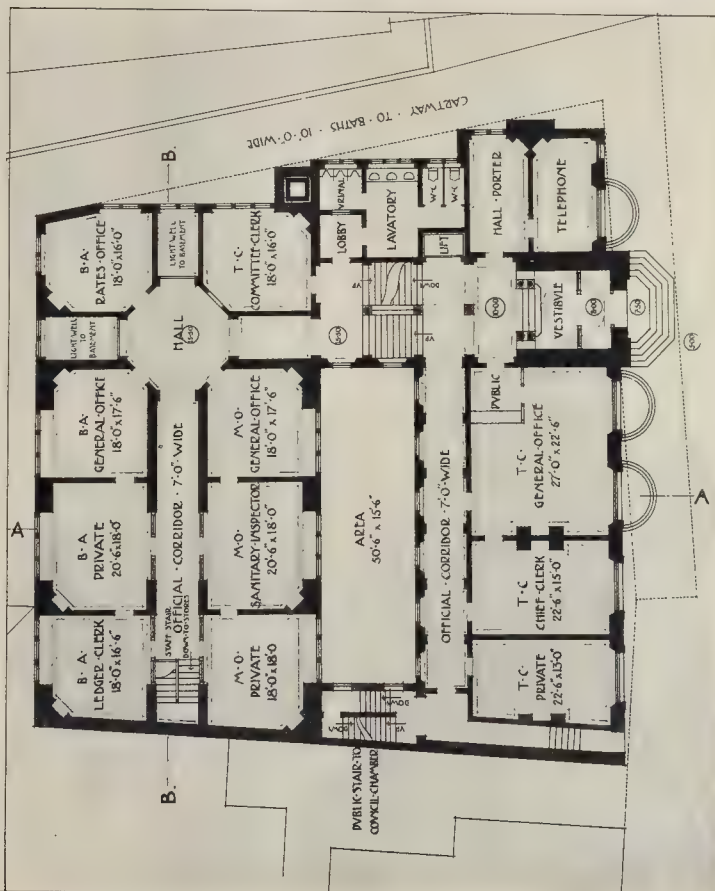
INK PHOTO SPRAYED & C. L. 4 & 5 EAST HANING STREET LONDON

DEPTFORD MUNICIPAL BUILDINGS COMPETITION FIRST PREMIAED DESIGN.—By MESSRS LANCHESTER, STEWART, & RICKARDS.

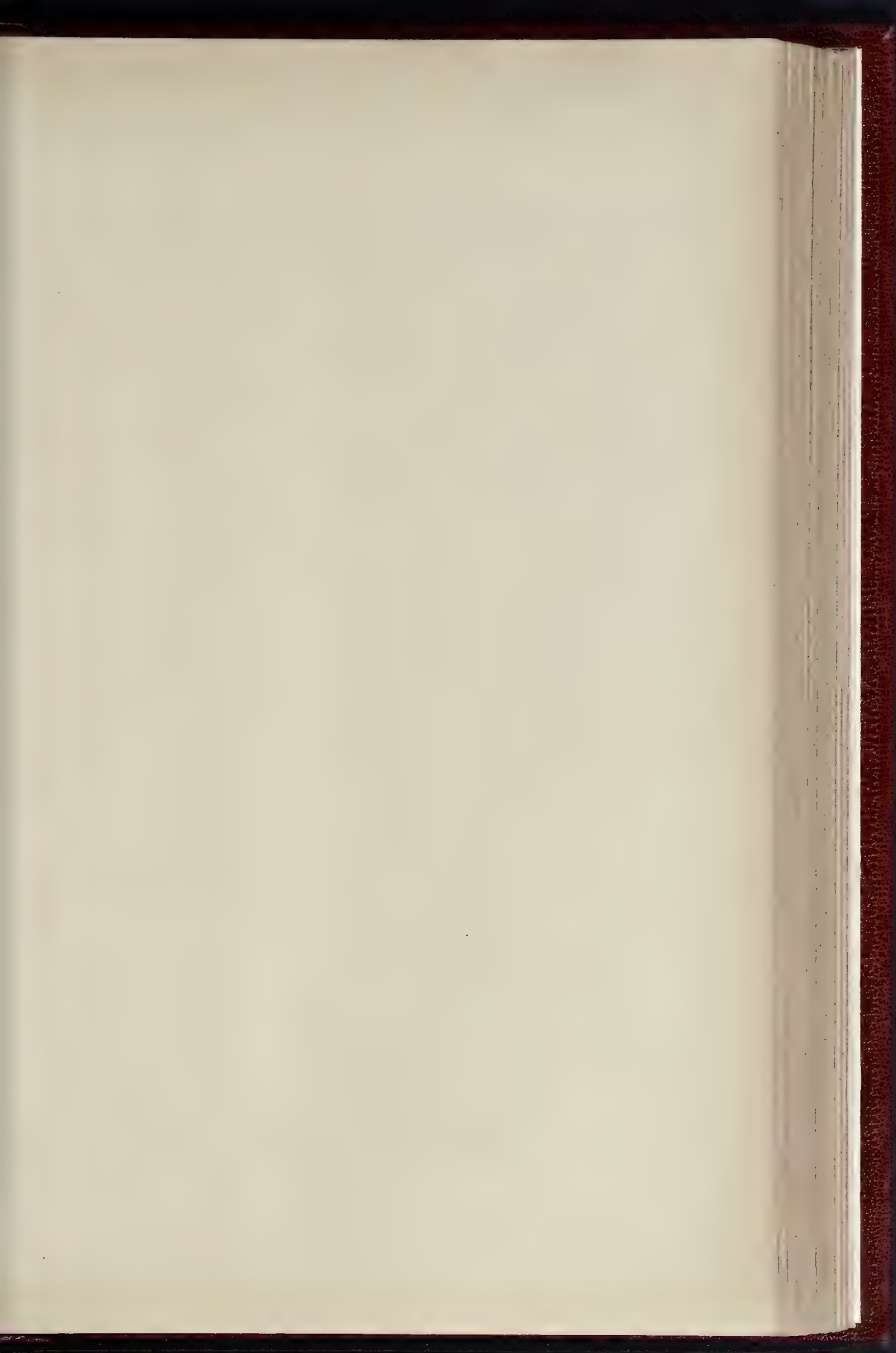


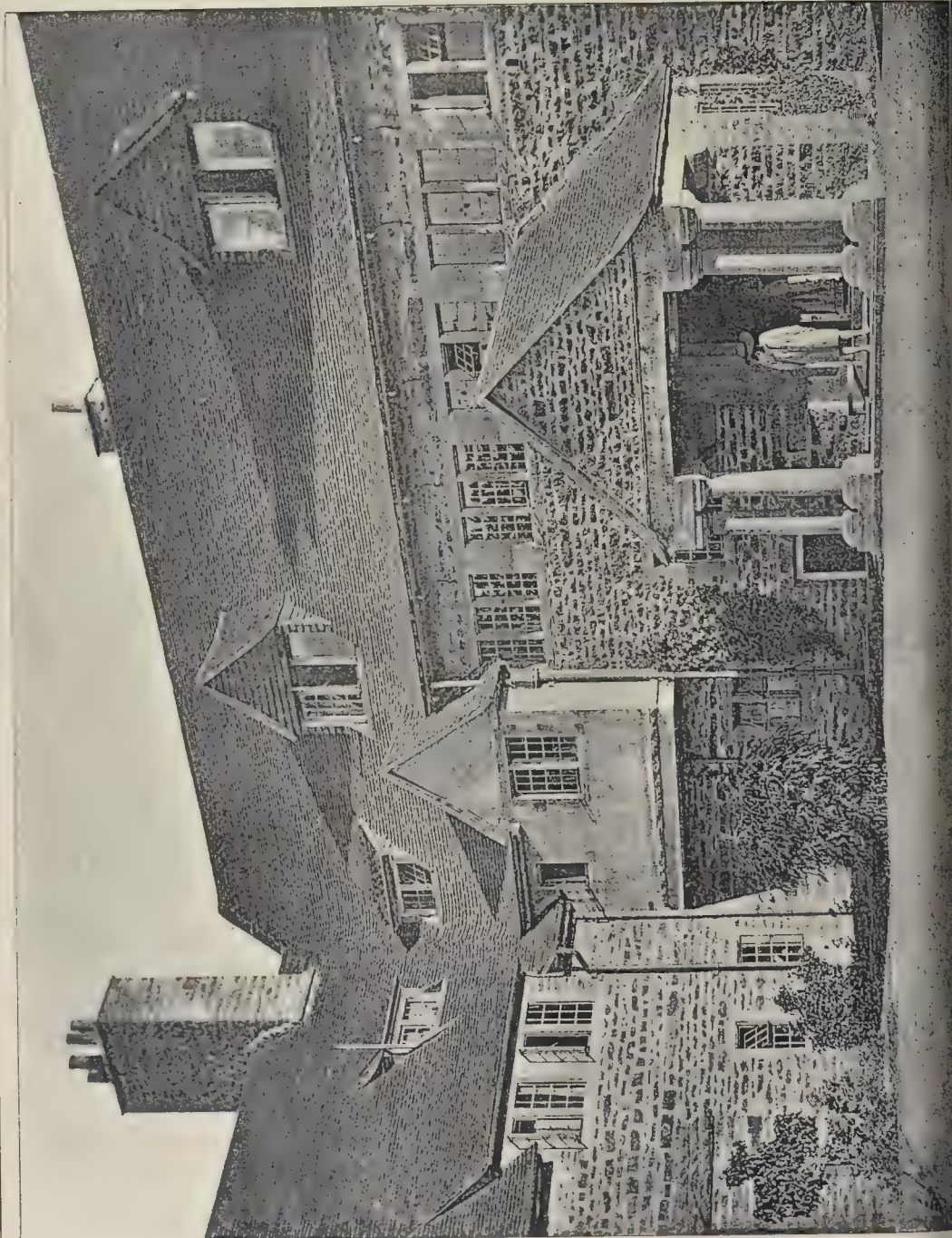
THE BUILDER, NOVEMBER 1, 1902

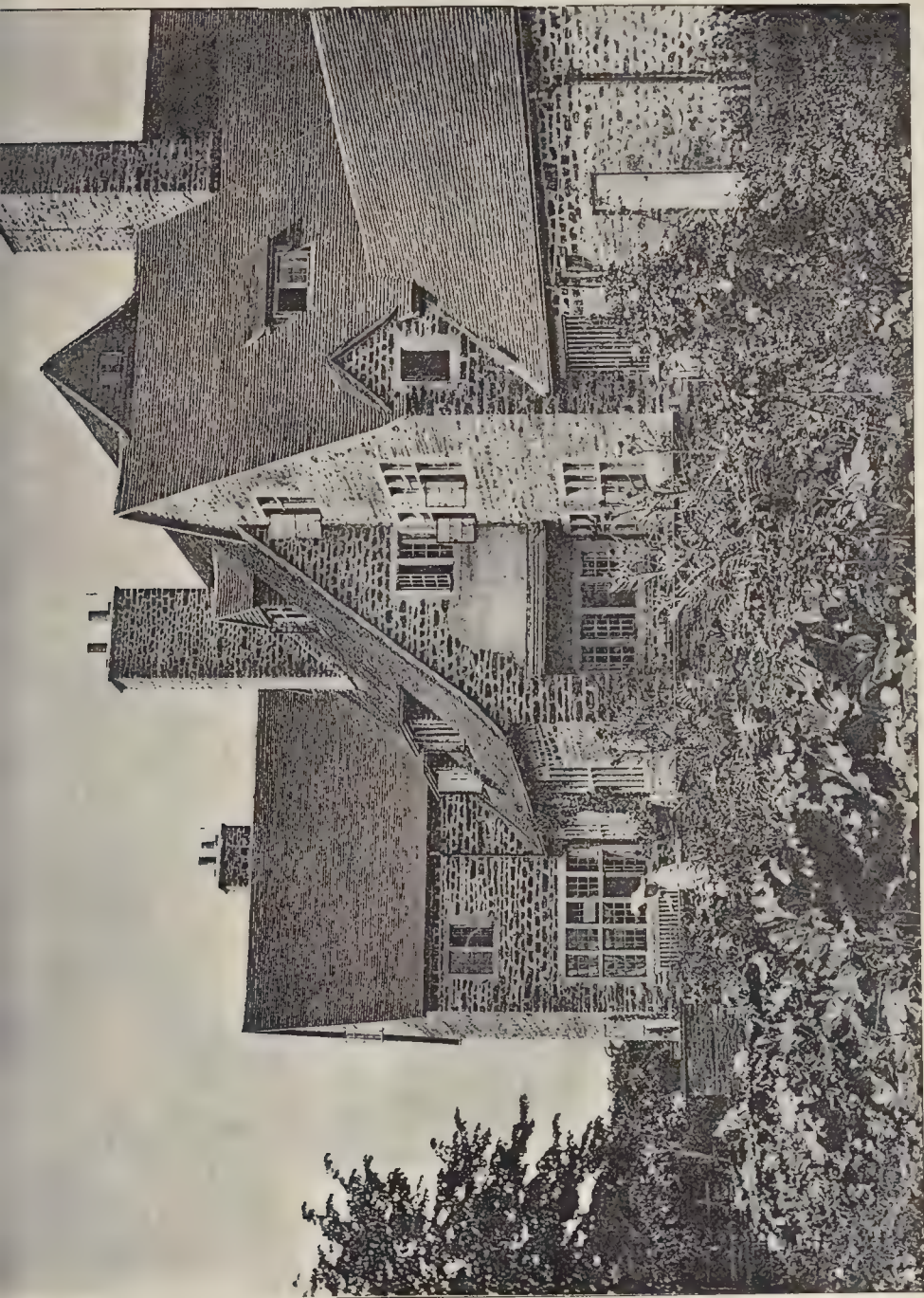




K PHOTO SUPPLIES & CO. LTD. 4 & 5 EAST HADDIN STREET FETTER LANE E.C.





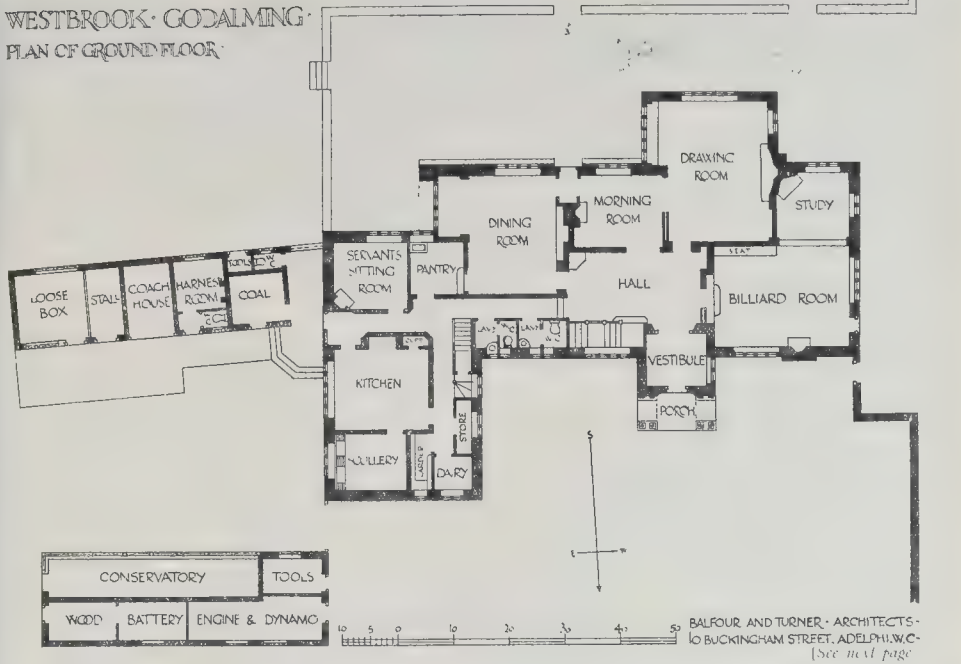


VIEW FROM SOUTH-EAST.

"WESTBROOK," GODALMING, SURREY.—MESSRS. BALFOUR & TURNER, ARCHITECTS

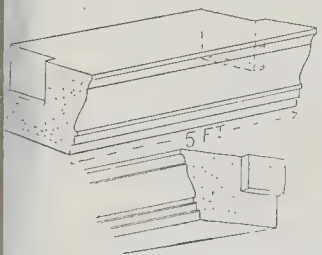
1/4 PHOTO SCALE, & A.C. 1/4 4.8.5 EAST-WARDING STREET, EXETER, ENGL. E.C.

WESTBROOK CODALMING.
PLAN OF GROUND FLOOR.



BALFOUR AND TURNER - ARCHITECTS -
10 BUCKINGHAM STREET, ADELPHI, W.C.
[See next page]

originality of character to the stone details, the principal of which are shown in the sheet of details, which is inserted also partly as representing the kind of illustration of a building which we should be glad to have more often if we could get it. An elevation, with details to a tolerably large scale, is a much more valuable form of illustration for an architectural paper than a perspective drawing with no details. The profile of the main cornice, of light projection in comparison with its depth, as dictated by the desire to have a fairly ch cornice, but to keep its return within the entire line of the party-wall, so that it should not be interfered with by any adjacent building. The carving (executed by Messrs. Raymond) is worked entirely by being sunk into the main profile of the stone, as shown on the section, so as to keep the profile line untouched. The arch on the ground story is an honest working arch, but the inner thickness of the wall, within the window-plane, is taken by a girder. The support of the centre part of the bay, which projects nearly to the edge of the ground-floor cornice, is arranged for in the setting of the stone, a five-foot length of stone in the centre of the cornice having a joggle cut at each end, as shown on sketch, on which projections in



the adjoining stones (which are well weighted) rear, thus avoiding any dependence on iron ties, the stone balls on the attic and final are gilt, and therefore have a brightening effect not seen in the lithograph, as gilding always reproduces dark. It is surprising that gilding is not more used in this kind of way in London buildings; it produces an excellent effect and lasts very well; of course it must be used with reserve. The ornamental grille under the ground floor

window is not a vain show; it is inserted to mask the louvres which were necessary for ventilating the store-cellar in the basement, and which would have had an unsightly appearance if prominently seen.

An elevation and details of the entrance-doors are appended; they are folding doors in 2½-in. oak, and form rather a fine piece of joiner's work. The handles are of white metal, sunk in recesses lined with the same material.

Messrs. Coils & Sons were the general contractors for the work. The glazing was all done by the Luxfer Prism Companies. The ground floor window is glazed with their prism glass in order to throw as much light as possible into the office. The Luxfer Companies have also been most successful in getting light into the basement, by means of a prism light in the pavement and one of their hanging screens inside, which diverts the light received from the pavement light into a horizontal light reacting far into the interior. In the upper windows the small quarries of glass are set in the Luxfer Companies' patent electro-glazing, which has been fully described in these columns, and which, while promising to be more durable than ordinary leading, certainly obstructs less light and has a very neat appearance. The gun-metal lettering on the front, and the letter-box front and other bits of decorative metal work, were carried out by Mr. Geo. Wragge. The mosaic pavement in the small vestibule is by the Rust Vitreous Mosaic Co. The whole of the details of every kind were made from the architect's full-size drawings.

H. H. STATHAM.

COMPETITION DESIGNS FOR DEPTFORD MUNICIPAL BUILDINGS.

We give in this number illustrations of the first premiated design in the Deptford Municipal Buildings, by Messrs. Lanchester, Stewart, and Rickards; and the second premiated design, by Messrs. S. B. Russell and C. E. Mallows.

The authors of the first premiated design send us the following quotation from their Report, as sufficiently explanatory of their intentions:—

"The design is in the traditional style of the seventeenth and eighteenth century buildings of the riverside towns, such as Greenwich, Gravesend, and Rochester, where many beautiful examples of work of that period

remain. The nautical associations of Deptford are expressed in all the sculptured ornament of the design, on the façade are six bas-reliefs representing admirals, who may have been connected with the town, and other sculpture and decoration illustrates its annals and naval record. The principal feature of the design internally is the arrangement of all rooms round a central hall containing a marble staircase with arcaded galleries on either side; this hall is lit from a dome, and its position makes the lines of communication between the rooms convenient and direct. The ground floor is devoted to the principal offices, while the first floor contains the Council-chamber, committee-rooms, &c., arranged to form one spacious suite; additional accommodation being placed in the basement and on a mezzanine floor."

SECOND PREMATED DESIGN.

In regard to their design Messrs. Russell & Mallows write as follows:—

"In this scheme the building is practically divided into a front and rear block, with a large area between for light and through ventilation.

Communication between the blocks is afforded by the principal staircase, which is arranged to take advantage of the natural fall of the site to the front.

By this means the floors of the rear block are raised from 5 ft. to 6 ft. above the floors of the front block, and efficient lighting is not only secured to all the rooms on the ground floor, with the window-sills at the usual height, but also to those rooms in the basement designed as spare offices.

The plan is laid on simple and direct lines, and is well lighted in all its parts.

All the offices to which access is required are entered from the front and rear halls on the ground floor, with the exception of the Borough Surveyor's department, which is on the first floor and is north lighted. Three good spare offices are provided in the basement.

The Council-chamber, ante-room, cloakroom, &c., are placed in the rear block on the first floor level, in a position retired from all external noise, with the Mayor's parlour, members' and committee rooms, &c., half a floor higher up on the front block.

The whole of the Council suite is detached from that part of the building frequented by the public, and in its position on the upper floors the loftiness necessary for its apartments can be procured without detriment to

other parts of the building. Easy access for Councillors can be obtained by the lift in the staircase hall.

The public gallery to the Council-chamber is entered by a staircase which communicates directly with the street as required by the instructions.

This stair provides also for private access to the caretaker's quarters.

Ample, well-lighted, and ventilated lavatory accommodation is provided on each floor, and two sets are arranged in connexion with the Council suite, so that in cases of receptions, &c., one may be set apart for the use of ladies.

The contents of the building, carefully measured, amount to 455,861 cubic ft.—say 456,000, which allows approximately a sum of 16d. per cubic foot to erect the buildings for the sum of 30,000l.

From experience of the cost of similar buildings this rate is considered ample.

Mr. Belcher, in his published award, remarks on this design as follows:—

"The design I have placed second is of an unusual character, and of a type differing considerably from any other in the competition. The lighting of every part has been successfully managed by the introduction of a large internal area carried down to the basement."

The required accommodation has been obtained by the insertion of an extra floor in the front block. These floors are connected by half flights of stairs with those of the rear block, the required areas being thus obtained in every instance with ample lavatory accommodation.

The arrangement of the committee-rooms in conjunction with the Council-chamber is less satisfactory, and does not lend itself well for receptions and public ceremonies.

The elevations are quiet in character, and suitable for their purpose."

"WESTBROOK," GODALMING.

This house was built under favourable conditions, as Bargate stone for the walling stone was excavated on the site. The custom in the neighbourhood is to break it up into small cubes, but in this case it was used very much in the sizes it came out of the pit. Doubling stone was used for the dressings, and the walls were lined inside with brick.

The windows have gun metal casements throughout, and are glazed with Crown glass, all of which have been provided by Messrs. Hope, of Birmingham.

The roofs are covered with old hand-made plain tiles, and the eaves are formed with thin slabs of Bargate stone, which are held in place by the weight of the roof resting on the wall plates. The staircase and panelling in the hall are of English oak, and were executed by Mr. Luxford, of Forest Row.

The main work, including laying out the garden, was carried out by Messrs. W. Holt & Sons, of Croydon; all the electric light work being done by Messrs. W. A. S. Benson & Co., of Bond-street.

The architects are Messrs. Balfour & Turner.

Books.

The Works in Architecture of Robert and James Adam. Facsimile Reprint, complete. London: E. Thérard, 1902.

MR. THÉZARD has now completed his splendid reprint of the "Works in Architecture" by James and Robert Adam, to the issue of the earlier parts of which we drew attention when they first appeared. The two concluding parts, 9 and 10, constitute vol. iii. of the original work, which is the most scarce of all, even the library of the Institute of Architects, we believe, possessing no copy of the original volume.

Part 10 contains three very interesting and fine illustrations of a pavilion erected for the Earl of Derby at The Oaks, Surrey, for a great *fête champêtre* held there on June 9, 1771, which must have been an entertainment of truly royal magnificence. The plan shows a ballroom 72 ft. by 33 ft. within the columns, 80 ft. by 36 ft. within the walls, the oblong portion of it being lined with a colonnade, while at one end there is a semicircle of coupled columns. Outside of and concentric with this, and extending also outside the straight portion of the ballroom, is a vast supper saloon

forming a kind of aisle round the whole. Besides this, there are tea-rooms at each end of the supper saloon, and an octagonal vestibule 30 ft. wide giving access to the ballroom. Then we have a large view of the ballroom taken from outside the semicircular colonnade, and a view of the interior of part of the supper saloon; both crowded with figures. The whole interior is carried out and decorated with the most profuse decoration of the kind so familiar to us in the work of the Adams, with a profusion of columns (Corinthian order). It must have presented a splendid spectacle, and it would be interesting to know in what materials this magnificent temporary Temple of Pleasure was carried out. Among the other contents of the third volume are the elevation of the river front of the Adelphi as existing before the Thames Embankment was made; and the plan and two elevations of the buildings for the University of Edinburgh.

There is no occasion here to consider afresh the merits and demerits of the style which Robert Adam may be said to have created; it is familiar to all, and was seldom more appreciated than at present—perhaps a little over-appreciated; but it has a remarkable quality of grace and refinement, and it must be added that Adam's best buildings are better in their actual effect than in the highly finished but hard and mechanical drawings in which he had them illustrated.

His book, however, is a monumental one, without which no architectural library can be said to be complete; it contains illustrations of some notable buildings and decorative structures which have been demolished and are only recorded in these plates; and the whole work is a remarkable monument to an architect who rose in his time to a great position solely by his own talents and high character. Mr. Thérard's reprint, in which the French and English text are retained and the old font of type imitated, is, except in commercial value, almost as good a possession as the original work, and we have no doubt that many architects will be glad thus to be able to secure a publication which is now hardly to be had in its original imprint.

Trades Waste: Its Treatment and Utilisation, with Special Reference to the Prevention of Rivers Pollution. By W. NAYLOR, F.C.S., A.M. Inst. C.E., Chief Inspector of Rivers, Ribbles Joint Committee &c. London: Charles Griffin & Co., Ltd., Exeter-street, Strand, 1902.

IN the preface Mr. Naylor limits the scope of this work to "the causes of rivers pollution, and also the best-known practical means of preventing such pollution economically." The utilisation of trades waste is only discussed incidentally. Engineers have for a long time desired a full and authoritative treatise on the purification of the waste waters from manufactories of different kinds, and Mr. Naylor's work can be recommended as an able statement of the best modern practice in this important branch of sanitary engineering. The first chapter is introductory, the most interesting paragraphs being those relating to standards of purity. The author states that the only way out of the present difficulty in respect of river pollution is "the adoption of a standard," and adds that "a standard has got to come." On a later page, however, he thinks it "questionable whether a uniform standard could be applied to all trades." Chapter II. is entitled "Chemical Engineering," and gives formulas for the rate of subsidence of solid particles, the strength of tank walls, &c., and details of different forms of precipitation-tanks, pumps, filters and other apparatus. The following six chapters treat of the wastes from woollen manufacture, tanning and fellmongery, brewing and distilling, calico-bleaching and dyeing, calico-printing and dyeing, and paper-making, and there is a final chapter on "General Chemical Waste." In the Table of Contents, Chapter III. is entitled "Woollen Mill Waste," but the title given in the body of the work—namely, "Wool Degreasing and Grease Recovery"—is more appropriate. The waste waters from the processes of tanning and fellmongery are less difficult to purify, as the solid matters are amenable to bacterial treatment, and the chapter on these processes is in the main an account of the modern methods of tank treatment and subsequent filtration. Brewery

wastes can also be purified in a similar way, but as they become "sour," it is necessary to neutralise the acid in some way, and the author describes his method of effecting this by means of sewage or sewage-sludge introduced into the tanks. The same method has been adopted by Mr. Naylor for the waste waters from calico-bleaching works.

It is unnecessary to refer in detail to the treatment of the waste waters from all the other trade processes described by Mr. Naylor. We need only say that the book is packed with useful information and is well illustrated by means of about twenty photographic views of actual installations, twenty-seven folding diagrams (chiefly drawn to scale), and over a hundred illustrations in the text.

The Elements of Electrical Engineering. By T. SEWELL, A.I.E.E. London: Crosby Lockwood & Son, 1902.

THIS book goes over the ground usually covered in a first year's course of electrical engineering. The descriptions of most of the fundamental phenomena which form the basis of modern engineering practice are clear and concise, and some of the instruments in everyday use by electricians are well described. The author has carefully avoided treating any problem on orthodox mathematical lines, but he manages by means of arithmetic and very elementary algebra to give a very fair conception of the methods employed in electrical calculations. In some places, however, the straining after simplicity has led to vague statements which would puzzle the beginner more than a fuller mathematical statement. For example, on page 64 an argument is summed up as follows:—"Therefore, the magnetic potential of the coil is one and a quarter times the ampere turns." The beginner, if he tries to understand this at all, would soon be led to the most erroneous notions about magnetic potential. Again, on the same page, no distinction is made between lines of magnetic induction and lines of magnetic force. It is true that magnetic potential and magnetomotive force, flux of lines of force and flux of induction, are often used indiscriminately by engineers, but this is surely all the more reason why beginners should be taught accurately.

Again, the definitions in several places are given so inaccurately that it would have been better to omit them altogether. "The grammme is the unit of weight." "It is the weight of water at 4°C. which will just fill a cube of one centimetre side." Now the grammme is the unit of mass, and the mass of a body is a constant and independent of its position on the earth's surface, but the weight of a body is less at the Equator than at the Poles. The mass of the riders for use with a Kelvin balance is constant, but their weight is calculated from a formula depending on the latitude of the place and its height above sea-level. Again, the grammme was originally defined as the mass of a cubic centimetre of distilled water at 4°C. not at 0°C. A sentence on p. 10 shows how important it is to distinguish between mass and weight. "At sea level the gram exerts a force of 981 dynes, or a gram acting on another gram for one second would impart to it a velocity of 981 cm. per second." The only action of a grammme on a grammme is the attraction produced by the Newtonian gravitation between them, and is exceedingly minute.

In the chapter on indicating instrument no mention is made of the Kelvin amperemeter balances, which are the most important of all ammeters. In the chapter on meters Mr. Sewell gives a good description of the Aron Watt-hour meter, but it is sadly discounted by the diagrams being apparently made from worn-out blocks. The principle of the ar lamp is well explained, and the working parts of several kinds of lamps are clearly described. Some very curious curves, taken from the results of tests made on enclosed arc lamps by the National Electric Light Association Committee of America, are given. It would be interesting to know how far these curves represent actual phenomena, and how far they are due to the unavoidable experimental error inseparable from the photometric methods employed. It is stated that the light is given in "Heifer" units, and that if we wish to convert it to English candle-power we must divide them by 0.875. According to this the "Heifer" would equal 1.14 English candles. On p. 248

Mr. Sewell gives the "Hefner" as equal to 875 of an English candle, and this is the value we have been accustomed to take, although some English glow-lamp manufacturers issue standards which make the English candle less than the "Hefner."

The space devoted to the description of the reversed ohmmeter and generator is inadequate. The principle of this instrument can be very clearly explained to beginners by means of a diagram, and it is an instrument in such general use that every electrician should understand how it acts. It would also have been well to explain the difference between the insulation resistance between the mains and the insulation resistance of the mains to earth. It would startle the beginner after reading this book to find that this last resistance was the only one measured by central station engineers.

The Painter's Laboratory Guide: a Handbook on Paints, Colours, and Varnishes for Students. By GEORGE H. HURST, F.C.S. London: Charles Griffin & Co. 1902.

THE work of the builder daily becomes more closely linked with that of the chemist. This book is essentially a book for the student who has passed through the usual chemical courses of a modern technical school. To the average architect, builder, or painter of an older school it will be of comparatively little value.

The book is especially intended to meet the requirements of students attending practical courses on colours, oils, and varnishes, at a technical institute; but all who have a laboratory and an elementary knowledge of chemistry will find it a useful guide to the methods by which the quality of oils, paints, and pigments may be tested, and adulterants, if present, be estimated.

The chapter dealing with coal-tar colour makes well, however, tend to alarm even the modern student unless he has previously studied the chemical constitution of organic colouring matters. Chemists are fast approaching the ridiculous in their efforts to indicate the constitution of organic bodies by their nomenclature. Thus the following are mentioned on page 150 as the names of four well-known dyestuffs:—

Benzene-azo-beta-naphthol-disulphonic acid.
Toluene-azo-beta-naphthol-disulphonic acid.
Xylene-azo-beta-naphthol-disulphonic acid.
Cumene-azo-beta-naphthol-disulphonic acid.
And on page 152 we are told that Meldola's blue is the chloride of dimethyl-phenyl-ammonium-beta-naphthoxamine, while Nile blue is "of a more complex composition." Fortunately, commerce speedily discovers short substitutes for these lengthy appellations.

The greater portion of the book will, nevertheless, be readily understood by all students who have passed through what is commonly termed a "first year's course" in chemistry. The number of those connected with the building profession who receive tuition in chemistry is rapidly increasing, and to such students we can cordially recommend Mr. Hurst's handbook.

The Acts Relating to the Supply of Gas and Water by Companies and Local Authorities. With Reference, Notes, and Index. Compiled by JOSEPH REESON. London: Butterworth & Co. 1902.

THE increase in the number of companies and local authorities who are concerned with the supply of gas and water, renders this compilation timely and useful. It is brought down to the end of August last, and may be commended to the notice of those who have to do with the subject of which it treats. Pretending to be no more than a collection of Acts which treat of two subjects, it requires no detailed notice. That the work will be useful we cannot doubt.

The "Mechanical World" Pocket Diary and Year Book for 1903. Manchester: Emmott & Co., Ltd.

THE greater part of this book is devoted to engineering notes, rules, and tables, the diary being quite a subsidiary feature. Most of the data given relate to mechanical engineering, but there are useful sections on beams and girders and on the electrical transmission of power. Many new tables have been added in this issue, and the tables of logarithms have been set in larger type.

TRADE CATALOGUES.

MR. J. STANNAH sends us his abridged catalogue of lifts, hoists, and cranes, illustrated with well-executed diagrams. This contains a great deal of information in a small compass, in regard to the electric lifts and the high and low pressure hydraulic lifts manufactured by the firm. The illustrations show high-pressure cellar hoists and incline hoists, in the latter of which the guides are formed with steps and form a staircase in addition; the high-pressure suspended hydraulic passenger-lift, adapted for working off the mains of the Hydraulic Power Co., at 700 lbs. per square inch, and which Mr. Stannah puts forward as "the ideal lift for passengers"; and the low-pressure hydraulic passenger-lift, for use in towns which have not high-pressure mains, and which can be supplied either from the City mains or from pumps worked by gas or electric motors. We have also descriptions and illustrations of goods lifts, warehouse and wharf cranes, hand-power lifts, &c.

The New Expanded Metal Co. send us their "Handbook of Practice, Tests, and Tables of Approved Formulae" relating to the employment of the metal in concrete, plaster work, &c. This consists of considerations in reference to the use of steel in combination with concrete; diagrams and descriptions of various applications of expanded metal and concrete, and some reports and opinions on the behaviour of the construction under tests; one from the British Fire Prevention Co., which speaks both with authority and impartiality. In the first portion of the pamphlet the writers have hardly made as good case as they might; for it is not correct to say, as a general proposition, that "the cohesion between steel and concrete is thoroughly satisfactory"; in the case of rods and wires it is not, and they have a tendency under strain to pull through the concrete. The advantage of expanded metal over rods or wires is that it makes a complete key with the concrete, and cannot pull through it. The pamphlet contains a good deal of practical information in regard to a system which has much to recommend it.

The Luxfer Prism Companies send us a most compact and conveniently made-up pocket-book in leather cover, giving every information that can be required for architects using their materials. It includes a description of the principle on which their prism glass is made, full directions for specifying it, and a number of useful constructional diagrams showing the manner of fixing various forms of their glass in various kinds of frames. Architects who are using any of these forms of glazing will do well to get a copy of this book.

The Lighting Corporation, Ltd., of 4, Bloomsbury-street, W.C., have sent us their illustrated catalogue of "Wenham" glow and arc lamps. It is claimed that by using these glow lamps consumers effect a saving of 25 per cent. in their meter bills. They are made for all voltages up to 250, and their price is moderate. A large variety of "fancy" lamps for decorative purposes are illustrated, and high candle-power and "focus" lamps for special purposes are also shown. In the "Corporation" lamp for street lighting the reflector does not form part of the lamp, but can be removed from it when the lamp gives out and fitted to a new bulb. The "Wenham" enclosed arc lamps for direct and alternating current are simple mechanically, and will not easily get out of order. Single direct current arc lamps are quoted for running on 200-volt circuits, and two in series can be run economically at any voltage between 200 and 250.

A handsomely got up illustrated catalogue of the "Benson Electric Light Fittings" shows a great variety of designs, mostly good, certainly of a far higher order than we usually find in catalogues of this class of work. A good deal of the effect of these results from the pleasing and well-considered forms in which the glass shades are designed. Some of the metal portions show too much naturalistic tendency in the leafage; in this as in many other such catalogues, the designs on the simplest lines are the best.

The Duddridge Iron Works, Stroud, send us their catalogue of gas and oil engines and gas-producing plants. The engines appear to be of strong and simple design, and the producer plant is in compact form, requiring no brick-work beyond fire-brick lining for the generator.

Messrs. C. Nurse & Co. send us their catalogue of engineers and joiners' tools and machinery, a volume of over 300 pages, containing illustrations, prices, and particulars of practically all the hand and small machine tools required in a workshop. The series of gauges and measuring instruments catalogued is very complete.

Correspondence.

IN REGARD TO FIRE INSURANCE.

SIR,—Referring to the comments in your issue of 11th inst., on Mr. C. Spensley's pamphlet "How to Insure against Fire," perhaps, in equity, the courtesy of your columns may be afforded to a few statements in defence of the Fire Offices.

Your reviewer contends that considerable dissatisfaction exists among insured persons ("Insurers," by the way, is a term which can be applied to the companies only) in regard to the settling of claims, inveighs against the present practice of dealing with losses, and indicates that it might be well were offices to generally issue "Valued Policies."

Indemnity being the fundamental principle of a fire insurance contract, the insured is precluded from making a profit out of any fire loss he may sustain, and it will be conceded by all right-thinking people that the basis of indemnification is the only proper one on which the business should be conducted.

On a loss occurring, the companies require all reasonable information in regard to the claim; due allowances having to be made for depreciation, and salvage if any. All claims, except those of a trifling nature, are dealt with by professional fire loss assessors, unattached to any particular office, and qualified by training and experience to deal with settlements. Provided that a claim is just and *bona fide*; that all necessary information is accorded; that reasonable facilities are afforded the assessor in the pursuit of his duties; and that the office is not one of the few "irresponsibles;" it may be said most emphatically that there will be no conflict between the insurer (or insurers) and the insured. Too many of the community nowadays look on the companies as philanthropic institutions; consequently their claims, when they have occasion to make them, are sometimes grossly inflated. This naturally causes delay, and the companies are often stigmatised as exacting and niggardly, whereas the fault lies solely with the insured. Assessors and fire office officials are only too ready to pass an absolutely just claim, but such a thing is almost a *rara avis* in these days. The impression that assessors are paid salaries to browbeat claimants is quite erroneous. They simply receive fees as licensed valuers.

I have not had the opportunity of seeing Mr. Spensley's pamphlet, but I am certain that no "insurance expert" worthy of the name would put forth a plea for the adoption of "valued policies." The British fire offices have sedulously refrained from generally granting such instruments, their principal reasons being as follow:—

1. A valued policy would mature only in the event of total destruction of the property covered. Only a small number of fires out of thousands yearly occurring in these Isles result in complete "burns-out." Therefore, to secure the necessary trustworthy valuations of thousands of properties in order to save trouble (more or less chimerical) in these few instances, would simply have the effect of greatly enhancing the cost of insurance.

2. If such valuations were done without, evilly-disposed persons could purposely over-insure property, with the possibility (a moral certainty practically in remote country districts) of reaping a profit from the handiwork of the fire-fund.

3. The mutability of values, too, must be taken into consideration. Property valued at 2,000l. today may shortly, through various causes, be worth only 1,000l., and, if the owner were privileged in event of loss to recover the former sum, fire would be a contingency rather to be welcomed than carefully guarded against. In fine, "valued policies" would put a premium on incendiarism, which *Deus avertat!*

Insurance companies do not all work together. There are two divisions, "tariff" and "non-tariff." The former class, comprising the large and important offices, charge rates for certain classes of risk which experience has proved to be requisite. The latter class, consisting almost entirely of the small fry, charge what rates they like, professing to deal with risks on their merits, a proceeding which simply means under-cutting the tariff offices, whereas their contention would require them to raise at times above tariff rating, but this is for them a thing unheard of.

To talk of insured persons having to fight an "Insurance Trust" would seem to be a covert gibe against the tariff organisation.

Surely the present position of our strong offices is owing in no small degree to the salutary rating and other principles laid down by the tariff, principles by which reckless rate-cutting and ruinous competition is prevented.

Every facility in effecting insurances is now offered to property-owners: but let it be din-

into the ears of such that companies of known repute are those with which they ought to deal. If people persist in placing business with tiny concerns who fight and quibble over even reasonable claims—well, experience teaches.

Much could be written of the generous manner in which our standard institutions meet certain claims *ex gratia*—i.e., make payment in cases where they are not strictly liable; but enough has perhaps been said to do something in the way of relating aspersions on the organisations which stand between many of the commonwealth and—ruin.

J. JAMESON LAMONT.

Edinburgh, October 16.

[*.* We are glad to print the views of an advocate of the insurance companies. When Mr. Lamont writes that a just claim is almost a *rara avis* in these days, he appears to admit Mr. Spensley's contention. The meaning of Mr. Lamont's words is that each claim must with rare exceptions be resisted. When insurance companies start with the idea that all men are rogues, it is obvious that they must constantly try to resist claims which should be at once admitted. There is much more to be said in favour of valued policies than our correspondent admits.—Ed.]

THE ELLIPSE AND THE TUDOR ARCH.

SIR.—The two methods described by "Knox & Wells" are quite distinct; the second is the Gothic method, and no one would use a true ellipse in a Gothic arch. A friend of mine sent me a very ingenious instrument for drawing a Tudor arch by a bent stick, and it certainly gave a very pleasing curve.

"Knox & Wells" method and "W.P.'s" trammel are Greek instruments of the third-class (see the *Builder*, July 12, 1902, fig. 4). It seems that the arrangement thus shown gives an ellipse, and that irrespective of the shape of the triangle; perhaps "T. L. B." will enlighten us on this point.

It is quite refreshing to find that so much attention is being given to curves.

DANIEL WOOD.

BOOKS RECEIVED.

A NEW SYSTEM OF HEAVY GOODS TRANSPORT ON COMMON ROADS. By Bramah J. Diplock. (Lancaster.)

A HANDBOOK OF THE OPEN-AIR TREATMENT IN A SANATORIUM. By Dr. Chas. Reinhardt and Dr. David Thomson. Second edition. (John Bale, Sons, & Danielsson.)

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

18.—TIMBER—DRY-ROT—WET-ROT—PRESERVATION—FIREPROOFING.

CHEMICAL COMPOSITION.—Chemistry has not hitherto been of any service to the builder as an aid to the distinction of good from bad timber, but it is possible that, as our knowledge of chemistry advances, acquaintance with the science may prove of practical utility even for the timber merchant. Chemistry has, however, already given rise to a new and rapidly growing industry entirely dependent upon the use of wood for constructive purposes, for it is by chemical treatment that timber is protected from the attacks of destructive insects and fungi, and by chemical treatment that it is rendered fireproof or fire-resisting.

The woody tissue of timber consists mainly of cellulose ($C_6H_{10}O_5$) and a closely allied compound known as lignin ($C_{10}H_{14}O_4$). Sometimes the mixture of these two substances is termed "ligno-cellulose." Several compounds closely resembling cellulose in composition and properties are known, and it is probable that all trees contain two or three members of this cellulose group, but so little is yet known concerning their respective functions in plant life that it would be useless to discuss them here.

The sap of trees contains water, albumen, tannic acid, resinous matter, and a number of other substances of complex composition. If timber be not properly dried, the sap is liable to putrefy or ferment and cause the timber to decay, owing to chemical decomposition of the woody fibre taking place. The process of drying the timber is termed *seasoning*, and is most commonly performed by stacking it for many months or years under shelter, in such a manner that fresh air can readily circulate around each piece. The timber gradually becomes dry, principally owing to the evaporation of the water of the sap; but oxidation also plays an important part in destroying the

ferment spores and hardening the resinous matter. Sometimes the sap is first partially washed out of the timber by churning it down under water in a running stream for several days. This latter process is termed *water-seasoning*.

• The *heartwood* or inner portion of the trunk of a tree is harder, stronger, and more durable than the *sapwood* or portion in closest proximity to the bark. The sapwood is softer and lighter in colour than the heartwood, from which it can usually be readily distinguished. It is said, however, that much of the American walnut imported into this country for the use of cabinet-makers consists of sapwood dyed to render it indistinguishable from the more costly heartwood, although furniture constructed with this sapwood is greatly inferior to that constructed with heartwood.

Different woods do not vary so largely in chemical composition as might be anticipated. The following are the results of some analyses made by Chevallier:—

Variety of Wood.	Carbon.	Hydrogen.	Oxygen.	Nitro. en.
Beech	49.89	6.07	43.11	0.93
Oak	50.61	6.03	42.05	1.28
Birch	50.61	6.03	42.04	1.12
Aspen	50.72	6.19	42.39	0.98
Willow	51.75	6.19	41.08	—

Water in Wood.—The amount of water in living wood is greatest in the summer months whilst the growth is not active. Timber should always be felled in the winter or early spring, when the tree is dormant and contains the smallest proportion of water. Even when felled in winter about 40 per cent. of the total weight of the tree consists of water. After felling, the bark is stripped off, the trunk is raised off the surface of the ground, and allowed to air-dry under shelter for several years. When thoroughly seasoned, the timber contains from 10 to 20 per cent. of water. Timber is commonly regarded as sufficiently seasoned for carpenter's work when it has lost about one-fifth of its weight, and sufficiently dry for joiner's work when it has lost one-third of its weight. Some woods, however, contain a much larger proportion of water than others, and it is not possible, therefore, to determine the condition of the wood by its loss in weight.

The following table shows the specific gravities of some green and air-dried woods respectively, as determined by Karmarsh:—

Variety of Wood.	Specific Gravity.	
	In the Green State.	In the Air-dried State.
Ash	0.852	0.602
Birch	0.919	0.713
Box	—	0.971
Ebony	—	1.259
Elm	0.900	0.619
Oak	0.973	0.785
Pine	0.920	0.497

The difference in the specific gravities of green and air-dried pine is especially noteworthy, as affording an indication of the large proportion of water contained in this wood. The specific gravity of ebony being higher than that of water, this wood will not, of course, float in that liquid.

Timber exposed to the weather so that it is alternately wet and dry decays rapidly unless protected by paint or other preservative.

Dry-rot.—Dry-rot in timber is produced by the growth of a fungus known as *Merulius lacrymans*, or *Merulius destruens*. This fungus is propagated by spores. It first appears on timber as a network of fine cells, called *mycelium*, but soon develops into a number of denser rounded masses. The colour and appearance of the fungoid growth is dependent upon the conditions under which it develops. In some cases it spreads in web-like fibres over the surface of the wood, while in others it forms thin bands or cords. It usually possesses a brown colour, but may be white, greyish-white, yellowish-red, or some other colour. Timber attacked by dry-rot emits a musty odour, assumes a darker colour, loses weight, and is frequently also attacked by wood-boring insects. The fungus continues to grow so long as it remains in the neighbourhood of any sound timber from which it can derive nutriment. When the fungus has been at work for a considerable time, the timber is found to have been converted into a friable, honey-combed mass, so deficient in strength

that it may easily be crumbled to powder between the fingers.

Cause of Dry-rot.—The fungus which causes dry-rot thrives best in a warm, moist, stagnant atmosphere. Deficient ventilation is, therefore, a common cause of dry-rot. It may also be caused by painting or tarring timber before it has been sufficiently seasoned.

Dry-rot is liable to develop upon the ends of timbers built into walls unless protected by metal shoes. It frequently attacks wood in warm cellars, and in basements used as kitchens. Oil-cloth or other impervious covering laid upon damp floorboards is also favourable to the development of dry-rot.

Prevention of Dry-rot.—Use only thoroughly seasoned timber; do not allow the timber to remain in contact with a damp surface, and, where possible, ensure that a current of fresh air shall always flow along at least one side of the timber. Impregnation of the timber with creosote is, where practicable, a good method of rendering the timber proof against the attacks both of fungi and of wood-boring insects.

Wet-rot is produced in wood that is alternately soaked with water and exposed to a moist, stagnant atmosphere. It often occurs in living trees. The heartwood is attacked by a fungus and disappears, while the sapwood continues to live. In this way trees with hollow trunks are formed. Wet-rot, like dry-rot, is the result of the development of a fungus which thrives upon the nutritive portion of the wood, and leaves the remaining portion so weak and friable that it is readily blown to powder by wind and washed away by rain.

Preservation of Timber.—Thoroughly seasoned timber may be preserved to a certain extent by painting, but a coat of paint placed upon insufficiently seasoned wood tends to destroy rather than preserve it, for the moisture of the sap is prevented from escaping, and the timber consequently soon commences to rot.

Railway sleepers are most commonly preserved by treatment with creosote. Creosote is one of the distillates obtained from coal tar, and contains carbolic acid, naphthalene, and other antiseptic compounds. The sleepers are placed in an iron cylinder from which the air may be subsequently pumped in order to withdraw the air from the cells of the wood. Creosote heated to a temperature of about 120 deg. Fahr. is then forced into the cylinder under a high pressure (Bethell's process). The amount of creosote absorbed per cubic foot of wood is from 10 lbs. to 12 lbs. in the case of soft woods, but considerably less in the case of hard timbers. Sometimes the timber to be creosoted is merely soaked in a tank of the hot creosote.

Creosote has up to the present time proven the most effective of the cheap liquids for preserving timber. It coagulates the albumen of the sap and destroys or repels all the varieties of fungi or insects which commonly feed upon or bore into timber.

Carbolinum or Carbolinum Avenarius is a preservative liquid, said to be obtained by mixing anthracene oil with linseed oil and certain antiseptic substances. It is often used for painting telegraph poles and fences, as it prevents water from soaking into the wood. Anthracene oil, like creosote, is a distillation product of coal-tar.

Kyan's Process, which was introduced in 1834, consists in treating the timber with a dilute solution of corrosive sublimate. The bichloride of mercury combines with the vegetable albumen and preserves it from fermentation. Mercury bichloride is, however, comparatively costly, and is also objectionable on account of its very poisonous character.

Boucherie's Process consists in impregnating the wood with copper sulphate.

Burnell's Process consists in impregnating the wood with zinc chloride.

Fireproofing Timber.—A large number of recipes for rendering timber fireproof by treating it with certain salts have from time to time been recommended, but many of the salts proposed are comparatively costly and materially increase the weight of the timber. In some cases, moreover, the treated wood is discoloured, its elasticity is considerably reduced, and it corrodes iron nails or other metals with which it is placed in contact.

Timber exposed to frequent rains or washed by sea-water cannot, of course, be rendered permanently fireproof by simple impregnation

with a soluble salt, although such salt may be useful for sheltered timber.

The following are some of the materials which have hitherto been most extensively used for fireproofing timber:—

1. The timber is first painted with a solution of sodium silicate, and then with limewash. (Insoluble silicate of lime is thus formed in the cells of the wood. (Abel's process.)

2. The timber is heated with a solution of ammonium phosphate. This soluble salt is liable to be washed out of the wood, and has a corrosive action upon iron.

3. The timber is treated with borax and sulphate of magnesia to produce insoluble borate of magnesia in the pores of the wood.

4. The timber is soaked in a solution of tungstate of soda. This is costly, and greatly increases the weight of the timber.

5. The timber is carefully limewashed. The limewash considerably reduces the inflammability of the timber, but cannot be said to render it non-flammable.

A method of rendering timber permanently fireproof without materially reducing its strength or unduly increasing its weight and cost has yet to be discovered, but sufficient success has already been achieved to render fireproofed timber a material which may in many cases be used in place of inflammable timber with great advantage. For the timber work in exhibition buildings and in factories fireproofed wood should always be employed, and it has already been extensively used as a substitute for inflammable timber in modern battleships.

The term "fireproof timber" has, of course, been used in the present paper to denote non-flammable wood, and not a timber that will resist gradual destruction by intense heat. No method of treatment can prevent timber from becoming useless as a building material when subjected to a very high temperature for a prolonged period.

OBITUARY.

MR. ROWELL.—We have to announce the death, on the 18th ult., at his residence, Elbury Lodge, Newton Abbott, St. Devon, of Mr. Joseph William Rowell, in his seventy-sixth year. Mr. Rowell was senior partner in the firm of Messrs. J. M. Rowell & Son, of the Devon Estate Office in that town, and had practised as an architect and land surveyor and agent at Newton Abbott during nearly the whole term of his professional career. Of the principal architectural works carried out by him and his firm in the county of Devon we may instance the following:—The renovation of the parish church of St. Paul at Starcross (built in 1828), and the designs for the pulpit and lectern carved in oak by Messrs. Harry Hems & Sons, of Exeter; the reparation, with the re-roofing, of the ancient church of St. Martin at Exminster; the Constitutional Club, Bovey Tracey; a residence, with stabling, entrance lodge, &c., at Yarty, near Exminster, for Captain C. H. S. Buckle, R.N., at a cost of nearly 5,000l.; the Cockington Isolation Hospital, 1897-8, with a ward for special and private cases, built of the local red rock (J. W. Rowell); the Isolation Hospital at Newton Abbott erected last year for the Joint Committee at a contract price of 5,225l. (J. W. Rowell); the enlargement and improvement of the boys' Board school at Highweek, near Newton Abbott; the new Board school for girls at Highweek, together with road works, sewers, and so on for the Highweek fees (J. W. Rowell); the Sunday schools near St. Michael parish church, East Teignmouth; the stabling at Holcombe Hall, Dawlish, for Mr. Harrison Benn; and, in Newton Abbott, the church of St. Paul, in Devon-square, built in 1861-74 after the Early English style, at the cost of the late Earl of Devon, and the Wesleyan chapel in Durlenay-street, 1869-70, erected at a cost of about 1,000l. for 700 sittings (J. W. Rowell). Mr. Rowell was appointed surveyor for the laying out of the Falk Estate, since Lord Haldon's, on the outskirts of Torquay, and was employed by the late Earl of Devon, in respect of his property in and around Newton Abbott, which town has been considerably extended during the past thirty or forty years.

GENERAL BUILDING NEWS.

CHURCH, BALLINAHOW, IRELAND.—On the 8th ult. the new church at Ballinahow, six miles from Athlone, was dedicated. The church, which is Gothic in style, consists of a nave and aisle. It has six lancet windows, with niches occupying the intervening spaces. The transepts are divided by polished granite shafts with ornamental caps. The transepts are lighted by three-light traceted and cusped windows in the gable, surmounted with unique-foil traceted lights. The apse end has a stained-glass window representing the Ascension of Our Lord. The intersection with the nave is

marked by a deeply cut and moulded chancel arch, with polished granite shafts and moulded caps and bases and octagonal pilasters. The stained glass in the four-light tracery window in the front gable represents the arrival of St. Columkille at Tara. The gallery is in pitch pine, as also is the porch. The tower and spire rise to a considerable height. The exterior of the building is executed in limestone from the Ross quarries at Mountugent, Ballinasloe. The high altar is of white marble, and has a canopy carried on green marble shafts. The side canopies are inlaid with Irish marbles. The altar is the work of Mr. Thomas Ryan, Dublin. The church was designed by the late Mr. Hague, and on his death the completion of the building was entrusted to his successor, Mr. T. F. M'Namara, Dublin.

CHURCH, BROCKHAMPTON, HEREFORDSHIRE.—A new church has been erected at Brockhampton, near Hereford. Mr. Lethaby was the architect.

LONDON BAPTIST ASSOCIATION CHURCH, STREATHAM.—The foundation-stone of this church was laid on the 23rd ult. The church is designed in perpendicular Gothic, freely treated. The facings are of pressed red brick, and dressings of Bath stone. A tower forms a prominent feature at the west end. The estimated cost of the complete block (without the upper portion of the tower) is 5,238l., the latter being 440l. extra. The portion at present being erected is the tower, nave, and vestries only, together with a temporary apse, the transepts being left for completion at a future date. The architects, whose designs were accepted in a recent competition, are Messrs. George Baines and R. Palmer Bates, London.

SCHOOL, HELENSBURGH.—At Helensburgh Dean of Guild Court plans have just been passed for the erection of a school on Newark Villa ground, East Clyde-street. The school is to take the place of Grant-street and James-street schools, and accommodation is provided for about 100 pupils. It will also be class rooms for cookery and laundry. The cost will exceed 10,000l. The architect is Mr. Alexander N. Paterson, Glasgow.

SCHOOLROOM, MONKTON COMBE, WILTSHIRE.—New schoolrooms have been provided at Monkton Combe. The architect was Mr. F. W. Gardiner, of Bath.

MUNICIPAL BUILDINGS, ALDERSHOT.—At a recent meeting of Aldershot Council, the Public Grounds Committee reported that they had considered the amended plans for the Municipal Buildings, submitted by Mr. Hutchinson, the architect, and they recommended them for approval, and also that the architect be instructed to prepare the necessary tracings for the Local Government Board, and the working contract drawings. The report was passed.

BUSINESS PREMISES, BIRTLEY.—On the 25th ult. new Co-operative buildings at Birtley were opened. The architects were Messrs. Liddle & Brown, and the builder Mr. Jopling.

NEW BUILDINGS FOR LAMBETH BOARD OF GUARDIANS.—The buildings at Lambeth are now being erected as: new porter's lodge, relief station, nurses' home and offices for the Guardians. This is only part of a larger scheme whereby the present rooms used by nurses in the central administrative block of the infirmary (which are quite inadequate for the nursing staff, both as to numbers and also baths and lavatory accommodation) are set free for use as a ward to accommodate sixty-two additional patients; being nine single-bed wards, six three-bed wards, six four-bed wards, one eleven-bed ward. It is proposed to build also a new four-bed observation ward on the site of the temporary offices, and to get a good operating room to the administrative block, the total cost of the whole scheme (as sanctioned by the Local Government Board) being 54,000l. to 55,000l. The accommodation given in the new buildings is as follows:—In basement:—Muniment room, large stores, and heating chamber, &c. Ground floor (Clerks' Department):—Clerks' public office, clerks' private office and large central office, accountants' settlement officers, call-over staffs, collectors, superintendent's relieving officers, lunacy and warrant officers' offices, lady guardians' room; public waiting-room; two large committee-rooms; private waiting-room; lavatories; board-room, 50 ft. by 30 ft. (the old one was only 34 ft. by 23 ft.). The nurses' home contains the following accommodation:—Kitchen, scullery, dining-room, visiting-room, lavatories, cloak-room, and cycle shed. On the first and other floors are matrons' rooms (three), charge nurses' room, two assistant matrons' rooms, nurses' sitting and recreation room (30 ft. 6 in. by 34 ft. 3 in.), with lecture-room, box-rooms, cupboards, lavatories, and bathrooms, and bedrooms for 101 nurses and servants. There will be flats over the front bays for airing purposes to the nurses and easy access to the infirmary by the covered bridge, already mentioned. The building externally will be faced with red bricks and stone dressings, with granite columns at entrance, and all walls are being built with Fletton bricks in cement. The corridors internally will, as far as possible, be tiled, and all materials used in construction that will stand hard wear. The builders are Messrs. W. Lawrence & Sons, of Waltham Cross, and the architect Mr. Sidney R. J. Smith, of London; Mr. Nightingale being the clerk of works.

CHILDREN'S HOMES, SIDCUP.—In 1899 a site of 62 acres, with a substantial old residence at Half

way-street, Sidcup, was acquired by the Greenwich Board of Guardians at a cost of 250l. an acre, with the residence given in. School homes on the cottage principle, as opposed to the old barrack construction, have been erected by the guardians for 525 children, from the designs of Messrs Thomas Dinwiddie & Sons, of Greenwich and London. A portion only of the site has been used; upwards of 20 acres being in reserve for ultimate building development. The buildings, which are of considerable extent, and comprise twenty-four different blocks, including swimming bath, gymnasium, &c., were publicly opened by the Chairman of the Board recently. The buildings are in full occupation. The contractor was Mr. T. Rowbotham, of Birmingham. Messrs. Morwood & Sons for the engineering, Messrs. Johnson & Phillips for the electric light installation, and Messrs. Tilley & Son for well and pumping machinery.

SWINDON ISOLATION HOSPITAL.—The extensions of the Swindon Isolation Hospital were formally opened on Wednesday, the 22nd ult. The buildings, which have been erected at a cost of 9,500l., were designed by the joint architects, Mr. Geo. E. Halliday and Mr. John W. Rodger, of Cardiff. The contract for the general work has been carried out by Mr. A. J. Colborne, of Swindon, and Messrs. J. Williams & Son, of Cardiff, did the engineering work. The chimney stack was built by Mr. Phillip Myles, of Dorking, and the terrazzo floors were laid by Messrs. Geary, Walker, & Co., of London. The new buildings comprise a lodge and entrance gateway; a fever pavilion for twenty-four beds, arranged in two large wards and two special wards for one patient each; also a laundry block, with which are incorporated the disinfecting station, mortuary, and boiler-house. The wards are heated by steam at atmospheric pressure. The whole of the hot water for laundry purposes and for baths in the pavilions is heated by steam generated in a Cornish boiler, 18 ft. by 5 ft. The laundry is fitted up with the latest appliances, driven by a 6 h.p. horizontal engine.

BOARD SCHOOL, HARROGATE.—The foundation-stone of the new Board school at Starbeck, Harrogate, was laid on the 15th ult. The school is being built at the extreme rear of the playgrounds of the existing school, and provision is being made for accommodating 300 infants (in five class-rooms). On the first floor rooms are provided for the teaching of cookery and manual instruction. The class rooms contain tubular racks connected to the low-pressure hot water circulation, thus enabling the children's cloaks to be dried in wet weather. The work is being carried out under the superintendence of the architect, Mr. T. E. Marshall, of Harrogate.

THE GRAMMAR SCHOOL, LICHFIELD.—The buildings, together with the head-master's house, of the old Grammar School at Lichfield have sold, under a scheme made by the Charity Commissioners, at auction for 1,035l., to the landlord of the Lichfield High School for Girls. The proceeds are appropriated to the cost, estimated at 9,000l., of the new buildings at Borrowcopp Hill, Lichfield, now being erected, after designs and plans prepared by Mr. T. Hillier-Pyke, of East Ham, Essex, to accommodate, for the present, 125 day boys and twenty-two boarders, with residences for the head-master and assistant masters. The Conduit Lands Trust gave the site, eight acres, for the new schools, and contributed 4,500l. to the building fund, towards which Mr. R. T. Cooper, High Sheriff of Staffordshire, also subscribed 300l. The County Council, moreover, have undertaken, it is said, to make a substantial grant in aid of the scientific and technical departments which the Governors hope to be able to develop at no distant period. Of the old school, which is associated with the youthful days of Dr. Johnson, Addison, Garrick, Dr. Darwin, and Elias Ashmole, the antiquarian, there is an engraving after John Buckler, in Croker's edition (1848) of Boswell's "Life of Johnson." It was founded temp. Edward VI., as appears from the record of a small endowment payable out of the former Court of Exchequer, and rebuilt in 1602 at the charges jointly of the City Corporation and the fees of the conduit lands.

FREE LIBRARY, NEWTOWN, NEAR CARDIFF.—The memorial stones of the free library in course of erection at Newtown were laid on the 18th ult. The building is in a central position in the town, and the architect is Mr. F. H. Shaylor, Walspool, and the builder Mr. E. H. Nicholas, Shrewsbury. The stone laid bears the inscription, "This portion of the building was erected by the Co-operative Union, acting on behalf of the co-operators of the United Kingdom, to the memory of Robert Owen, the founder of co-operation."

TEMPERANCE HALL, LINCOLN.—On the 9th ult. the new Temperance Hall at Lincoln, which comprises a central hall and a suite of rooms, named the Lawson Institute, after Sir Wilfrid Lawson, was opened. The total outlay in connexion with the new premises will reach about 8,000l. The institute stands at the eastern end of Salter Gate, and covers the site of the old Temperance Hall, which was close to Frowd Gate, and the ground previously occupied by a number of cottages and other buildings at the rear of the old premises. With a view to future extensions, a clear space of 300 square yards has been retained. The hall has a balcony and gallery, and seating accommodation is provided for 1,000 people. The building is of red

brick, with dressings of concrete masonry by Messrs. Daniel & Co., of Lincoln. There are three entrances from the north, and emergency exits fitted with panic bolts are conveniently placed. The principal hall is arranged on the plan of a theatre, with circle, pit stalls, and pit. Access to the pit is gained by the central door, and in that portion there is seating for 400. The eastern door forms the entrance to the stalls and the front rows of the circle, extra exits being provided into Thorn-gate, and the west door admits to the upper portion of the circle. In all there are five exits. The stage, or platform, is 30 ft. wide and 19 ft. deep, and the proscenium is 25 ft. wide by 25 ft. high. The foot-lights are movable, so that when necessary the platform can be extended over the orchestral portion of the hall, and that will give an additional depth of 5 ft. 6 in. The premises contain four dressing-rooms at the back, and the platform entrance is from Thorn-gate. There are ladies' and gentlemen's cloak-rooms for the circle and stalls, and behind the circle is a room 10 ft. by 10 ft., which is to be converted into a refreshment foyer, and is in communication with the kitchen in the basement by means of a lift. On the first floor there is a lecture hall 40 ft. by 25 ft., with double entrances and exits. There is an office for the Secretary on the ground floor, the heating has been undertaken by Messrs. Truswell & Son, of Sheffield, the electric lighting by Mr. Hazledan, Lincoln. The contractors were Messrs. S. & R. Horton, and the architects Messrs. W. Mortimer & Son, Lincoln.

ENLARGEMENT OF TOWN HALL, BATLEY.—It is proposed to extend Batley Town Hall from plans prepared by Mr. W. W. Hanstock, and the approximate cost of the scheme is £6000. A second front will be made to face the Market estate. The scheme provides for the retention of the large room, offices for all the officials, committees, a council chamber, and police-court room, with Mayor's parlour and magistrates' retiring-rooms. There will be cellar accommodation in the basement from which a lift will communicate with the second floor of the building on which will be situate the assembly-room, &c. There will also be a caretaker's house.

MISCELLANEOUS.

CHANGES IN SOUTH MOLTON-STREET, W.—Messrs. Giles, Gough, & Trollope have been appointed as architects to the Symonds Hotel Co., for new premises on the site of Nos. 3 to 9 in this street. The site of No. 13 has been cleared for rebuilding, and the City Lands Committee of the Corporation of the City of London recently offered the letting by auction, on an eighty years' building lease of the site—covering an aggregate area of 6,000 sq. ft.—of Nos. 57-62, whereof No. 57 is the Globe Tavern with a frontage of 114 ft. to the main street, a depth of 55 ft., and frontages to Globe-yard and Haunch of Venison-yard. The architects for the new buildings on the site of No. 13 are Messrs. Read & Macdonald.

STATUE, WEXMOUTH.—On the 20th ult. the memorial statue of Queen Victoria was unveiled by Princess Henry of Battenberg. The cost of the statue, independent of foundations and pedestal, is about £800. The memorial consists of a portrait statue of the late Queen upon a pedestal of Portland stone, and the sculptor was Mr. George Simonds. The total height of the memorial is about 25 ft. The design of the pedestal is also by Mr. George Simonds, and the stonework has been executed by Mr. S. G. Stone. The bronze casting was by Messrs. J. W. Singer & Sons, Ltd., of Frome.

ERRATUM.—In the notice of the Deptford competition, page 363 *ante*, the word "ends" in the top line of the centre column was a misprint for "levels."

AUSTRALIAN LAND REGISTRATION.—The absence of litigation with respect to titles to land is a marked feature of the Australian judicial system, and is a result of the general adoption of the Real Property Act, as devised by the late Sir R. R. Torrens, and which first came into operation in South Australia. It was introduced into New South Wales in 1862, and completely revolutionised the procedure in regard to land transfers, which, until that date, had been largely modelled on law existing in England. The leading features of the Act are, according to the New South Wales Government Statistician, the transferring of real property by registration of title instead of by deeds; the absolute indefeasibility of the title when registered, and the protection afforded to owners against possessory claims, as a title issued under the Act stands good notwithstanding any length of adverse possession. One result of the Real Property Act is that in New South Wales, as in other parts of the Commonwealth, land is bought and sold with the greatest ease. The fees paid for registration are, after certain deductions have been made, devoted to a fund for compensating any holder of a registered title whose claim, by reason of some informality, may prove invalid; but such is the care exercised before a title is granted that instances of this character are almost unknown. Every change of ownership, in whole or in part, has to be inscribed on the title. Thus, if the holder of 5 acres sells a couple he has to return his deed, which is replaced by a fresh one showing him to be the holder of 3 acres, a second one being issued

to the purchaser, giving him a title to 2 acres. Thus each deed shows only what land the holder is actually entitled to under its provisions. In this way all disputes respecting land ownership are avoided.

PLUMBERS AND THE PUBLIC HEALTH.—At a meeting for the distribution of certificates of registration at Norwich, on Saturday last, Dr. Cooper Pattin, Medical Officer of Health for the City, said that no one realised more than he did the extreme importance of sanitary work being done properly, and he had reason to believe that a steady improvement in that direction was going on. He found every year from the reports that came in from the inspectors in each department that defective plumbing work was steadily decreasing, the defects that did arise being mostly discovered in work done years ago. It was rare to have a defect reported in any work that was done within a recent period. That improvement he believed to be due to the care and the *esprit de corps* which animated all the plumbers of the present day, and he hoped that Parliament would sanction the principle that work of this character should not be done by any one who did not hold a certificate of competency. The plumbers would then be putting themselves in the same position with members of his own profession.

THE HOUSING QUESTION, LIVERPOOL.—The Executive Committee of the Liverpool Housing Association have addressed a letter to each candidate, asking for a statement of his views upon the housing question. They say: "There are in the city still about 10,000 insanitary houses and 3,201 cellar dwellings which require to be closed or demolished. Many of these are terribly overcrowded, the report of the Census Commissioners for 1901 showing that the houses of four rooms and less contain 54,300 persons living under conditions of gross overcrowding when tested by a standard which allows two persons to a room, counting two children as one person. The present conditions of the city, as well as districts like Everton, Kirkdale, and West Derby West, are already far too densely packed with houses, and any scheme of housing reform which only aims at replacing the existing insanitary court-houses with block-dwellings and one-room and two-room tenements of small dimensions will do little or nothing to decrease overcrowding of houses upon land. In any case, this plan, the only one as yet considered by the City Council, takes no account whatever of the overcrowded surplus of 54,300 persons above-mentioned. The Association, therefore, urges upon members and candidates for membership of the City Council the urgent importance of municipal buildings in less congested areas on the outskirts of the city. Land is much cheaper there, and cheap tramway communication now overcomes the objection of distance from work. It may be that the present slum-dwellers would not go out to the suburbs, indeed, that might not be desirable, but thousands of artisans in Everton, West Derby West, and other thickly-populated districts, would gladly avail themselves of the better cottages at fair rents. The migration of the artisan class would give more elbow-room to the poorer folk who now occupy slums. The speculative builder has largely failed to meet the demand for cheap and commodious houses, the advantage of cheaper transit having been diverted into the pockets of the landlords by a general rise in rents. The health of the citizens, as well as the financial interests of the ratepayers, demand a bold policy of municipal ownership of land and of house property. The candidates are asked to answer the following question:—'Are you willing to support and to advocate the building of municipal cottages on cheaper land in the suburbs of Liverpool, supplementary to the present method of building tenements on expensive land in the central parts of the city?'"

THE SLATE TRADE.—A blast, bringing down 200,000 to 300,000 tons of bad rock took place at the Colwyn Quarry on the 28th ult., the shot being fired by Mr. Justice Buckall, now on circuit in N. Wales. The Colwyn, as well as other quarries in the district, has been clearing large quantities of bad rock, but the outlay is amply repaid by the high class of slate produced in the Nantl Valley. Trade is very brisk, and stocks low.

NEW WINDOWS, MARGATE COLLEGE.—The stained-glass windows which have been inserted in Margate College Chapel in memory of those Old Boys who died in the front (over 250), were unveiled and dedicated on the 28th ult., with a special service. The work was done by a local artist, Mr. Hill.

LEGAL. IMPORTANT WEST-END ANCIENT LIGHT DISPUTE.

THE case of Dean v. Maddick came before Mr. Justice Bruce and a special jury in the King's Bench Division on the 27th, 28th, and 29th ult. This was an action by the plaintiff to recover damages laid at 500l. for alleged interference with his ancient lights.

Mr. Arthur Powell, K.C., and Mr. J. H. Keeling were counsel for the plaintiff; and Mr. Abel Thomas, K.C., and Mr. D. Pollock for the defendant.

It appeared that the plaintiff is a surgeon residing and practising at No. 69, Harley-street,

W., and he alleged that he had suffered damage by reason of defendant having wrongfully obstructed the access of light to ancient windows in his house. Plaintiff took over lease of the premises, granted for forty years in 1871, by an indenture dated May 25, 1867. For more than twenty years prior to the erection of the building complained of—viz., a building at the rear of No. 67, Harley-street—plaintiff and his predecessors in title had enjoyed the following windows and lights, viz., on the ground floor, a window facing south lighting a lavatory, two windows facing south lighting a small room used as an operating-room, a window facing south-west, in the bay of an, partially lighting a room used as a consulting-room, a window facing south in the same bay, and partially lighting the last-mentioned room, and two windows facing west, lighting a room now used as a dining-room; on the first floor, lighting a boudoir or music-room, and in the basement a certain skylight and windows lighting the kitchen and domestic offices. Adjoining the plaintiff's premises on the north side are the defendant's premises, No. 67, Harley-street, consisting of a dwelling-house and, until 1901, there was behind it a yard, about 57 ft. long, and 12 ft. wide, which was used for stabling, which, when it was pulled down, was over thirty years old. For more than twenty years before the erection of the building on the site of the stabling, plaintiff and his predecessors had continuously and uninterruptedly enjoyed free access of light over the said yard and stabling and through the windows and lights before mentioned. In or about April, 1901, defendant pulled down the stabling and, in November or December he erected on the site of part of the yard a building called a maisonette, much higher than the stabling. The plaintiff alleged that this new building materially diminished the access of light to his premises, and he claimed the damages before stated.

The defendant by his defence did not admit that the plaintiff's lights or windows were ancient lights or that the plaintiff had always enjoyed the light he alleged over the stables. He pleaded that he pulled down the stabling in September, 1901, and in November or December caused a new building to be erected on the site. The building was erected upon part of the open space between the old stabling and the defendant's main building, and was set back and arranged so as not to damage or interfere with the plaintiff's lights. Defendant further denied that his new building materially or at all obstructed or diminished the access of light to any of the windows or lights in the plaintiff's house, or that the plaintiff had suffered any damage by reason of any of the acts complained of.

Mr. Arthur Powell having opened the case, reciting the before-mentioned facts, the following evidence was called:—

Mr. Elgodd, an auctioneer, stated that he had visited the premises in question, and he considered that the wall the defendant had erected had diminished the light going into the plaintiff's building. The operating-room and the consulting-room of the plaintiff had had the light interfered with, whilst the dining-room suffered to some extent. Before the defendant's building was erected there was an uninterrupted light right across New Cavendish-street to the plaintiff's house. Having regard to Harley-street being the abode of the medical profession, he was of opinion that the plaintiff's house had been depreciated to the extent of 50l. a year, the capital sum of 385l.

Cross-examined: He put down the loss of rent to the diminution of light alone.

Mr. Henry Dean, the plaintiff's father, manager of the London and County Bank, examined, said he often visited his son at No. 69, Harley-street, whilst the stables were up at the rear of the house, and he had been in all the rooms of the house. He had been in the rooms since the erection of the defendant's new building. He had noticed an appreciable difference in the light since the defendant's building had been up, particularly to the consulting-room and the operating-room. The light there was materially affected. The light to the dining-room was also affected. With regard to the basement, the sky could formerly be seen from the housekeeper's room, but now the sky was obscured, and all that could be seen was the top of the roof of the defendant's new building.

Mr. Henry Percy Dean, the plaintiff, a consulting and operating surgeon, of 69, Harley-street, said he took the premises in May, 1867, going into occupation the following June. At that time there was a stable there and there was a good light. A good light was necessary for his profession, and he took the house on account of the good light. In May, 1901, he discovered that it was proposed to erect a building where the stable formerly stood, and when the scaffolding was up it was covered with a tarpaulin in order to see what effect the building would have on the light to his house. The result was very marked, the light being very much interfered with. About October the erection of the building commenced, and in November he instructed his solicitor and eventually the present action was commenced. The defendant's building had been completed, and it covered more ground than the stable formerly did, and was bigger and higher than the building which had been pulled down. The result was that the light had been materially diminished to the dining-room, consulting-room, operating-room, and basement.

Cross-examined: He emphatically denied that he had discussed with defendant or his agents the right to which he would not object to the defendant's building going. He had all along acquiesced in the judgment of his architect, Mr. Scott, who had advised him as to the height to which the defendant's building could go.

Mr. John Scott, an architect and surveyor, of No. 15, Bedford-row, W.C., said he was called in in arch by the plaintiff with reference to certain projected buildings by the defendant. At that time there was a very good light in plaintiff's consulting operating rooms and lavatory. The dining-room was a dull room, and never had a good light. November defendant's new building was getting a rapidly. The new building projected 13 ft. 6 in. beyond the wall of the old stable, and was that distance nearer the plaintiff's house. The wall of the maisonette rose 9 ft. 6 in. above the height of the old stable wall, the roof going up to a vertical height of 16 ft. 10 in. above that. The loss of light by the erection of the building was as follows to the plaintiff's different rooms, viz., lavatory, vertical, 1 deg. less, and horizontal 23 deg.; operating-room, vertical, 184 deg., and horizontal, 184 deg.; consulting-room, vertical, 24 deg., and horizontal, 1 deg.; and in the dining-room a loss of 16 deg. of light. There had also been a diminution of light in the kitchen.

Cross-examined: When he saw the defendant's architects before the building was erected, he was sure he never expressed his approval of the plans. He was sure he disapproved of them.

Mr. David A. Ross, an architect and surveyor, gave evidence that the roof of the erection of the maisonette by the defendant materially interfered with the light to the rooms complained of.

This being the plaintiff's case,

Mr. Thomas submitted a point of law to his lordship, contending that the plaintiff had no rights to light. Plaintiff held his premises under a lease which expired in 1911. By the 1896 plaintiff gave notice to take up a new lease of the premises for twenty-four years from 1911. This being the case, he submitted that all the plaintiff's rights to light and air were taken away by the plaintiff taking the new lease dated 1896 for twenty-four years from 1911. Under that second lease plaintiff gave up all easements over any other proposition on the same estate, as he had no right to object to anything on the estate. Now the defendant was a tenant of the same estate as the plaintiff, and therefore the plaintiff's right to sue for any diminished light was gone. If his lordship upheld his view, then there was an end to the plaintiff's case.

Mr. Powell complained that this point was not raised in the defence. But he contended that the plaintiff was not barred from bringing the action, inasmuch as he only claimed for the term up to 1911, and further that the new lease did not come into operation till that date. How could his learned friend raise an objection to a lease that was not yet in operation?

His lordship decided to hear the case out, and to raise the question of fact to the jury.

On behalf of the defendant, Mr. J. Douglas Matthews, F.R.I.B.A. and F.S.I., said he had examined the premises of the plaintiff. He did not consider that the light of the lavatory had been affected materially by the erection of the new buildings of the defendant. With regard to the dining-room, the eastern window was unobstructed. The western window was obstructed to some extent. The room, however, was amply lighted, and there had been no material obstruction in its light. As regarded the consulting-room, there was no material obstruction of the light. It was amply lighted. Both this room and the dining-room had sustained no appreciable loss of light by the erection of the new buildings by the defendant.

Mr. W. H. White, defendant's architect, gave evidence to the effect that defendant's new building caused no appreciable interference with the light of plaintiff's premises.

Mr. Edw. Robert Robson, F.R.I.B.A. and F.S.I., said he had had great experience in light and air cases. He had in June last carefully examined the buildings in question, and the plans and the angles of light. Plaintiff's dining-room had never been a well-lighted room, and its light could not have been affected by the defendant's building. The consulting-room was amply lighted room, and a little diminution in the light to the plaintiff's window would not affect the light of the room. The loss there was absolutely immaterial. With regard to the plaintiff's operating-room, the witness said he was of opinion that the light there was not materially affected by the defendant's new building. The lavatory in the plaintiff's house was well lighted, and was now as good as it always had been. On the question the plaintiff's house was not prejudicially affected by the defendant's new building with regard to the light. Its general attractiveness was certainly not affected so far as it was concerned. He thought it was rather improved by the removal of the stables and the erection of the defendant's new building.

Mr. Edward Bernard Pether, F.R.I.B.A., said he had had a large experience in dealing with questions of light and obstruction of light. In June last he carefully examined the plaintiff's premises. He had already become acquainted with the defendant's premises. He was of opinion that defendant's building did not take away any necessary light or material light from the plaintiff's lavatory window, and that the defendant's new building beneficially affected the lavatory. The effect of the defendant's new building on the light to the plaintiff's operating-room was inappreciable, neither did the new building affect the light to the consulting-room. With regard to the dining-room, he thought that no case existed on paper as to the loss of any light to this room. Generally, the plaintiff had not in his opinion suffered any loss of light that was appreciable.

Mr. Samuel Clarke, estate agent, auctioneer, and surveyor, of New Cavendish-street, said he was of opinion that the letting value of the plaintiff's house had been improved by the erection of the maisonette in the place of the old stables.

Mr. J. T. Bedford, of Wigmore-street, house agent and surveyor, gave evidence of a similar nature.

This evidence closed the defendant's case.

In the result, the jury, after deliberating for an hour and a quarter, intimated that they could not agree on a verdict. The parties, however, agreed to accept the verdict of the majority, when the jury returned a verdict for the defendant by a majority of 10 to 2.

Judgment was entered accordingly.

CASES UNDER THE EMPLOYERS' LIABILITY ACT.

The case of Pearce v. Robertson, a report of which appeared in our last issue, came again before the Marylebone County Court last week. The plaintiff, may be remembered, was William George Pearce, a bricklayer, 14, Crawford-buildings, Marylebone, W., and he brought an action, under the Employers' Liability Act, against Messrs. Robertson & Sons, builders and contractors, 141, Edgware-road, W., claiming damages in respect of personal injuries, alleged to have been sustained through the negligence of the defendants or their servants.

The main question was as to the cause of an accident which occurred to the plaintiff whilst he was assisting in removing an old bressemer from over some stable doors in Wood's-mews, off Park-lane, W. Plaintiff's case, briefly, was to the effect that a man named Tennant was acting as foreman on the job, and told him not to use a scaffold for the work; and that while Tennant and an apprentice named Houghton were pulling one end of the bressemer, and he (plaintiff) was at the other end, the huge piece of timber "gave a jerk," causing him to fall and injure himself.

The defence, in effect, was that Tennant was not acting as foreman, but that Mr. James Robertson had charge of the job, and had previously told plaintiff to use what scaffolding might be necessary, and that the plaintiff overbalanced whilst standing upon a pair of ordinary builders' steps.

The questions which the judge put to the jury, and the answers given by the jury were as follows:—

1. Were there scaffolding, planks, and trestles on the premises?—Yes. 2. Was the plaintiff bound to obey the orders of Tennant?—Yes. 3. Or was he merely to be at liberty to assist him?—No. 4. Did Tennant tell the plaintiff not to get scaffolding, but to work on steps?—Yes. 5. Or did he ask him to do so?—(No answer). 6. Or do you think that Tennant was guilty of negligence in so doing?—No. 7. Do you think that Tennant or Houghton or either of them started moving the bressemer without warning?—No. 8. Was the accident caused by the plaintiff working on the steps?—Yes. 9. Or by Tennant or Houghton, or either of them moving the bressemer without notice?—No. 10. Or by both?—(No answer). 11. Do you think that the plaintiff consented to work on the steps willingly, and voluntarily incurred the risk?—No. 12. Amount of damages, if any?—50l.

There was a long discussion as to whose favour the verdict was in, but ultimately his Honour entered judgment for defendants, with costs, giving leave to move for a new trial, the application for judgment on the jury's finding to be taken as an application under the Workmen's Compensation Act.

At the Brompton County Court (London) on Tuesday, before Judge Stonor and a jury, James Butcher, a builder's labourer, 80, Lot's-road, Chelsea, S.W., brought an action, under the Employers' Liability Act, against the London County Council, claiming 234l. in respect of personal injuries said to have been sustained owing to negligence for which the defendant Council were responsible.

Mr. A. H. Carrington, counsel, appeared for the plaintiff, and Mr. J. Dumas, counsel, for the defendants.

Plaintiff's counsel explained that in August last his client was in the employment of the London County Council, assisting in some works connected with the formation of a pumping-station at Lot's-road, Chelsea. A large scaffold had been erected, consisting of heavy standards with ledgers across them, upon which were placed putlogs and scaffold boards. Below this scaffold were large and heavy pieces of stone which were required to be pulled up by means of a block and fall from a trench. The plaintiff and another man were told by the general manager, and

also by the foreman on the job, to pull up these pieces of stone. They had got one piece up safely, and were putting up a second piece when the rope appeared to have caught one of the putlogs, which had not been properly tied or otherwise secured, and which fell upon the plaintiff's head. The injuries were very serious, involving, it was said, concussion of the brain, impaired sight, &c.

The plaintiff bore out his counsel's opening statement.

In cross-examination, the plaintiff said that it was impossible for them to lift the pieces of stone up without using the pulley. When a putlog was near a wall it was generally fixed in a hole in the wall, but if the end of a putlog came near a space, such as a window opening, he considered that it ought to be fastened by a rope.

Mr. Christopher Richard Griffiths, architect and surveyor, Gray's Inn, stated that he had inspected the works in question, and found that in some instances the putlogs were not lashed to the ledgers. He considered it a highly dangerous thing to direct labourers to use a pulley near putlogs overhead which were unlashd to the ledgers.

Mr. William Robert Pether, a consulting engineer, Mansion House-chambers, E.C., gave evidence generally corroborating that given by the last witness.

Charles Cutler, foreman scaffolder, in the employment of the London County Council, said that it was not usual to lash putlogs to ledgers, provided they were not in the immediate neighbourhood of such a thing as a pulley. Between the two standards where the pulley in question worked the putlogs that were lodged in the wall at one end were cut off at the other end, so that there should be no projection for a rope to catch. Witness however admitted that these putlogs were not lashed to the ledgers.

The judge: The evidence of this witness seems to settle the whole case. It is quite clear that, although they cut off the front ends of the putlogs, they did not tie them, and the question is whether the jury think that they ought to have tied the putlogs. I think we ought now to ask the jury: What damages?

Mr. Dumas: I must say, your Honour, that the case has taken a turn which I did not expect.

A jury found that the putlog was used in an unsafe way, owing to it not being lashed, and they assessed the damages in the plaintiff's favour at 150l.

His Honour gave judgment accordingly, and allowed costs.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

13,307.—SOLDERING IRONS: J. G. Wallis and E. Bagnall.—The tapered ends of a twisted wire or iron bar which carries the bit of the soldering-iron, either at a right or other angle, are fixed into the handle, and the bit is fashioned with a hole and channels for the wire or bar.

13,310.—FLUSHING MECHANISM: A. Barraclough.—A bell, having an annular recess, or, in some cases, a flap valve, that will start the flush when it is lowered, is disposed over a cone which communicates at its base with the shorter leg of the siphon. A small siphon leading from a container that takes the float of the ball-cock will supply an after-flush.

A butt-and-flange joint for the flushing pipe consists of a flange thereon, which is fastened with a hollow nut screwed into a collar.

13,351.—INSULATION OF ELECTRICAL CONDUCTORS: C. E. Woods.—For insulating purposes the conductors are covered with the split intestines of animals which, when moist, are laid around them lengthwise or are wound in spirals having overlapping edges, and then, on occasion, overlaid with some waterproofing substance.

13,370.—MECHANISM FOR THE BUCKETS, &c., OF CRANES: W. Taylor & W. S. Hubbard (Taylor & Hubbard).—For opening and closing the bottoms of buckets and skips automatically, the inventors link the flaps to a rod that is joined to the lifting-chain. To the body of the bucket they join a sleeve, through which the rod is inserted, and which has a conical and shouldered top. A sleeve consisting of two portions bolted together is hung from the jib, and is slotted to take projections from bell-crank triggers, which will engage with the shoulder of the first-mentioned sleeve, and are, under normal conditions, drawn upwards with springs, their play sideways being restricted by means of projections that engage with slots on the sleeve of the jib. When the loaded bucket is drawn up, the conical end of the sleeve forces the triggers apart so as to then engage together beneath the shoulder. As the load is lowered, the triggers will be pressed downwards by the weight of the bucket, and their horizontal arms will become engaged with projections from the arms that springs press inwards; when more of the chain is paid out, the flaps of the bucket open, whilst the triggers sustain the bucket; then as the bucket is again raised and its weight is taken by the chain, the triggers are drawn upwards by means of their springs as they turn on their fulcrums, whereby, when the bucket is again lowered, the sleeve of the rod falls, and as its shoulder becomes engaged with the arms, the triggers are freed, and will resume their place in readiness for the next turn.

13,373.—A FLOAT VALVE FOR FLOUSING MECHANISM: A. W. Murray.—Discharge ports are formed in the valve casing which is screwed on to the end of the supply pipe, and they will be closed, normally, with a disc and will effect a noiseless discharge on to the outside of the pipe, a heavy washer covers the disc valve which has a middle aperture for the flow of water into the supply pipe above it, in order to force the valve on to its seat, a cap which is worked by the counter-weighted arm of the float-lever normally keeps shut an extension from the top of the valve, the cap will rise as the float falls, and thus water can escape from the top of the valve, the cistern being refilled as the valve is lifted by pressure in the supply pipe.

13,391.—IMPROVEMENTS IN LOCKS AND FASTENINGS OF DOORS, &c.: G. Højbye and G. Thallbiter.—The cylindrical casing of a spring-worked bolt is fashioned in two portions and is fastened within a mortise cut in the door, on the bolt is mounted a guiding-block which is pierced for the engagement of two ends of crank-levers, press-buttons in the door-handles are coupled to the other ends of the levers, a stem from the guiding-block will enter a hole in a revolving block to be turned with a key, and one can withdraw the bolt by pressing the button when the hole registers with the stem. The bolt cannot, however, be withdrawn if the block is so turned that the hole does not register with the stem.

13,401.—MEANS OF VENTILATING ICE-SAFES AND SIMILAR RECEIVERS: J. W. Sutton.—A fan driven by clockwork draws the air through a pipe, and is combined with an auxiliary and adjustable regulating fan.

13,413.—KILNS FOR CEMENT-BURNING: F. Kilby.—A small shaft-kiln especially intended for the burning of cement, and also available for burning bricks, lime, plaster, and so on, is squared in section and has apertures into the asphalt for a forced-draught current, and doors lined with fire-brick in its side. A central draught is provided for by means of a divided arch near the top of the shaft.

13,415.—HOLDERS FOR INCANDESCENT LAMPS: G. Wallace.—Two tubular pieces that are affixed to another similar piece constitute the sockets of the holder for two bayonet-capped lamps; the third tubular piece is slotted for the arms of a ring, and is screw-threaded for an outer coupling-ring which retains a flanged cap into which a grip for the cord is screwed; in that tube is put an insulator beneath the arms of the ring, which holds a middle rod having two spring plungers, and two rods having single spring plungers set obliquely through opposite sides of the insulator. The plungers are thus disposed for effecting contact with the lamps, the wires being inserted through cross-holes in the insulator. The lamps can be placed in either parallel or series accordingly as the supply wires and the three rods are connected.

13,438.—A FUEL-ECONOMISER: G. F. Parkman.—Over the fire-bars is laid a false bottom, having slots, feet, and bars that cross the grate. Under the false bottom slides a plate furnished with side holes and a similar set of cross-bars: thus the two rows of bars will make a bottle closed to the fuel when in one position, but will allow a free current of air when in another. The slots of the false bottom take projections from the bottom of a plate, of which the upper edge lies against the back of the fire-plate. The contrivance is claimed as being applicable to any fire-place, and for producing soot combustion in an ordinary stove.

13,439.—AN IMPROVED GAS-BURNER: A. G. Dayles.—The inventor seeks to ensure a uniform flow of gas and to obviate waste with a check, or chamber, which he puts within the pillar of the burner, and which consists of two stepped thimbles, having a deflecting plate and a distributor made of gauze. Since the area of the inlets of the chamber is smaller than that of the outlets, a decreased pressure of gas in the chamber is obtained, whilst the pressure is yet further diminished by reason of the chamber, which is formed in the pillar above the check, being larger than the first-named chamber; the capacity of the opening of the tip being at the same time larger than that of the combined outlets.

13,443.—A SOLDERING-IRON: W. Pullen.—Within the handle is a chamber for the generating of acetylene. A tube that contains the wick leads from a water-chamber to that which holds the carbide cartridge. The tube is inserted through an opening in one end of the cartridge, at the other end whereof are apertures for the escape of gas that are covered at both ends with discs of canvas. The generation of gas is regulated with a screw which presses the cartridge against a spring, and a pipe from the water-chamber communicates with the gas.

13,452.—MAKING OF ARTIFICIAL STONE: C. K. Graham.—For making artificial stone from various cements the cement first mixed with water to excess, the surplus water being expelled by pressing the moulded goods between felt or wire, setting in a hydraulic press. To the fully hydrated cement may be added disintegrated asbestos fibre and quicksand or other loading material. The moulded articles are specified as being frost and fire proof and available for roofing and kindred uses.

13,454.—A TACKLE OR PULLEY BLOCK: J. M. Ervin.—The flat side-plates have a middle flat rib which is deep enough to take the sides of the yoke. The yoke and side-plates have eyes for the sheaves,

and slots in the side-plates enable the cottarpins to lie flush with them. Lugs from the bridge-plates are rivetted into holes in the side-plates. Slots in the lower bridge-plate afford a clear way for the ring, and slots in the bridge-plates are engaged with tongues of the division-plate. The entire block is to be made by cold stamping.

13,476.—A SAW-SET AND A GAUGE: C. Samu.—The saw-set is in the form of a four-armed anvil. The ends of the four arms are bevelled at different angles. One sets the saw by laying it on the anvil and hammering the teeth down upon the bevels. The U-shaped gauge has an opening wherein a file is secured with a set-screw, and the saw is placed between the legs of the gauge. As the file is moved along the saw it marks the highest teeth. For testing purposes one removes the set-screw and applies the gauge to the teeth. When the saw-blade has been put between the branches, the distance between the latter will be equal to the degree of set.

13,498.—LOADING AND UNLOADING APPLIANCES: Brown Hoisting Machinery Co.—The load is fed into the bucket from a supply bin overhead. The hoisting ropes are passed around pulleys, and from their other ends are hung weights which, together, are heavier than the bucket. The eyes of other ropes, which are wound around drums on a shaft having a friction brake, are linked to flies that form the bottom of the bucket, and those ropes also carry weights. In use, the brake keeps the flaps shut whilst the bucket is being loaded, but when the friction is relaxed the bucket will descend, its flaps being still shut, until the latter weights meet stops, whereupon the load opens the flaps. The flaps remain opened until the bucket is lifted into place for reloading, when the weights will shut them again.

13,556.—CRUSHERS FOR STONE, BRICK, ORE, &c.: W. H. Baxter.—A middle rocking standard carries the shaft, and there are bearings in the wings of the swing-jaw for the eccentrics. The shank of the standard is taken by an opening in a cross-head on which are the pivots, and the standard may have a flange at its base to be bolted on to the cross-head. In another form the standard consists of two portions, so that one may adjust its length with packing-pieces, whilst the connecting-bolts will avail as breaking-pieces. Four adjustments are provided for by pivot bearings in the shape of square blocks having eccentricity. Confer also No. 10,729 of 1899 for the winged swing-jaw.

13,578.—BRUSHES FOR SCAVENGERING ROADS, AND SIMILAR USES: S. Rosenfeld.—Strips or clamps set lengthwise in channelled bars secure the bristles of a rotatory brush which project through slots around the roller and can be drawn in or pushed out by means of cones, or else disengage spiral grooves, that engage with projections from the channelled bars. The bars are either fixed or caused to slide in radial grooves in the end-plates of the rollers. A screwed rod, fitted with hand-wheel nuts, serves for the axial adjustment of the cones or discs.

13,580.—LEGS FOR SHEARS: H. Maulen and J. Coult.—A rigid triangular frame, on to which a pair of legs is hinged, is stayed with ropes. The top of the frame and the top of the legs are joined together with tackle, which also supports the legs, and of which the falls are passed around pulleys at the top of the frame, and so to the ground-winchets. From a point near the top of the legs is hung the lifting tackle.

13,643.—PROCESS OF PULVERISING AND CRUSHING STONE, &c.: Picard, Pictet, & Cie.—The material is maintained by centrifugal force in contact with the drum of the mill as it rotates upon its hollow journals, and is acted upon in turn by a set of lens-shaped rollers inside the drum, whilst scrapers, carried upon a curved rail, throw the crushed stone from beneath one roller to the next one. A current of air may be impelled through the journals so as to carry the pulverised mass into a receiver.

MEETINGS.

FRIDAY, OCTOBER 31.

Architectural Association.—Conversation, Royal Institute of Painters in Water-Colours, Piccadilly, W. 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor R. Elsey Smith on "Building Materials" 7 p.m.

Institution of Mechanical Engineers.—An extra meeting, when the discussion upon the following paper will be continued: "Old Motor Cars of 1902," by Captain C. C. Longridge. 8 p.m.

SATURDAY, NOVEMBER 1.

British Institute of Certified Carpenters (Carpenters' Hall, E.C.). Monthly meeting. 6 p.m.

MONDAY, NOVEMBER 3.

Royal Institute of British Architects.—Opening address of the session, by Mr. Aston Webb, A.R.A., F.S.A., President. 8 p.m.

London Institution.—Professor W. M. Flinders Petrie on "The Earliest Kings of Egypt." Illustrated. 5 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor R. Elsey Smith on "Sanitary Building, Construction and Planning; Soil and Local Physical Conditions." 7 p.m.

Society of Engineers.—Mr. T. Andrews, F.R.S., on "Effect of Segregation on the Strength of Steel Rails." 7.30 p.m.

Liverpool Architectural Society (Incorporated).—Special general meeting to consider and approve revised Schedule of Charges, Clauses of set, 6 p.m. Ordinary meeting, Mr. S. Pugin, Powell on "Heraldry with special reference to the arms in the windows of Houses of Parliament. Illustrated by some of the original working drawings. 6.30 p.m.

TUESDAY, NOVEMBER 4.

Institution of Civil Engineers.—Address by Mr. J. Hawkshaw, M.A., President, and presentation of medals and prizes received by the Council. 8 p.m.

Architectural Association of Ireland.—Mr. O. M'Carthy on "Three Weeks in Normandy." 8 p.m.

WEDNESDAY, NOVEMBER 5.

Architectural Association Discussion Section.—Mr. H. M. Cauley on "The Buildings about a Farm." 7.30 p.m.

British Archaeological Association.—Mr. S. W. K. Shaw, M.A., F.S.A., on "Outlands in Weymouth." 8 p.m.

Royal Archaeological Institute.—Mr. W. W. Knowles, F.S.A., on "Blackland Abbey, Northumberland." 2. Mr. Philip M. Johnston on "Twelfth Century Paintings Recently Discovered in Claveney Church, Shropshire." 4 p.m.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection in the District of St. Marylebone. 1 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

THURSDAY, NOVEMBER 6.

Sanitary Institute (Lectures for Sanitary Officers).—Professor R. Elsey Smith on "Ventilation, Warming, and Lighting." 7 p.m.

FRIDAY, NOVEMBER 7.

Architectural Association.—Mr. F. C. Eden on "Roof Coverings." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. Max Clarke on "Calculations, Measurements, and Plans and Sections." 7 p.m.

SATURDAY, NOVEMBER 8.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at Richmond Main Sewerage Pumping Station and Purification Works, Great Garden. 2.30 p.m.

The Craft School, 137, Globe-road, Bethnal Green, E. Mr. C. Spooner on "The Study of Old Furniture, with some Suggestions for Modern Work (with lantern illustrations)." 8.30 p.m.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

October 6. By A. & D. EDWARDS (at Hereford).
Lecminster, Hereford.—Upper Wintercot Farm, 200 a. 2 r. 38 p., for £1,300.

October 12.—By R. & J. MITCHELL (at Cockermouth).
Wythop, Cumberland.—Riggs Estate, 131 a. 0 r. 26 p., for £1,400.

October 15.—By HORNE & CO.
Kensington.—15, Campden Hill-rd., and 16, Philimore-mews, u.t. 5½ yrs., for £1,200.

October 15.—By HORNE & CO.
Westbourne Park-rd., Aldridge-rd., Villas, u.t. 54 yrs., for £1,200.

October 15.—By HORNE & CO.
12, Burlington-rd., u.t. 5½ yrs., for £1,200.

October 15.—By HORNE & CO.
Pimlico.—St. George's-sq., u.t. 35 yrs., for £1,200.

October 15.—By HORNE & CO.
Kensington.—Addison-rd., u.t. 7½ yrs., for £1,200.

October 15.—By HORNE & CO.
Paddington.—26 and 28, Shirland-rd., u.t. 59½ yrs., for £1,200.

October 15.—By HORNE & CO.
43, Shirland-rd., u.t. 53 yrs., for £1,200.

October 15.—By HORNE & CO.
41, York-rd., u.t. 53 yrs., for £1,200.

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41, York-rd., u.t. 53 yrs., for £1,200.

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41, York-rd., u.t. 53 yrs., for £1,200.

October 15.—By HORNE & CO.
41, York-rd., u.t. 53 yrs., for £1,200.

[See also page 105]

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Designs for University Buildings, Cape of Good Hope	Agnt.-Gen. for Cape of Good Hope	400l., 200l., 100l.	Jan. 31

CONTRACTS.

Nature of Work or Materials.	By whom Advertised	Forms of Tender, &c., Supplied by	Tenders to be delivered
Additions to Workhouse, Clayton	North Bierley Guardians	S. Spencer, Architect, 34, Great Horton-road, Bradford	Nov. 4
Bridge Works, Norbury Hollow, near Stockport		G. S. Doncaster, Surveyor, Council Offices, Hazel Grove	do.
Additions to Glenside House, Aberdeen		Jenkins & Marr, Civil Engineer, 18, Bridge-street, Aberdeen	do.
Schools, Ystradgynlais		P. Williams, Tyr Gorot, Ystradgynlais	do.
Villa, Belgrave-road, Bridlington	Kettering Joint Hospital Board	S. Dyer, Architect, 29, Quay-road, Bridlington	do.
Additions to Lodge, Rookingham-road	Mansfield Town Council	Goach & Saunders, Architects, Bent Chambers, Kettering	do.
Road Works, &c., at Gasworks	West Molesley U.D.C.	F. Vallance, Borough Surveyor, Town Hall, Mansfield	do.
Sewers, &c.		J. Stevenson, Engineer, East Molesley	do.
Chapel, Cwmillynelli, Glam.		Rev. J. Rees, Cwmillynelli	Nov. 5
Villas, Presbury-road, New Malden, Surrey		Y. Davison, Architect, 7, Market-place, New Malden	do.
Clock Tower, Llangedra, N. Wales		Douglas & Mitchell, Architects, Chester	do.
Hall, Hamilton-road, Bangor, Ireland	Hove (Sussex) Corporation	Young & Mackenzie, Engineers, Belfast	do.
Road Works	North-Eastern Railway Company	H. H. Scott, Borough Surveyor, Town Hall, Hove	do.
Station Buildings	Padiham U.D.C.	W. Bell, Architect, Newcastle-on-Tyne	do.
Ironwork, &c., at Gasworks	do.	A. J. Jackson, Engineer, Gasworks, Padiham	do.
Fireclay Materials, Pipes, &c., at Gasworks	Gallagher R.D.C.	do.	do.
Surveyor's Materials	Watford U.D.C.	W. Bevan, Surveyor, Deri, via Cardiff	do.
Wrought-iron Fencing, &c.	Guardians, St. George-in-the-East	Engineer to the Council, 14, High-street, Watford, Herts.	do.
Joinery Work		R. S. Tasker, 58, John-street, Bedford-row, W.C.	Nov. 6
Alterations, &c., to Inn, Hobden Bridge		Walsh & Nicholas, Architects, Halifax	do.
Additions to Hotel, Cluny, N.B.	Edinburgh Lunacy Board	A. Mackenzie, Architect, County Buildings, Kingussie	do.
Additions to Infirmary, Bangour	Kinsale R.D.C.	H. J. Bland, Architect, 25, Rutland-square, Edinburgh	do.
Thirteen Cottages	Llandudno Pier Company	J. Murphy, Workhouse, Kinsale, Ireland	do.
Alteration to Landing Stage, &c.	Cromer U.D.C.	J. J. Webster, Civil Engineer, Victoria-street, S.W.	do.
Well, Metton	Middlesbrough Corporation	J. C. Mellis, C.E., 204, Gresham House, Old Broad-street, E.C.	Nov. 7
Stable, &c., Albert Park		F. Baker, Civil Engineer, Municipal Buildings, Middlesbrough	do.
Hospital, Old Kattray		L. & J. Falconer, Architects, Blairgowrie, N.B.	Nov. 8
Additions to Asylum, Ballinasloe	Glamorgan County Council	J. Young, Llanarfon Asylum, Ballinasloe	do.
Additions to Town Hall, Bridgend	Huntingdon U.D.C.	T. M. Franklin, County Offices, Cardiff	do.
Laying Cast-iron Pipe	Fermoy R.D.C.	R. E. Middleton, Civil Engineer, 17, Victoria-street, S.W.	do.
Cottages, &c.	Batley Corporation	P. O'Neill, Council Offices, Fermoy	do.
Additions to Town Hall	Brighouse Corporation	W. Hanstock & Son, Architects, Branch-road, Batley	Nov. 10
Wall, &c., at Electricity Works	Brighouse (Yorks) Town Council	City Surveyor, Town Hall, Manchester	do.
Road Works, Clifton-road	Walsall R.D.C.	S. S. Haywood, Borough Engineer, Brighouse	do.
Sewers, Daw End	Glyncorrwg U.D.C.	F. W. Mager, Civil Engineer, Aldridge, Walsall	do.
Steel Works, Tunnel-terrace	Market Harborough R.D.C.	W. P. Jones, Surveyor, Cwmmer, Port Talbot	do.
Sewage Works, Queen-street	Metropolitan Borough of Islington	F. W. Mager, Civil Engineer, Aldridge, Walsall	do.
Stables, &c., Daw End, Rushall	Barnesley Corporation	Borough Engineer, Town Hall, Upper-street, N.	do.
Alterations in Strong Rooms, Town Hall	Northallerton & D.C.	J. H. Taylor, Civil Engineer, Manor House, Barnesley	Nov. 11
Outbuildings, &c., Locke Park	Middlesex County Council	F. Fairbank & Son, Civil Engineers, London, York	do.
Sewers, &c.	Cardiff Corporation	The County Architect, Middlesex Guildhall, Westminster	Nov. 12
Additions to Polytechnic, Priory Park-rd., Willesden	Hartlepool Gas Co.	Guardians Offices, Brook-street, Kensington-road, S.E.	do.
Outside Staircases at Norwood Schools	Borough of Hampstead	W. Harper, Civil Engineer, Town Hall, Cardiff	do.
Offices, Harroby-street, &c.	County Borough of Croydon	Martin & Fenwick, Engineers, 1, Park-place, Leeds	do.
Road Works	Borough of Lewisham	Borough Engineer, Town Hall, Haverstock Hill, N.W.	Nov. 13
Trenching Works	County of Southampton	Borough Surveyor, Town Hall, Paddington, W.	do.
Stable Foundations		Borough Engineer, Town Hall, Croydon	Nov. 17
Convenience at Paddington Recreation Ground		Surveyor, Town Hall, Catford, S.E.	Nov. 18
Erection of Cottages and Oak Park Fencing		County Surveyor, The Castle, Winchester	do.
Iron Fencing	Guardians, City & County of Bristol	Clerk to the Guardians, St. Peter's Hospital, Bristol	do.
Road Improvement, Eastleigh	Mid. and Railway	Engineer's Office, Derby Station, or, 22, Park-road, Nottingham	Nov. 20
Steel Bridges, Eastleigh	Londonderry Lunacy Commissioners	M. A. Robinson, Architect, Londonderry	Nov. 21
Block of Children's Homes, Downend	The Admiralty	Works Department, Admiralty, Northumberland-avenue, W.C.	do.
Station Buildings at Nottingham	Hanwell School Board	V. Pywell, Cumberland House, Hanwell, W.	Nov. 24
Buildings, &c., at Grove Point, Portland	Lewes Town Council	Borough Surveyor, Town Hall, Lewes	do.
Alteration of Boston-road Schools		J. Timms, Architect, 34, Bridge-street, Banbury	No date
Sewers, Cliffe and South Malling		Mr. Bell, Bower Green Combustion Co., Bower Green Shed, Bradford	do.
House and Shop, Dashwood-road, Banbury		E. G. C. Dora, Architect, 31, High-street, Cardiff	do.
Paving a Road, Bradford		Bland & Bown, Architects, Harrogate	do.
Business Premises, Tunnel-court, Cardiff		Smith & Tweedale, Architects, 12, South-parade, Leeds	do.
Caretaker's House, near Masham	Harrogate Corporation	Fairbank & Son, Civil Engineers, London, York	do.
Additions to Christ Church Schools, Leeds		J. C. Taylor, Civil Engineer, Kearsall, Southend	do.
Eleven Houses, Old Box Yard, Llanelli	Southend Kearsall, Limited	Bland & Bown, Architects, Harrogate	do.
Artificial Lake, Marine Park	Exors. of the late Mr. H. Atkinson	T. Parlington, Council Offices, Westhoughton	do.
Road Works, Hill Top House Estate, Bolton, Yorks.	Westhoughton (Lancs.) U.D.C.	E. H. Lugen Barker, 146, St. Owen's-street, Hertford	do.
Hospital			do.
New Infants' School at Portlaidale, Brighton			do.

PUBLIC APPOINTMENTS.

Nature of Appointment	By whom Required.	Salary.	Application to be in
Architects Assistants	London County Council	17. 1s. to 21. 1s.	Nov. 17

Those marked with an asterisk (*) are advertised in this Number.

Competition, —

Contracts, pp. iv. vi. viii. & x.

Public Appointment xviii.

PRICES CURRENT (Continued).

WOOD.			
	Per square.		
	£ s. d.	£ s. d.	
Prepared Flooring—			
1 in. by 7 inch yellow matched and beaded or V-jointed boards	0 11 0	0 13 6	
1 in. by 7 in. do. do.	0 10 0	0 11 6	
1 in. by 7 in. white do. do.	0 10 0	0 11 6	
1 in. by 7 in. do. do.	0 11 6	0 13 6	
6 in. at 6d. to 9d. per square less than 7 in.			

JOISTS, GIRDERS, &c.

In London, or delivered			
Railway Vans, per ton.			
	£ s. d.	£ s. d.	
Compound Girders	6 5 0	7 5 0	
Angles, Tees and Channels, ordinary sections	8 5 0	8 15 0	
Cast Iron Columns and Stanchions, including ordinary patterns	7 2 6	8 5 0	

METALS.

Per ton, in London.			
	£ s. d.	£ s. d.	
Common Bars	7 15 0	8 5 0	
Staffordshire Crown Bars, good	8 5 0	8 15 0	
Staffordshire "Marked Bars"	10 10 0		
Mild Steel Bars	9 0 0	9 10 0	
Hoop Iron, basis price	9 5 0	9 10 0	
Fitch Plates	8 5 0	8 15 0	
(* And upwards, according to size and gauge.)			
Sheet Iron, Black—			
Ordinary sizes to 30 g.	10 0 0		
" 22 g. and 24 g.	11 0 0		
" 26 g.	12 10 0		
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes 6 ft. by 2 ft. to 3 ft. to 30 g.	12 15 0		
" 22 g. and 24 g.	13 5 0		
" 26 g.	14 5 0		
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 30 g.	16 0 0		
" 22 g. and 24 g.	16 10 0		
" 26 g.	18 0 0		
Galvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 8 ft. to 30 g.	12 15 0		
" 22 g. and 24 g.	13 5 0		
" 26 g.	14 5 0		
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 30 g. and thicker	12 0 0		
" 22 g. and 24 g.	13 0 0		
" 26 g.	14 5 0		
Cut nails, 3 in. to 6 in.	9 5 0	9 15 0	
(Under 3 in. usual trade extras.)			

LEAD, &c.

Per ton in London.			
	£ s. d.	£ s. d.	
Lead—Sheet, English, 3 lbs. & up.	13 7 6		
" Pipe in coils	13 7 6		
" Soil Pipe	13 7 6		
" Compo Pipe	16 7 6		
Zinc—Sheet—			
Vieille Montagne	25 0 0		
Cathodic	24 10 0		
Copper—			
Strong Sheet	0 10 0		
Thin	0 12 0		
Copper nails	0 11 0		
BRASS—			
Strong Sheet	0 9 0		
Thin	0 10 0		
Coin—English Ingots	0 2 3		
Coin—Plumbers'	0 6 6		
Tinmen's	0 9 9		
Blowpipe	0 9 9		

ENGLISH SHEET GLASS IN CRATES.

1 oz. thirds	27d.	per ft. delivered.
1/2 oz. thirds	13d.	10 31
1/4 oz. thirds	6d.	10 31
1/8 oz. thirds	3d.	10 31
1/16 oz. thirds	1d.	10 31
1/32 oz. thirds	1/2d.	10 31
1/64 oz. thirds	1/4d.	10 31
1/128 oz. thirds	1/8d.	10 31
1/256 oz. thirds	1/16d.	10 31
1/512 oz. thirds	1/32d.	10 31
1/1024 oz. thirds	1/64d.	10 31
1/2048 oz. thirds	1/128d.	10 31
1/4096 oz. thirds	1/256d.	10 31
1/8192 oz. thirds	1/512d.	10 31
1/16384 oz. thirds	1/1024d.	10 31
1/32768 oz. thirds	1/2048d.	10 31
1/65536 oz. thirds	1/4096d.	10 31
1/131072 oz. thirds	1/8192d.	10 31
1/262144 oz. thirds	1/16384d.	10 31
1/524288 oz. thirds	1/32768d.	10 31
1/1048576 oz. thirds	1/65536d.	10 31
1/2097152 oz. thirds	1/131072d.	10 31
1/4194304 oz. thirds	1/262144d.	10 31
1/8388608 oz. thirds	1/524288d.	10 31
1/16777216 oz. thirds	1/1048576d.	10 31
1/33554432 oz. thirds	1/2097152d.	10 31
1/67108864 oz. thirds	1/4194304d.	10 31
1/134217728 oz. thirds	1/8388608d.	10 31
1/268435456 oz. thirds	1/16777216d.	10 31
1/536870912 oz. thirds	1/33554432d.	10 31
1/1073741824 oz. thirds	1/67108864d.	10 31
1/2147483648 oz. thirds	1/134217728d.	10 31
1/4294967296 oz. thirds	1/268435456d.	10 31
1/8589934592 oz. thirds	1/536870912d.	10 31
1/17179869184 oz. thirds	1/1073741824d.	10 31
1/34359738368 oz. thirds	1/2147483648d.	10 31
1/68719476736 oz. thirds	1/4294967296d.	10 31
1/137438953472 oz. thirds	1/8589934592d.	10 31
1/274877906944 oz. thirds	1/17179869184d.	10 31
1/549755813888 oz. thirds	1/34359738368d.	10 31
1/1099511627776 oz. thirds	1/68719476736d.	10 31
1/2199023255552 oz. thirds	1/137438953472d.	10 31
1/4398046511104 oz. thirds	1/274877906944d.	10 31
1/8796093022208 oz. thirds	1/549755813888d.	10 31
1/17592186044416 oz. thirds	1/1099511627776d.	10 31
1/35184372088832 oz. thirds	1/2199023255552d.	10 31
1/70368744177664 oz. thirds	1/4398046511104d.	10 31
1/140737488355328 oz. thirds	1/8796093022208d.	10 31
1/281474976710656 oz. thirds	1/17592186044416d.	10 31
1/562949953421312 oz. thirds	1/35184372088832d.	10 31
1/1125899906842624 oz. thirds	1/70368744177664d.	10 31
1/2251799813685248 oz. thirds	1/140737488355328d.	10 31
1/4503599627370496 oz. thirds	1/281474976710656d.	10 31
1/9007199254740992 oz. thirds	1/562949953421312d.	10 31
1/18014398509481984 oz. thirds	1/1125899906842624d.	10 31
1/36028797018963968 oz. thirds	1/2251799813685248d.	10 31
1/72057594037927936 oz. thirds	1/4503599627370496d.	10 31
1/144115188075855872 oz. thirds	1/9007199254740992d.	10 31
1/288230376151711744 oz. thirds	1/18014398509481984d.	10 31
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1/1152921504606846976 oz. thirds	1/72057594037927936d.	10 31
1/2305843009213693952 oz. thirds	1/144115188075855872d.	10 31
1/4611686018427387904 oz. thirds	1/288230376151711744d.	10 31
1/9223372036854775808 oz. thirds	1/576460752303423488d.	10 31
1/18446744073709551616 oz. thirds	1/1152921504606846976d.	10 31
1/36893488147419103232 oz. thirds	1/2305843009213693952d.	10 31
1/73786976294838206464 oz. thirds	1/4611686018427387904d.	10 31
1/147573952589676412928 oz. thirds	1/9223372036854775808d.	10 31
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1/590295810358705651712 oz. thirds	1/36893488147419103232d.	10 31
1/1180591620717411303424 oz. thirds	1/73786976294838206464d.	10 31
1/2361183241434822606848 oz. thirds	1/147573952589676412928d.	10 31
1/4722366482869645213696 oz. thirds	1/295147905179352825856d.	10 31
1/9444732965739290427392 oz. thirds	1/590295810358705651712d.	10 31
1/18889465931478580854784 oz. thirds	1/1180591620717411303424d.	10 31
1/37778931862957161709568 oz. thirds	1/2361183241434822606848d.	10 31
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1/151115727451828646838272 oz. thirds	1/9444732965739290427392d.	10 31
1/302231454903657293676544 oz. thirds	1/18889465931478580854784d.	10 31
1/604462909807314587353088 oz. thirds	1/37778931862957161709568d.	10 31
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1/4951760157141521099596496896 oz. thirds	1/309485009821345068724781056d.	10 31
1/9903520314283042199192993792 oz. thirds	1/618970019642690137449562112d.	10 31
1/19807040628566084398385987584 oz. thirds	1/1237940039285380274899124224d.	10 31
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1/2596148429267413814268448164610048 oz. thirds	1/162259276829213363391778010288128d.	10 31
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1/83076749736557242056590341267521536 oz. thirds	1/5192296858534827628536896329220096d.	10 31
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1 in. " ..	0 4½	0 5	0 3½	—	0 4	0 4	0 6	—
1 in. " ..	0 4½	0 4½	0 3½	—	0 3½	0 3½	0 5	—
2 in. " ..	0 3	0 3½	0 2½	—	0 2½	0 2½	0 4	—
Bass or American whitewood (good green colour) ..	—	—	—	—	—	—	—	—
3 in. per ft. super.	0 5	0 1½	0 7½	0 5½	0 4½	0 5½	0 6	0 3½
1 in. " ..	0 5	0 3½	0 6½	0 4½	0 3½	0 4½	0 5	0 3½
1 in. " ..	0 4	0 3	0 5	0 3½	0 3	0 3½	0 4	0 3½
1 in. " ..	0 3½	0 2½	0 4	0 3½	0 2½	0 3½	0 3½	0 3½
3 in. " ..	0 2½	0 2	0 3½	0 2½	0 2	0 2½	0 3	0 3

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The Builder.

VOL. LXXXIII.—No. 3118.

NOVEMBER 8, 1902.

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Liverpool Cathedral:	
A Sketch Design (No. 38 in the Liverpool Cathedral Competition)	By Mr. Leonard Stokes, F.R.I.B.A.
A Sketch Design: Plan and Section	By Mr. Leonard Stokes, F.R.I.B.A.
A House in Oxfordshire	By Mr. C. Maresco Pearce, Architect.
Monument to the late J. L. Pearson, R.A., in Westminster Abbey	Designed by Mr. W. D. Caroe, F.R.I.B.A.

Blocks in Text.

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Vauxhall Bridge Again.



THE question of the design of Vauxhall Bridge has entered upon a new phase, the reasons for which are stated in a Report of the Bridges Committee of the

London County Council, dated October 29.

The preamble of this Report sets forth that "after the passing of the Vauxhall Bridge Act some three years elapsed before the contract for the demolition of the old structure and partial construction of the new piers and abutments was let to Messrs. Pethick. The Council will remember that the proposal in 1897 was to construct a five-arched steel bridge with granite-faced piers and abutments, but that when the sketch was submitted it was rejected upon the grounds that it did not possess those features which it was thought a crossing of such importance should exhibit. Some eighteen months later, as the result of much deliberation, a design was submitted and adopted by the Council, showing a granite bridge backed with concrete, which not only had an appearance of stability and massiveness but which, it was believed, gave general satisfaction." We think most of our readers will agree with us that this statement is one of the coolest assertions—a mild expression indeed to use about it—that has ever been heard of, and shows how utterly incorrigible the Bridges Committee are in their defiance of public criticism. The fact that the design in question raised a storm of disapprobation in the architectural and artistic world, and that the Institute of Architects took the matter up seriously and appointed a committee to confer with the London County Council and endeavour (in vain) to expound to them the defects and the æsthetic clumsiness of the design of their engineer, is as absolutely ignored as if it had never happened. The Report proceeds to state that circumstances have arisen which, they regret to find, will compel the Council to revert to its original conception and build a steel bridge with stone

piers. For "stone" we presume we may read "granite."

The reasons for this change are clearly and fully given, and as far as the powers of the Council go we must admit that they seem conclusive. By the Vauxhall Bridge Act the County Council are practically in the hands of the Thames Conservancy, who care for nothing whatever in connexion with the bridge except the maintenance of the waterway and the headway; and the Act gives them power to insist that at all times "during the construction of the new Vauxhall Bridge" there shall be a maintenance of at least three openings having a clear waterway of 70 ft. in width, and "one of such openings having a clear headway of 18 ft. and the others of such openings having respectively clear headways of 15 ft. above Trinity high water mark." We may again quote the Report:—

"In 1893, when a concrete bridge was substituted for the original form of construction, it was pointed out that the headway of the arches, owing to the centreing required for the support of the concrete arch during construction, would have to be temporarily reduced, and a clause authorising the lowering was accordingly inserted in the General Powers Bill of that session, but was subsequently withdrawn, as it was represented to us that a method of construction had been discovered which would obviate the temporary headways at the centre of the arches being less than the prescribed 18 ft. and 15 ft. Accordingly, in the following year, a scheme for carrying out the work, showing headways respectively of 18 ft. and 15 ft. at the centre of the openings and lessening on each side towards the piers, was submitted to the Thames Conservancy Board and received general approval."

When, however, an action was brought by the Thames Conservancy against the contractor in respect of an accident to a steam-tug, which it was alleged resulted from the required waterway of 70 ft. not having been maintained, it was found that the contractor had been guilty of "legal negligence" in not maintaining the waterway at the stipulated width, and it also appeared that he might under the same Act be charged with "legal negligence" if the headways required were not maintained for the full width of the opening, during construction. This appears to us to be a most unreasonable demand, but there seems to be no doubt that the power to enforce it has been conferred on the Conservancy, and one cannot therefore be surprised that the County Council decided to act so

as to avoid running their heads against the law. But the engineer has now reported that he cannot carry out the concrete arch so as to allow of this. To obtain the required depth for centreing, and at the same time give the clear headway, would necessitate the arch of the bridge being raised 6 ft., the maximum upward deviation allowed by the Act being only 3 ft. The engineer further pointed out that in the construction of a concrete bridge the centres must be much more solid and less liable to movement than in the case of a stone bridge (which is perfectly comprehensible), and for this reason the permissible upward deviation is insufficient to give room for the satisfactory centreing of a concrete arch. If this were obtained, the gradient would have to be altered from 1 in 40 to 1 in 32.5, "which we consider excessive." It is more than is desirable, but there are plenty of streets with large traffic, in London, which must be at a heavier gradient than that; we have not the figures at hand, but we should think it must be so. However, the maintenance of an easy gradient is a very important point, and we cannot blame the Bridges Committee for giving full weight to this consideration.

It seems rather odd that all this was not discovered earlier; at all events the requirements of the centreing for a concrete arch, as compared with a stone one, must surely have been worked out and known at an earlier date. We rather question whether all the reasons have been given. Informally, and in conversation, we heard the other day at the County Council office that the engineer considered that the London clay, on which the foundations of the piers rest, is not at that point of a consistency to be quite relied on for carrying the weight involved in the use of concrete and granite arches, and that the return to steel girders was to be made mainly, or to a great extent, on that account, in order to lessen the weight on the foundations. If this is the case—and we had it on very good authority—we cannot understand why that reason should not have been embodied in the Report of the Bridges Committee, seeing that in fact it is a better reason for the alteration than any of those stated in the Report; and is indeed, if true, unanswerable. There is a passing reference to the desirability of lessening the weight on the foundations, in a subsequent passage in

the Report, but there is no reference to it as a main reason for the alteration from the originally adopted scheme.

The Report proceeds to say that the erection of a steel bridge faced with granite had been carefully considered, but had been abandoned from the difficulty of tying the two materials together and meeting the effects of unequal expansion, and from considerations of extra cost and weight. We are very glad to hear that it is abandoned, for a much better reason than any of those given, viz.: that such a bridge would be a mere structural sham. If we are to have the steel, let us have it honestly and visibly.

The bridge now therefore returns to the form of a superstructure of steel with granite piers; and the whole question, from the æsthetic point of view, turns on the treatment of the details. The Committee have had hung in the Council-room a drawing of what they consider the "most satisfactory" design for a bridge wholly constructed of steel with elliptical arches and with "ornamental facings." These last words are ominous; we know too well what that means in the hands of a bridge engineer. The design as far as can be judged from the drawing shows a generally graceful line in the arches—that can hardly be helped, but in other respects it is enough to fill one with consternation. It has indeed the merit of being less pretentious than Sir A. Binnie's design; but that is all that can be said. It is absolutely commonplace. The faces of the piers are square masses with immense panels on them; the spandrels of the steel arches are filled with an enormous coarse tracery—foliated circles and pointed panels of the kind found, on a small scale, in the spandrels in debased Gothic work; poor enough on a small scale, but positively offensive as a treatment of iron ornament on a large scale. If such a design were proposed for a bridge over the Seine, the Paris authorities would resolutely refuse their sanction to it, and would be exposed to public obloquy if they did not; but anything is good enough for a bridge over the Thames. It may possibly be that this drawing shows only the general crude conception of the structural system, and that it is not final as to its decorative appearance. We sincerely hope this may be the case. But if Vauxhall Bridge is erected on the design as indicated in this drawing, one more will be added to the series of coarse and vulgar-looking erections by which recent engineers have been allowed to disfigure the Thames and the city through which it flows.

PROPOSED LIFE- SAVING AMENDMENTS TO THE BUILDING ACT.

THE agenda paper for this week's meeting of the London County Council bristled with matters relating to fire protection, for it contained the Report of the Fire Brigade Committee on the Queen Victoria-street fire, with which we have already dealt; it contained some remarks as to the dangers of *culs de sac* in the City of London; and, lastly, it contained a very important Report (printed in full on another page), signed by Dr. Longstaff on behalf of the Building Act Committee, dealing with proposed amendments to the Building Act.

The redeeming feature of the Fire Brigade Committee's Report, which, as we have mentioned before, was so unsatisfactory so far as the Fire Brigade was concerned, was its proposal to make the London Building Act of 1894 retrospective as regards the provision of means of escape from high buildings. This was the identical recommendation of the Coroner's jury on the Queen Victoria-street fire, and, we should perhaps add, that it was the British Fire Prevention Committee that originally put forward this important principle in a letter appearing in our columns in June last.

The Building Act Committee has adopted this same policy of a retrospective Building Act, so far as safety of life is concerned, in a very thorough-going manner, and Dr. Longstaff—the able chairman of this committee—is to be congratulated on the practical character of his committee's recommendations and the terse way in which they have been put forward. It is to be hoped that this gentleman will remain in office another year, until the matters he has brought forward become law.

Summarised, the proposals of Dr. Longstaff's Committee comprise a reduction in the height above which the provision of special means of escape can be required in the case of new buildings (not being factories and workshops coming within the provisions of Section 14 of the Factory and Workshops Act of 1901 or common lodging-houses coming within the Common Lodging-Houses Act), and, after a certain date, the application of similar provisions to existing buildings. Further, the provision of means of escape from new, and after a certain date, existing buildings (not being factories or workshops coming within the provisions of the same Section 14 or common lodging-houses coming within the same Common Lodging Houses Act) in which a considerable number of persons are employed, or in which sleeping accommodation is provided for a considerable number. Again, the proposals include additional powers in regard to premises used in part for the purposes of trade or manufacture, and in part as dwelling-houses, especially where the part used for trade projects from the front of the building, as, for instance, in a one-story shop. Lastly, the powers proposed are to include the regulation of the use of the dangerous match boarding and panelling as an internal finishing to walls, and also to regulate the question of enclosing lifts in buildings.

All the above proposals, as will be observed, relate solely to the question of rapid exit and safety of life from fire, as distinct from any question of structural limitation of the spread of fire or structural prevention of causes of fire. In other words, these proposals might be termed "life-saving amendments" to the Building Act, and should hence not be confused with any of the questions of primary principles relating to the construction of buildings as regards fire.

There can be no question that the whole of the proposals put forward by the Building Act Committee must be endorsed by the professions concerned, and although we foresee that in many cases there will be a hardship individually on the existing vested interests, the importance of these primary conditions for the safety of life in buildings of the Metropolis cannot be underrated, and the pocket of the individual owner must naturally suffer for the common weal.

We quite understand that the proposals are urgent proposals—proposals which should have already been embodied in the Building Act of 1894, and which could well have been embodied any year since the great Cripplegate fire of 1897 so clearly showed the general public of London the necessity of carefully guarding against fire. It is for this reason of urgency that we will also say nothing against the advisability of pushing forward with the proposed amendments as fast as possible and putting them before Parliament next Session, although we should naturally have preferred to have seen at the same time proposals for many other amendments to the Building Act which would relate to preventing the spread of fire.

It is common knowledge that there is much in the Building Act that requires amendment, so far as the structure of buildings is concerned, and the prevention of the spread of fire. The Cripplegate fire, which we have just mentioned, not to speak of the Barbican fire, are examples in this direction. A well-considered Amendment Act embracing all questions of the spread of fire, as well as the question of the safety of life, would have been preferable, and it might even have been advisable to devote more leisure to so serious a question now that it has at last been energetically brought forward by the authorities. For instance, amendments to the Building Act embracing an entire revision of the schedule of fire-resisting materials would have been of an enormous advantage to the community. It might have been well to have embodied in these amendments the result of the systematic series of fire tests which is being conducted at the present moment with fire-resisting materials and systems of construction. It would have been well to have dealt with the question of openings in floors and partitions; with the question of fire-resisting doors, and the manner in which they are fixed and bolted; with the question of glazing and shutter protection to small area windows; with that of the protection of structural ironwork by concrete or otherwise; of the separation of tenements or flats in large buildings; and again, with the entirely neglected question of the substantiality and strength of internal walls in buildings.

But we suppose we must be thankful for small mercies; and if we get in 1903 certain "life-saving amendments" to the Building Act, it is at least a step in the right direction, and we may be left until 1904 to propose the structural amendments. At all events, we trust that the County Council in this instance will have the hearty co-operation of the architectural profession and the surveyors of London, and that the vested interests will not show that egotism with which they did so much to spoil the Building Act of 1894. We would, however, take the opportunity of pointing out to the County Council the necessity of obtaining the active co-operation of the great professional bodies and the Fire Prevention Committee and the Chamber of Commerce in the early stages of the drafting so that we may not have the Building Act amendments so maimed and distorted as is frequently the case where Technical Bills are before Parliament and the different interests naturally have to appear.

We hear that the Home Office will support the London County Council in its

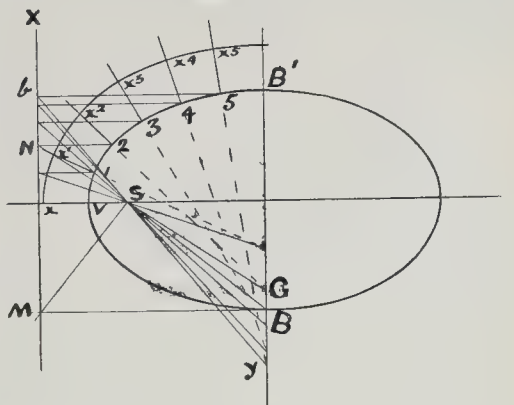
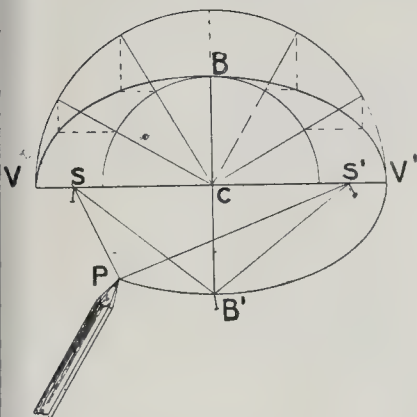
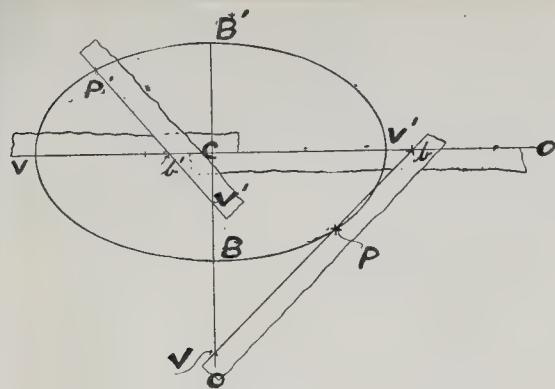


Fig. 2: Make $B'S B'S' = VC$, then SS' are the "foci." Insert pins at the points SB' and S' , stretch a line around

THE ellipse may be defined as the locus of a point moving in such a way that the sum of its distances from two fixed points within the figure is constant and equal to the major

Procure a straight-edge and mark upon it VP and P₀, the semi-major and semi-minor axes. Extend the axes of the ellipse to O and O', as shown. Place the straight-edge with the point b upon the major axis, and the point V upon the minor axis, when P will determine a point in the curve. By sliding the rod along, keeping b upon the major axis and V upon the minor axis, a pencil held to the point P will describe a quadrant of the ellipse. By treating each quarter of the figure in this way, the complete curve can be determined. It will be observed that in this case Vb equals the sum of the semi-major and semi-minor axes,

Hence determine the directrix (MX) by joining any point on the curve (in the figure B is made use of) to the focus. At B (the point) draw BM tangent at B (this will be parallel with the major axis), and at S erect a perpendicular to BS, cutting BM in M.

which is a point in the "directrix." Draw MX perpendicular to the major axis. To obtain the "normal" at a point—say 5—draw 5 b perpendicular to MX, meeting it in b, from b draw a line passing through S, meeting the minor axis in γ. A line drawn from γ through 5 is the normal at 5; the other normals 1, 2, 3, 4 can be obtained in the same way.

Reverting to the second definition here given of the ellipse we see that any point in the moving rod traces out an ellipse, and by taking different points (but using the same generating lines) any number of ellipses can be drawn, all having a common centre and their axes on the same lines; but no two of these ellipses are parallel, although sometimes they may appear nearly so.

To draw a curve parallel to a given ellipse, find a series of normals as just described, then mark on these the required distance between the curves as VX, IX¹, 2X¹, &c., and draw a fair line through the points thus determined.

T. L. B.

NOTES.

The County Council Loan. THE issue of a new loan by the County Council of 2,000,000*l.* at 3 per cent., bringing the total raised by the Council in the last five years to the sum of nearly 16,000,000*l.*, again furnishes an opportunity for drawing attention to the serious increase in municipal taxation. The net debt is now stated to be 27,188,000*l.*, equal to about one-twenty-fourth of the whole National Debt, and of this sum only about 2,500,000*l.* can, we believe, be called in any way reproductive debt, although how far any of the undertakings of the Council are remunerative in a strictly commercial sense we are unable to state. Before long we trust public interest may be aroused in the question of municipal government and loans, and especially in the question of municipal trading and the burdens imposed on householders for the so-called benefit of the community at large. We have from time to time expressed our views on these subjects, and now only draw attention to the above figures, and to the failure on the part of some members of the Council to extract any exact information from the Finance Committee as to the amounts to be raised in the near future.

Compensation for Land "Injuri-ously Affected." AN interesting and new point on the law of compensation when land has been taken under compulsory powers has been decided in the case of Long Eaton Recreation Grounds Co. v. Midland Railway Co., reported in the Law Reports for November. The Company owning the recreation grounds had sold certain other lands for building purposes to various persons. This land was all sold subject to two restrictive covenants—(1) against the erection of "any erection or building" except of one particular description within certain defined limits on the said land; (2) against the erection of any "building" on the said land other than private dwelling-houses. A railway purchased the land from the grantees, and erected thereon an embankment which it was alleged infringed both covenants, and in respect of this the Recreation Grounds Company alleged that the property retained by them was injuriously affected, and they claimed compensation under Sec-

tion 68 of the Lands Clauses Act, 1845. The Court of Appeal have now held the section to apply to an infringement of such covenants, and the Land Company to be entitled to the 650*l.* awarded them by a jury on the arbitration in respect of the injury sustained by their property. This is the point of importance to landowners, as it has never before been actually decided; but incidentally another point of interest was the subject of decision, viz., that the railway embankment was a "building" within the scope of the second restrictive covenant. It is obvious that in the present case the covenant was primarily directed to secure the building of private dwelling-houses only, but in view of the facts of this case draftsmen will be wise always to extend such a covenant to embrace all erections, or additions to the land, as all structures might not answer the description of "buildings."

Recovery of Water Rates. THE litigious householder will do well to study the case of Elliott and Another v. Russell (*Times*, October 30). The Town Council of Southampton, acting as the Urban Sanitary Authority under the Public Health Act, 1875, had supplied the appellant with water for trade purposes from March 21 to June 5, 1901. On August 18 they made a demand for the water rate, but not obtaining payment, on February 13, 1902, they laid an information under the Summary Jurisdiction Act, 1848. Section 11 of that Act enacts that when the provisions of the Acts of Parliament dealing with each particular case are silent as to time the information shall be laid "within six calendar months from the time when the matter of complaint arose," and it was contended that the date in this case was June 5, and not the date of the demand, viz., August 18, and that hence the information was out of time. The Divisional Court, however, held that since by the incorporation by Section 57 of the Public Health Act of certain provisions of the Waterworks Clauses Acts, the charge for supplying water became a "rate," section 256 of the Public Health Act had application and the information was rightly laid for failure to pay the rate when due or "for the space of fourteen days after the same has been lawfully demanded in writing." The decision, it will be observed, practically does away with any limit of time within which such proceedings must be brought.

Wooden Cottages. A QUESTION of considerable importance has been raised in some correspondence in the *Times*. A Mr. Tilley erected a six-roomed labourer's cottage, with kitchen, wash-boiler, bath, &c. He seems to have obtained some kind of sanction from the Local Government Board for the erection of this structure, but the Rural District Council of Dartford have obtained an order for its demolition. Whether this order is valid or not we are unable to say from Mr. Tilley's letter. The real point of importance is whether it would not be well if such buildings could be erected. They would be undoubtedly superior in every way to many existing cottages in rural districts, and on this ground should be allowed. Another ground is that the cost of building has increased so much of late years that there is less and less inclination on the part of land-

owners to lay out money in cottages which can return but little interest and give much trouble. Therefore, if possible, cheap, commodious, and wholesome wooden buildings should be allowed. Their life may not be long, but a building which exists only for a limited term of years in good condition, and can then be demolished, is better than a more durable building which stands long after it is really unfit for habitation. The subject is one of much importance, and we hope will be brought before Parliament.

"Boilers Old and New." WE have received a copy of a paper on "Boilers Old and New," read at a recent meeting of the Institution of Heating and Ventilating Engineers. It deals only with the boiler used for heating-installations of moderate size on the low-pressure hot-water system, and the title is therefore somewhat misleading. The author, Mr. Louis F. Pearson, prefers cast-iron boilers to wrought-iron, and considers steel inferior to both on account of its more rapid corrosion. Precedence in the manufacture of cast-iron sectional boilers is claimed for the country, but the early types were faultily constructed, and it was left chiefly for the Americans to make those improvements in details which have rendered this class of boiler so useful and popular. The paper is short and very far from exhaustive, but nearly all the most important points are briefly touched upon, and the author has usually something to say which is of practical value to the architect and heating engineer. Illustrations of the best modern types would have added to the value of the pamphlet.

Bosham Church, Co. Sussex. THE vicar asks for subscriptions to a sum of 2,500*l.*, the estimated cost of the reinstatement of the ancient parish church of the Holy Trinity, at Bosham, of which the walls, ceilings, and roofs, with the spire, greatly need repair. It is believed that the church stands on the site of a Roman basilica, some remains of which may be seen in the bases of the chancel piers. There are similar remains embodied in the nave, tower, and portion of the chancel, which are considered to be Saxon work. The former church is shown in the Bayeux tapestry, with the arrival of Harold, and an inscription—"They come to Bosham." Bosanham had been the home of Godwin, to whose earldom of Wessex, Sussex, and Kent his son Harold succeeded; a daughter of Canute, who also had lived there, was buried in the nave of the church. In A.D. 681, Wilfrid, Archbishop of York, when preaching Christianity in the South Saxon province, visited, as Bede relates in his "Ecclesiastical History"—see B.IV., c. 13—"a certain monk of the Scottish nation, whose name was Dicu, who had a very small monastery at the place called Bosham, encompassed with the sea and wood, and in it five or six brothers." That convent had been founded by Ethelwath, who in 648-86 was King of the South Saxons at Bosham, which lies at the head of the creek of Chichester harbour. From a very remote period the church had been attached to the manor. Early in the twelfth century William Warlewast, Bishop of Exeter, enlarged the fabric with two aisles, and lengthened the chancel, for a college of a dean with five secular canons, and the

collegiate church continued to be exempted from ecclesiastical jurisdiction until the Dissolution, when it became parochial. In 1845 the south aisle was restored and other improvements were made. In one of the articles, "The Statistics of Saxon Churches," published in the *Builder* of September-
November, 1900, Professor G. Baldwin Brown cites the fine moulded chancel arch with angle and soffit shafts and the very interesting Saxon work in the jambs; he says, indeed, that Bosham is one of the most complete Saxon churches in the South of England.

THE exhibitions at Messrs. Tooth's and at Mr. McLean's Galleries may be classed together, as they are next door to each other, and open always (probably by arrangement) on the same day. Mr. McLean has a large landscape by M. Harpignies, "On the Loire" (35), in the great French landscape-painter's best style, and a cattle-picture by Herr Van Marcke, "The Turnip-field—Early Morning," on a larger scale than usual with this painter, and with all his usual talent, but somewhat uninteresting from the absence of the landscape element. Mr. Hurt's Highland landscape, which is one of the regular events at this exhibition, is as powerful as usual; there is a fine moonlight landscape by Mr. Farquharson, and a large one by Mr. J. Weiss, "Chalk Quarry near Arundel," which is a broad and powerful work in itself, but does not convey the actual character of the scene, which we remember quite well; it is, as it were, translated into a rough, bold style peculiar to the painter, but not the character of Arundel landscape. The works in the small room include some small Corots; a good picture by Mr. Thaulow, "Steps of the Salute, Venice;" and a very charming small landscape by M. Lamorinière, "Pas de Calais." Messrs. Tooth's exhibition cannot be said to have any leading work, unless it is M. Roybet's "A Cavalier," in which the rather sentimental expression of the face is oddly at variance with the demonstrative character of the costume. Messrs. Tooth's gallery seems to be the chosen home of Mr. Leader, whose rather mechanical landscapes are somewhat too numerous; in "The River Conway," however (67), the distant hills are finely treated. There is a very fine specimen of the work of Clays, mannered as regards the water, but with a fine impression of calm about it; and there is a small but admirable and most interesting work by M. Detaille, "Bonaparte in Egypt, 1798," which enables one to realise the Bonaparte of the Directory—thin, handsome, long-haired, with large luminous eyes; a phase of Napoleon's personality which has been rather forgotten behind the more numerous paintings of the Napoleon of the Empire. There are eight small sketches by Meissonier, only one of which, however—"Soldat, Première République," has the special quality of Meissonier's art. Among the other noticeable things in the large room are a good example of Chevallier's work; two or three not very remarkable Corots; Jacque's "Shepherd and his Flock," which rather reminds one of the Vicar of Wakefield's family piece, with "as many sheep as the painter could put in for the money;" and a small but beautiful landscape sketch by Cazin. The small room contains an interesting miscellaneous collection, includ-

ing a cattle-picture by Rosa Bonheur, some good examples of Prout, a fine little landscape by Alfred Hunt, two satiric figures by Chevallier—"Lecture Sacrée" and "Lecture Profane," and two fine landscape and cattle subjects by A. J. Groenowegen, a painter whose name is new to us, but whose acquaintance is worth making.

The Goupil Gallery.

At the Goupil Gallery Messrs. Marchant have an interesting collection of studies and sketches by Mr. Clausen, not painted for exhibition, but representing just the current daily work of an artist. Some of them are pastels, and others which are not look a little too like pastels in texture; but they are full of fine suggestions of light and colour. The best perhaps is "The Path by the Ricks" (12), a work which arrests attention at once by its force and originality of style. Among the small and slight studies, mere memoranda of composition or colour, are some very clever and suggestive things; "The Little Moon" for instance (6), with the moon looking quite luminous, though a mere patch of colour in the middle of brown paper; and "The Rickyard." A half-length portrait of a girl, "The Bird's Nest" (2), though not exactly beautiful, is full of character.

Society of Fine Arts.

At the Society of Fine Arts is a collection of sea-paintings by Mr. W. Ayerst Ingram, representing "The Waters of the Old and the New World." Mr. Ingram is a sea-painter who has been steadily progressing in his art, and this exhibition ought certainly to add to his reputation; it seems to represent his best point of achievement, and contains many fine drawings, and nothing that is ordinary or commonplace. "Dawn in the Atlantic" (17) is an exceedingly fine study of sea; as also "Heavy Weather" (41), showing another aspect of the open sea. Some small sketches of Venice are notable for their feeling for colour; and "Workaday Venice" (42) shows how much poetry and effect may be got out of even the more prosaic portions of the city of the sea. In the two sketches of New York from the sea (43 and 49) the tower buildings are not quite upright, a not infrequent fault with painters who do not make a special study of architectural subjects. Among others which specially pleased us are "The Rapids, Penzance, Massachusetts" (10); "The House on the Sandhill, Tangier" (21), a capital effect of strong sunshine, with a figure in exactly the right place in the composition; "Coasting Craft at Anchor, Venice" (48); "Gathering Clouds" (50); and "The Dolomites, from Venice" (63).

French Gallery, Pall Mall.

At the French Gallery in Pall Mall there is a collection on view of the works of Professor Corrodi, of Rome; chiefly Italian landscapes. The first general impression to the English eye is the extreme hardness of manner of all the paintings; but to judge them fairly we must not doubt consider the position of a landscape painter habitually painting in the clear air of Italy, and also the influence of modern Italian taste in art; not we fear the best, but at all events very different from ours. From this point of view one may admit that these landscapes exhibit very careful work and a fine feeling for composition. The best

landscape in this sense is "Autumn Flowers Corsica" (23); "Peace: the Convent of Santa Margherita" (9), and "Napoleon at Elba" (31), are fine effects, if a little too scenic. "Montenegrin Highlands" (55) is a powerful representation of a wild country; "La Bella Napoli," with its level blocks of houses yellow in the sunlight, is very effective. Among two or three works purchased by the Queen, the small one "Tide Coming in on the Lido" (30), is a fine and finished study of the movement of water.

LETTER FROM PARIS.

An interesting paper was read on the 25th ult. before a meeting of the Union Syndicale des Architectes, by M. A. Bigot, one of the chief manufacturers of ceramic and enamelled stoneware in France. The subject of the paper was "Les Grès Flammés," and M. Bigot, who has produced some of the most important of the enamelled and decorative stoneware lately employed at Paris for architectural and decorative work, amongst which is the façade of the premiated house reproduced in the *Builder* recently, is considered an authority on this subject.

M. Charles Normand, the Director of the Société des Amis des Monuments et des Arts, has organised an excursion to the Château de Rambouillet, and will read a paper concerning the monument, enhanced in interest by the recent discovery of new documents.

M. Chedanne, the well-known architect, has been commissioned to prepare preliminary studies for a Franco-American club, to be erected on the Boulevard des Capucines. The proposed building will cover a surface of 8,000 super. yards, and will contain a large swimming-bath, together with rooms specially arranged for sports, lawn-tennis, &c. A hotel to contain 200 rooms will be annexed to the club.

At its next meeting the Société des Amis des Monuments Parisiens will discuss the competition organised by M. Edouard Dédaille for decorative shop signs at Paris; the question of the employment of the trolley system of electric tramways in Paris; the hideous aspect of the river quays at Paris since the late Exhibition; a résumé of the efforts made by the Société since its formation to obtain a modification of the regulations concerning street fronts at Paris, so as to afford facilities to architects to change the somewhat monotonous streets characteristic of Paris; the satisfaction given by the new regulations passed in August last, and the question of avoiding going to extremes in the other direction.

On Wednesday, the 29th ult., M. Louis Bonnier, the originator of the new regulations regarding street fronts, gave an interesting lecture on this subject to a crowded audience in the theatre of the Ecole des Beaux-Arts. M. Bonnier explained by means of diagrams and models the terms of the regulations concerning the somewhat complicated rules for the templates, angles, arcs, projections, &c., which will allow architects in future to study out new effects for their cornices, balconies, and projecting mouldings on façades. The new regulations are already in force, but it has been decided to permit a certain latitude until the end of this year.

M. Roujon, Directeur des Beaux-Arts, has approved the estimate prepared by M. Daumet, architect, amounting to 7,000*l.*, for the continuation of the work of restoring the Château de Saint-Germain. This credit, voted from the funds of the Monuments Historiques, is entirely separated from the equally important credit granted by the Commission des Bâtimens Civils.

The opening of the Ecole Spéciale d'Architecture at Paris took place on the 15th ult., and was presided over by M. Doumer, late Governor of Indo-China. In reply to M. Emile Trélat, the Director of the Ecole, who felicitated M. Doumer on the important work he had accomplished during his mission, the latter replied that his work had chiefly consisted in opening up the country and affording architects and engineers opportunities of constructing roads, railways, and bridges, and that it was only just before his departure that he was able to erect a palace for the Governor and a museum. He said he would like to speak of the reflections which the changed

aspect of some of the Parisian streets since his absence suggested. He said that on seeing certain buildings and certain "maisons de rapport," recently constructed at Paris even as far as in the Avenue des Champs Elysées, it was obvious to him that the French good taste—which relied chiefly on simplicity, and drew all the beauty of its work from the grace of line and the harmony of proportions—was being sacrificed in favour of German and Austrian taste, which revelled in complicated lines and numerous ornaments. He entirely condemned the "New Art," as exhibited in some of the recent work at Paris, and sincerely trusted that the young architects to whom he was speaking would return to the traditions of their national art.

The date which ends the competition for shop signboards is now approaching, and about seventy designs and models have already been submitted. Several of these have been sent from abroad—from Rome, Liverpool, Gênes, &c. One artist from Angers has sent in a design which would cover an entire façade. Among the competitors are M. Gérôme and M. Detaille. The question as to the liberty to be allowed in regard to the size and projection of the premiated designs when executed will now become one of much discussion, more especially since the passing of the new street regulations concerning projections on house fronts. The Académie des Beaux-Arts has selected five of its members to form part of the jury in the competition. These are MM. Bonnat, Vaudremer, Luc-Olivier Merson, Fremiet, and Chaplain. The designs and models will be exhibited to the public in one of the public halls, installed with electricity, so as to provide illumination for the luminous signs.

The Minister of Public Works has been authorised to accept in the name of the State the donation made by M. Rouville, Ingenieur-en-Chef des Ponts et Chaussées, of a sum of 2,400*l.* intended to form a prize every five years to be awarded to one of the engineers of the Ponts et Chaussées who, in France or abroad, shall have executed a remarkable work of engineering, or have published a technical work realising a progress in the science of engineering, or have realised in some manner an important improvement in the art of construction, or in the industry of transports. A sum of 400*l.* will be awarded every five years, starting from 1900.

On the initiative of the Société d'Océanographie of the Gulf of Gascony, it has been decided to construct a maritime meteorological observatory on the quays of Bordeaux. MM. Halphen and Girard are the engineers, and the building, which shows some originality in design, will be a very lofty one. It will contain all the telegraphic and meteorological instruments necessary for rational forecasts of the weather and their utility to navigation and agriculture.

The question of "tout à l'égout" has again entered into a practical stage, and a large number of householders, who have not yet complied with the recent law concerning the sanitation of houses in Paris, will be brought before the courts this month.

The "Vieux Paris" Committee has been invited to meet at the Hôtel de Ville for the purpose of giving the opinion of its members on the various schemes proposed for the prolongation of the Rue de Rennes. The Committee has decided to uphold the scheme submitted by the Prefect of the Seine and M. Bouvard, which proposes to divide the Rue de Rennes into two portions where the prolongation meets the building of the "Institut," and to carry one portion along the side of the Hôtel de la Monnaie as far as the embankment, the other side having its termination on the Quai Malaquais near the statue of Voltaire.

The interesting and important railway bridge called the Viaduc du Viar, situated on the new line of railway from Carmaux to Rodez, was inaugurated on the 5th ult. by M. Maréjols, Minister of Public Works. This viaduct, which is most remarkable by reason of its height, its immense span, and the boldness of its design, was constructed by the Société des Batignolles, as the result of the competition opened in 1890 by the Minister of Public Works. The viaduct was designed by M. Bodin, engineer, professor at the Ecole Centrale, and was carried out under the supervision of MM. Volant, Lanusse, and Andrieu. The length of the bridge is 1,500 ft., the span of the central arch is 722 ft., with a height of 375 ft. from the bottom of the valley beneath.

The total weight of the metallic portion is 3,760 tons. This viaduct, which is wholly constructed of steel, with masonry abutments, took seven and a half years to complete.

The Champ de Mars, cleared of all vestiges of the late Exhibition and neatly arranged into gardens by MM. Bouvard and Vacherot, has now been opened to the public. No decision has yet been come to between the State and the City as to the ultimate arrangement of this immense space into avenues and public parks.

It has already been found necessary to make a careful revision of the upper portions of the Grand Palais de Champs Elysées, for very lately a large portion of the entablature fell in front of the central entrance. Instructions have been given to the Service of Architecture to make a careful examination of the entablature and cornice, under the direction of M. Pascal. It is said that the foundations of the building were insufficiently protected from the infiltrations from the Seine close by, and that the foundations generally are settling.

The "Vieux Paris" Committee is now extending its attentions to the outskirts of the town, and is doing good work in calling attention to the state of the various historical buildings in the suburbs. It has induced the Municipality of Bagnolet to affix historical inscriptions on the Château du Regent, the Château des Bruyères, and the Parc le Peletier, all of which have some historical interest and architectural details. The Committee has also adopted the suggestion of M. André Hallays to reproduce in a methodical manner, by means of photographs, all the various present aspects of Paris, and it is intended to present to the Carnavalet Museum a complete collection of photographs of Paris as it exists to-day. A competition will probably be opened between photographers, both professional and amateur, for the supply of general and detailed views, and medals will be awarded by the Municipality to the authors of the selected photographs.

M. Redon, the architect to the Louvre, has terminated the rooms destined to receive the fine collection of Oriental antiquities presented to the Museum by M. de Morgan. M. de Morgan has lately visited these rooms and has declared himself quite satisfied. He expects to be able to add to the collection by objects which he will bring back after his new researches in Persia.

Independently of the monument to Charles Garnier, which is still behind scaffolding and the date of the inauguration of which is not officially settled, there will shortly be several artistic ceremonies in Paris. In December the Minister of Fine Arts will open the Gustave Moreau Museum; and about the same date the Petit Palais will be thrown open to the public. Great efforts are being made to prepare the interior for the reception of the Dutilleul bequest by the specified date. The galleries for it have been lined with grey blue hanging which will make a very good background for the works to be exhibited. The picture gallery of old masters is completed, and presents a fine show of works by Hobbema, Teniers, De Hooghe, Rembrandt, especially a fine portrait of himself by the artist—Mieris, Ostade, and Terburg. In the next gallery are original drawings by Rembrandt, Van Dyck, and other painters of the seventeenth century. The ceramic gallery contains comparatively few objects, but they are of genuine value, especially the specimens of Palissy ware, and of the faience of Oiron, now very scarce. In the east part of the building are placed the books left by M. Dutilleul, including many rare editions and fine bindings, as well as illuminated manuscripts. In the opposite wing will be placed the principal modern pictures belonging to the Municipality of Paris, including works by Courbet, Delacroix, Cogniet, Delaroche, &c., and among living painters MM. Bonnat, Laurens, Bessard, Tattegrain, Roll, Detaille, Dagnan-Bouveret, and many others. In the front gallery parallel to the main avenue (the ceiling of which is ultimately to be decorated with paintings) are arranged a good many modern works of sculpture, including M. Fremiet's "Saint George," M. Mercier's splendid group "Gloria Victis," M. Allouard's "La Source," M. Gautherin's "Paradis Perdu," and Dalou's splendid bas-relief in marble "A la Gloire de la République," as well as a small reproduction of his monument on the Place de la Nation. These will be mingled with plants and shrubs, so as to form a kind of winter garden of sculpture.

The idea of an Autumn Salon, for which it was thought the Petit Palais might be utilised, is now at an end as far as that locality is concerned, the building being now entirely occupied; such an exhibition, if organised, would have to be held in the large Palace. In any case the idea of carrying it out is deferred to 1903, but it is not likely that the scheme would have any success with the public, who have at present as many exhibitions as they want. At the Hôtel de Ville the competitive designs for Signs are to be exhibited, and after this is over there will be an exhibition of the paintings for the decoration of the Mairie de Vanves—entirely a landscape painter's competition, as the pictures are to consist of representations of the coast scenery of the neighbourhood.

The "Vieux Paris" Committee has recently a rival and opponent in a "Nouveau Paris" Committee, which sets no store by antiquities, and opposes all archaeological prejudices which will stand in the way of Paris "improvements." The Municipal Committee condemned the proposed Pont du Louvre on aesthetic grounds; the Paris Nouveau Committee is demanding that it should be carried out by "Ingenieurs et architectes modernes," a very disturbing phrase, for modernism has become of late a very elastic term, and while "Art Nouveau" is bad enough in private houses, it offers for public works opportunities for eccentricity which may have very painful results, as the new stations of the metropolitan railway already attest.

Some days since, the Luxembourg Garden received a new sculptural ornament in the shape of a monument to Gabriel Vicair, the poet, modelled by M. Injalbert; a bust placed on a pedestal draped after the antique fashion. Also there has been inaugurated, at the Mont Parnasse Cemetery, the monument to Baudelaire, by M. de Charmoy. This is a work designed in a ghastly kind of taste which was probably thought suitable to the memory of the poet who wrote "Fleurs du Mal." It represents the dead figure of the poet enveloped in a winding-sheet and laid out on a tombstone. Above is a grimacing figure representing the "Génie du Mal."

The works of the Metropolitan Railway are being vigorously pushed forward in all corners of Paris, and workshops in connexion with it, in various quarters, bear witness to the activity of the municipal engineers. On the line No. 2 there is full circulation as far as the Place d'Anvers. Beyond that station the line rises with a very steep gradient to the long viaduct which leads to the Belleville tunnel; but this part of the line can hardly be open for traffic before February.

The death is announced, at the age of thirty-three, of M. Georges H. Levalley, the engraver, who in 1890 obtained the Grand Prix de Rome. He was a pupil of Henriquel Dupont, Cabanel, and Théodore Mailliot, and exhibited frequently in the Old Salon. Among his best works are "Printemps," after Botticelli; "L'Amour sacré et l'Amour profane," after Titian; and "Un Astronome," after M. Roybet. Some of his engravings were published in the *Gazette des Beaux-Arts*.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

PRESIDENT'S ADDRESS.

THE opening meeting of Session 1902-1903 of the Royal Institute of British Architects took place at No. 9, Conduit-street, Regent-street, W., on Monday, when the President, Mr. Aston Webb, A.R.A., delivered the opening address.

Mr. Alexander Graham, hon. secretary, announced, with regret, the decease of the following members:—W. Salway, of Melbourne, elected an Associate in 1874 and a Fellow in 1885; G. Truefitt, Worthing, elected a Fellow in 1860, and placed on the list of retired Fellows in 1899; C. France, Bradford, elected a Fellow in 1898; Emerich Steindl, elected an Hon. Corresponding Member in 1894, Professor of Architecture in the Royal Polytechnic School, Budapest, and architect of the Parliament Houses, Budapest (a few months before his death the Institute received from him an album of photographs of this building); and Eugène Müntz, elected Hon. Corresponding Member in 1893, a member of the Institut de France, Vice-President of the

* For illustration, see our issue for August 25, 1894.

Académie des Inscriptions et Belles Lettres, and conservateur of the Library and Collections of the Ecole Nationale des Beaux Arts. M. Mintz died on October 30, aged fifty-seven. M. C. Lucas, Hon. Corresponding Member, has promised to write an account of the principal works of M. Mintz, and showing the great loss that archaeology and the history of art has suffered by his death.

It was intimated by the Chairman that letters of condolence would be sent to the families of the two deceased hon. corresponding members.

Mr. W. J. Locke, secretary, announced that a statutory examination for the office of District Surveyor and Building Surveyor was held on October 23 and 24, when the following candidates passed and were granted by the Council certificates of competency to act as District Surveyors in London, i.e. Mr. W. G. Perkins, Tooling; and Mr. A. Halcrow, Verstage, London.

The Chairman said he had the pleasure to announce that the Edinburgh Architectural Association had applied for affiliation with the Institute in accordance with the Charter. It was his pleasure to move: "That the Royal Institute of British Architects do admit to alliance therewith, under provisions of Section 17 of the by-laws (Nos. 77-81) the following association, i.e., The Edinburgh Architectural Association."

The motion having been heartily agreed to, the Chairman read the following address:—

Colleagues, Ladies, and Gentlemen,—

Since our last meeting in this room two events of national importance have taken place: the dangerous illness and marvellous recovery of our Sovereign the King; and the Coronation of the King and Queen in Westminster Abbey on August 9—an event attended by all the splendour of the ancient rites and ceremonies which tradition has handed down to us as fitting for such an occasion; and it seems but right that the first words of the President of this Royal Institute should be to express on behalf of its members their thankfulness for this happy consummation of their hopes and aspirations.

My next words must be to thank you for the honour you have done me in placing me in this chair—an honour which carries with it many responsibilities, which I shall do my best to fulfil; but whether I succeed or not I will ask you to believe that I am actuated solely by what I consider to be the best interests of architecture, and of this Institute, in which I have always been a firm believer.

I am aware that my task is not made the easier by the admirable manner in which these duties were performed by my friend and immediate predecessor, Sir William Emerson; and I am glad to take this opportunity of publicly acknowledging them, on behalf of the members of this Institute and myself, on the high honour of knighthood conferred upon him by his Sovereign—an honour which has given much pleasure and satisfaction to all of us, the more so that it is, I believe, the first time that a President of this Institute has been so honoured.

It is now my duty as your President to notice, as concisely as I can, some of the questions on the art and practice of architecture and the affairs of this Institute which present themselves to us at the present time, and in doing so I will ask you to understand that I in no way lay claim to any special fitness for this task, but that it is merely through the fact of my present position that I am privileged to do so.

On looking back over the last ten years I think we may fairly congratulate ourselves on the progress this Institute has made, the position it has attained, and, more important than all, the work it has done during that period. Ten years ago we had 1,400 Fellows and Associates, now we have nearly 1,700; not perhaps so large an increase as we could wish, but still a considerably larger increase than in the previous ten years.

It is true that our register still lacks the names of some distinguished architects whom we should like to see there, and whose presence would strengthen our power for good, not only in London, but throughout the country. Many of them we know to be well-wishers of this Institute, and to appreciate the work we are doing; I can only say we should greatly value their presence amongst us, and should give due weight to their opinions on any matters in which they may consider that the policy of this Institute could be made in-

creasingly useful in the interests of architecture.

Within the last few weeks we have been much gratified to receive a proposal for alliance from the Edinburgh Architectural Association, which has hitherto held somewhat aloof from us and we shall, I am sure, all welcome the accession to our ranks of so earnest and able a body of architects, numbering many men who are really enthusiastic and doing good work, and, though the distance between us is great, I hope we may not infrequently have the pleasure of welcoming some of their members amongst us here, and that the alliance may prove of advantage to both societies.

It has often occurred to me how little we know of the proceedings of our allied societies, their aims and the matters on which they feel most strongly, and that anything that would bring us more into touch with them would be a mutual advantage. With this view, one naturally turns to the journal, so ably conducted by our Secretary, Mr. Locke, and there we find our noble selves fully reported in all the glory of large print, but not much space given to the proceedings of our allied societies; and it appears to me that if that space could be increased, a portion allotted to each society, and if the societies would help us by sending up reports of their papers and discussions, we should all get to know a great deal more of what is going on in the country, and become more familiar with the men who are taking an active part in each society's affairs, while the information thus given would greatly widen the interest of our journal. The addresses of the local Presidents could be printed, together with other papers and discussions; and these could, if so desired, be printed separately and issued to the members of the local Society concerned, and thus each Society could obtain an independent journal of its own proceedings at a very moderate cost.

While on the subject of the *Journal* I may say the editor would be very glad to receive communications from members which would add to the interest of the *Journal*, not only from Fellows but also from our younger members.

The President of the Architectural Association of Ireland (Mr. F. G. Hicks), in his opening address the other day, said, speaking of his institute, "It is not a bit up to date, and there seems very little cohesion among the members, for they seldom have an opportunity of meeting." Well, I have heard something of the same sort applied to this institute, that there is a lack of opportunity for members to meet and know each other, and I propose, with the permission of the Council, to give one or two informal "At Homes" here during the session, (to bring us "a bit up-to-date"), and where members may meet in a friendly way and get to know each other better; and I cannot help thinking that if you will support me by your presence some good may be done in this direction.

The admission of Fellows to this Institute can hardly yet be said to have arrived at a final and satisfactory settlement, and in my opinion this will not be done until Fellows are elected solely from the ranks of the Associates, except in very exceptional instances. But there are at present a large number of practising architects we wish to see Fellows whom we cannot expect to submit to our examinations. This is a matter which will have to be once more considered by your Council, more especially as the provision for the direct election of Fellows lapses in May next.

The financial position of the Institute is, I am glad to say, satisfactory. Ten years ago we had a capital of £8,000, now we have a capital of £11,500. Then our revenue hardly balanced our expenditure, now it exceeds it by something over 1,000l. per annum.

It is obvious that this increased prosperity lays upon us the obligation of increased activity, for we are not a society to accumulate funds, but rather to make proper use of those our increased prosperity supplies us with.

The question of premises is one that is always with us, and the increase of our office work, and that of the library, is beginning to make it a very pressing one. In many ways our premises here suit us well enough, but we now occupy the whole of the building, with the exception of the galleries, &c., on the ground floor, which we unsuccessfully negotiated for on behalf of the Architectural Association and ourselves in 1896. Failing these galleries, our power of expansion here has

come to an end, and the alternative is to build premises elsewhere. This raises the question of a site, which I mention now, as it is possible some of our members may know of something likely to suit our requirements, and, if so, we should be glad to receive from them any information or suggestions on the subject.

The Council, on the suggestion of the Finance Committee, have started a premises fund, and have placed the sum of 1,000l. to this account.

A cause which I think this Institute should as far as possible assist is that of architectural education. The Institute, as an examining body, has deliberately left the education of architects to other architectural societies; and in this I think they have acted wisely, for the undue multiplication of educational centres is obviously undesirable. The Royal Academy has an excellent architectural school, visited and instructed by architects, but does not undertake very elementary work, and deals with design only. The Architectural Association has recently started a day school, dealing with elementary work, and worthy of every encouragement; it is a scheme which, I venture to think, this Institute would do well to foster by every means in its power, both financially and otherwise, while individual architects could also do much to assist it by advising parents to send their sons for one or two years to the school previous to their being articled to them.

These two schools, at the Academy and the Association, do to some extent overlap, and if a certain course at the Association schools could be recognised as giving entrance to the Lower Architectural School of the Royal Academy, much in the same way as certain work at the public schools will admit a man to the University of Oxford, subject of course to any conditions that might be thought desirable, a great impetus would be given to both schools, and architects might at last feel that the education of the next generation was in a fair way to being placed on a satisfactory footing that would be capable of great development. There is, I think, no worthier or more unselfish object for this Institute to promote, or one that is more likely to influence architecture for good, than the careful and systematic education of our young men, by a system which will not supplant the present system of apprenticeship, but will rather supplement it by supplying that which cannot be learned in an architect's office, or at least can be better taught systematically in a school.

Our examinations are, I believe, proving of real use to the younger men, and, judging by the increasing number that enter for them, they are fully appreciated. Ten years ago 305 went up for these examinations, while last year there were no fewer than 674.

The real benefit of these examinations is the work required in the preparation for them. We do not claim that they necessarily turn out artists (these are born, not made), but we do claim that, with the knowledge thus obtained, it enables those who are gifted with the artistic instinct the better, and with the more certainty, to realise their imaginations and aims. It is an object for a young man to work for, and an inducement for him to acquire knowledge in some branches of our complex art which, though very necessary for its proper realisation, are apt to be neglected as ungenial. In connexion with this matter may I venture to hope that architects will give all reasonable facilities to those under them to undergo the necessary preparation.

The question of competitions is one of those questions that are always with us, and as long as architects see fit to enter for competitions it is plainly the duty of this Institute to do what it can to secure—first, the drawing up of such conditions as shall be fair to both parties, and at the same time not entail more labour on the competitors than is necessary to enable a competent assessor to arrive at a just decision; and secondly, to secure the adoption and execution of the best design.

With this end in view a series of suggestions for architectural competitions was drawn up by this Institute in 1881, and reconsidered and revised by the Council during the last session. These have recently been sent to all public bodies likely to organise competitions; in addition to which a copy is always sent to the promoters of a contemplated competition as soon as it is heard of by the officials of this Institute. But when all this is done there still remains the question of the appointment of the

assessor, a matter of supreme importance both to the promoters and the competitors. Ever since 1881-2 architects have insisted that a professional adviser should be appointed in all open competitions, and in many cases the President for the time being of this Institute is asked to nominate the assessor, and after some inquiry into the matter I can find but little objection taken to the selections made, or to the decisions given, bearing in mind, as I well know by experience, that the decision can seldom be thoroughly satisfactory to more than one of the competitors. It has been, however, urged by some that the selection of the assessor should be made by a small committee rather than by the President, and that two or more assessors should be appointed in all competitions of any size. Personally I do not share this opinion, believing that the sense of individual responsibility is likely to give better results in both cases.

How far the system of selecting an architect by competition for the erection of any building is a desirable one will, I suppose, always be in dispute; but that it gives an equality of opportunity to all architects, great or small, known or unknown, is, I think, indisputable; and it has always seemed to me one of the strongest points in its favour, for we all could name men, now doing excellent work, whose first opportunity came by competition, and we know in this crowded world of ours how difficult it is for new men to obtain a hearing.

Before leaving matters more especially connected with the affairs of the Institute, I should like to say a word on behalf of the Architects' Benevolent Society. There are so many who faint by the way, and to whom a little temporary assistance is of untold value; there are so many others who have been worsted in the battle, and through ill-health and other difficulties have fallen out of the ranks, that great demands are made upon the funds of this Society. It is surely our duty to provide for them without going outside for help. Mr. Macvicar Anderson last year raised in a short time over 1,000l. with this object, a very handsome and most acceptable addition to the funds; but interest is very small now and the cost of living very high, and the income of the Society still wants largely increasing. The Council of this Institute, for the first time, have voted an annual contribution of 200l., and there would be nothing pleasanter than to see the number of annual subscribers largely increased during the present year. At present out of 617 Fellows, only 191 subscribe; and out of 1,066 Associates, only 70 subscribe. I venture to think that this ought not so to be.

And now, gentlemen, if I have not already worn out your patience, I will ask you to consider some questions of wider architectural interest than those we have been considering.

The interests of this Institute are with both old and new buildings. Our interest in old buildings is to trace the history of their origin and growth, and to devise means for their maintenance and necessary repair.

The fall of the Campanile at Venice forcibly reminds us of the necessity for continual watchfulness as to the structural stability of ancient buildings, and the engineer's report on the foundations of our own St. Paul's still further emphasises the fact; and while these instances by no means justify undue interference or rebuilding of these structures, they show the danger of endeavouring to hand them down to posterity in exactly the same condition as we have received them. Most of the members of this Institute will, I think, sympathise with the desire of the Italians to re-erect their fallen tower, and be pleased that the Royal Academy has taken the lead in showing the practical sympathy of art-loving England with Italy in her loss. But how much better, by careful maintenance and judicious repair, to avoid such catastrophes! In the case of St. Paul's a note of warning has been sounded, apparently, none too soon, and we look to the guardians of that great pile to take every precaution, on the best possible advice, to ensure its safety, appealing to the Government for funds should that be necessary.

But there is another, and even greater, danger threatening the buildings and antiquities of the kingdom which would rob us of much that gives this old country its charm; it is, I am afraid, a more subtle danger, and therefore more difficult to deal with. I mean the wholesale depredations of the "art" dealer.

I am informed, on reliable authority, that certain districts in this country are systematically mapped out by these gentlemen, and

anything of interest, such as a panelled room, a moulded ceiling, a bit of ironwork even, a chest, or a clock, are all carefully scheduled, the position and means of the owner ascertained, and, as opportunity offers, the property is purchased, the cottage or house often pulled down, the contents sold, generally abroad, and then the land, stripped of its little treasures, is resold. It is difficult to use temperate language about such proceedings; but surely it behoves us, before it is too late, in conjunction with other societies, to see if it is not possible to take some united action to get these buildings and fittings registered as national belongings, so that, at any rate, they cannot be removed from this country, a course which, I understand, has already been adopted, to some extent, in France and Italy. This is work in which other societies are also interested, and we are always ready to act with them as occasion arises; indeed, it interests and affects all educated Englishmen.

It is in modern architecture, however, and its allied arts that our influence is naturally most likely to be exercised, especially at a time of such exceptional building activity as the present. The Government is largely engaged in the erection of public buildings; Local Authorities all over the country are busy with the erection of town halls, asylums, schools, technical institutions, &c.; while the buildings, residential and commercial, in our great towns continue to increase at almost an alarming rate. What, I think, must strike most of us in all this activity, is that while minute control is exercised by public authorities over the details of these buildings, such little control is exercised over the laying out of our cities that, to a great extent, they seem to be left to lay out themselves.

How often we see a really noble and costly building hidden away in some inconvenient and cramped site, without any approaches worthy of the name, simply because the land was easily obtainable or happened to be vacant at the time, or could be obtained cheaply, or to improve the value of adjoining property; reasons we have heard put forward repeatedly, but nearly always resulting in the loss of a great opportunity of ennobling and beautifying the town; while, instead of money being saved, as is foolishly supposed, money is really wasted and thrown away.

A predecessor of mine in this chair once urged when heading a deputation on the erection of a public building, that the extra cost necessary for its worthy completion would, even from a commercial point of view, be soon repaid by the increased attractiveness of the city, and the number of visitors that would be drawn to it. The suggestion was received as if it was not seriously meant; but surely there is force in the contention, though it is but a secondary reason for urging on the public authorities the importance of so placing their public buildings that they may be the ornament and crowning feature of the town.

Why is the National Gallery site so frequently pointed to as an ideal one? Surely because it has, as so few buildings have in London, a slightly elevated site, with a large open space in front of it, and is approached by a main thoroughfare leading directly to its facade. The Royal Exchange has a fine site, for a similar reason. When carefully planned the most splendid approaches to St. Paul's, which would have made the City one of the finest in the world; but the greed and disputes of the citizens unfortunately prevented his scheme being carried out. Most of our public buildings have no dignified approach, and usually a general view can only be obtained, in sharp perspective, from the roads which run past them, not up to them, and, as Wren says, they are seen sideways. The matter is of still more importance now that the picturesque manner of the Houses of Parliament and the Law Courts is giving place to a more palatial and formal style. Continental towns set us a great example in this respect, and though we may consider their love of straight avenues and boulevards is often carried to monotony, we cannot but admire the dignified and monumental surroundings they almost invariably contrive to provide for their buildings. I would venture to assert, though it should surely not be necessary, that every public building should be entirely detached, and should stand on a site of an area at least half as large again as the area which the buildings actually cover, and that they should, wherever possible, have a fine road leading up to them. The Americans, who

are generally credited with a keen eye for the financial side of a question, are fully alive to this point, and are laying out their cities with great monumental dignity. It seems almost impossible to exaggerate the importance of the architectural surroundings of a building. In the case of private houses some architectural support in the way of steps, walls, and terraces is now usually designed, though unfortunately by no means usually carried out, and one has only to look at the design and the executed work to see how great the loss has been. But if important in a house how much more so in a great public building! And yet in England how often is this entirely ignored.

Another matter which I notice in London and other places with regret is the disappearance, in the new quarters, of the old-fashioned "square," which adds so much to the appearance of the older quarters. The new-fashioned "gardens" apparently have taken their place, the difference being that while a "square" was bounded by a public road, and had the fronts of the houses facing it, the "gardens" have no surrounding road, and the backs of the houses abut immediately upon it. The result, of course, is that while the "square" adds greatly to the variety and beauty of our streets, the "gardens" are entirely hidden away, and might be non-existent, as far as the public thoroughfares are concerned. The advantage claimed is the increased privacy obtained for the "gardens" counterbalanced, surely, by the improved outlook given by the "square" to the front of the houses, while the somewhat sordid surroundings of the "garden," with its rows of back windows and its stagnant air, hardly make for beauty or restfulness.

Numerous other points in the laying out of our cities will occur to all of us, but I mention these two with a view to asking whether something could not be done to ensure that all such matters should be duly considered while improvements are under contemplation, and before it is too late. I venture to think that these are matters in which this Institute and our Allied Societies can do important public service.

The design and details of buildings are a matter for the individual artist, and not one, in my opinion, in which this Institute can often, if ever, usefully interfere; but when great improvements are in contemplation the opinion of such a body as ours, composed of societies all over the country, may, I think, be of great use to the public authorities. Never, I feel assured, was there a time when our Corporations and County Councils were more anxious to do all in their power to improve the aesthetic aspect of our cities and towns, or more willing to avail themselves of every means to that end that may be open to them. The Government and the London County Council have frequently consulted this Institute on matters of architectural importance, and other public bodies do, from time to time, consult with their local Architectural Societies. Something, however, more definite seems to be required than this.

At present, as we all know, we architects are unable to erect any building, in any of our towns, without first submitting very complete plans, and in many cases elevations and specifications, to the Borough Surveyor, who exercises, under the local by-laws, a strict supervision with regard to height and size of rooms, windows, thickness of walls, the minutest details of drainage, and other matters; but when it comes to laying-out suburban districts, street improvements, and such like, which call for the highest qualities of the architect, the plans are usually drawn by the Borough Surveyor, and subjected apparently to practically no expert criticism whatever.

Now, might it not be required that when such schemes have to be prepared they should be submitted for criticism and advice to some expert architectural authority, such as, say, the local Architectural Society, who might also be asked to nominate an architect to consult with the surveyor in preparing the scheme, and, in the event of the Corporation or Council and the Architectural Society not agreeing on any point, might not the question be referred, say, for example, to the Council of this Institute? It surely could not be argued that this would be derogatory to the borough surveyor, for, as we architects cheerfully submit our proposals to the surveyors, there would seem to be no impropriety, but quite the reverse, in the surveyors laying their architectural schemes before the architects, and, in important architectural schemes, working with them.

In saying this, it must be understood that I am not in the least impugning the capacity of a thorough surveyors. They are, we all know, an exceedingly able body of men; but they are selected for these posts on account of their fitness and acquaintance with subjects somewhat apart from architecture proper, the study and practise of which subjects do not specially fit them for the designing of work of the highest architectural importance. They are, I venture to think, liable to have great pressure put on them to sacrifice too much to the very important questions of convenience and economy; and if this is so, a further independent opinion would greatly strengthen their hands.

The tendency in recent years has been with corporations to substitute for the official architect, as he used to be called, the surveyor; and this is, probably, the most reasonable course, for the matters which the Works Department of a Corporation or Council have mainly to superintend would be perfectly come under this heading; but would seem reasonable that, when strictly architectural matters have to be dealt with, they should be subject to the criticism of architects, not necessarily officially connected with the local body.

I have dealt with this matter at some length, because it seems to me one in which the Institute could be of real use, and because it is one which so greatly affects the beauty of our cities and towns.

Another matter to which the attention of this Institute has been called is the local building laws in many rural or practically rural districts. This may at first sight seem a subject very remote from architecture, though in reality, as many of our members know, it affects architecture very much. These by-laws for rural districts are often drawn up on the lines of the building laws of large towns, they impose most unnecessary and burdensome conditions on those building in the country, and though the attention of the Local Government Board has been directed to the matter, and a reputation has been received, but little more has been done.

The London County Council have schemes in hand of the greatest magnitude, and they have, as is well known, consulted this Institute for reference to the great new thoroughfare from Holborn to the Strand. Unfortunately, they were not able to adopt our suggestions in their entirety; but their Committee, with the best intentions (which they appear not to have been strong enough to carry through), obtained designs in a limited competition, and a report upon them by an assessor, whose decision every one would have been willing to abide by. This report, however, was not made public for two years, and appears to have remained a dead letter since; and now, I believe, this Institute and the public are absolutely in the dark as to whether there is to be any general scheme or control over the buildings to be erected, and, if so, by whom this control is to be exercised, whether each plot is to be set to the highest bidder, without any reference to a general scheme; and, finally, what has become of the design placed first in the assessor's award; and yet it is hardly too much to say that in almost any suggestions in Europe it would be looked upon as a matter of public and national importance, and surely it is one on which all are entitled to be informed.

In these public matters connected with architecture, the daily Press might do much to educate public opinion; without the aid of the Press little is likely to be done. But in order to have the necessary influence, architectural matters must be treated with a complete and thorough knowledge of the subject, as is usually the case in matters affecting the cognate arts.

The encouragement of local schools of art by their municipalities is another matter that should interest this Institute. It will be remembered that when London was being decorated for the recent Coronation, the decoration of Westminster Bridge was entrusted to the Royal College of Art; and, mainly through the instrumentality, I believe, of Sir William Richmond, funds were provided by the London County Council for the purpose, the students giving their services. A very ambitious scheme was prepared and carried out, though, owing to the postponement of the Coronation, the scheme hardly received the attention it deserved; but I have reason to believe it gave a great impetus to the work of the college, the

students devoting much enthusiasm to a scheme which was not a mere exercise, but one in which their work was actually to be seen in position.

I think the London County Council and all concerned are to be congratulated on this experiment, which might be usefully followed throughout the country, for there are many buildings required for temporary premises, such as those for exhibitions, receptions, rejoicings, meetings, and of which require erection and decoration, and present precisely the opportunity required for students to try their hands upon, and so to learn how much their work gains or loses when seen in reality, and in other surroundings than the studio in which it has been prepared. The employment of students in temporary work such as this is better than their employment on more permanent work, where their inexperience remains recorded against them, and may only end in discouragement. Besides it is only comparatively seldom that an opportunity for permanent work occurs, and when it does it is more properly reserved for men who have passed through the schools, gained experience, and proved their ability. On the other hand, the temporary work gives the opportunity so much desired by students and should it prove unsatisfactory it is soon removed and forgotten; besides, their employment should greatly increase the interest of the municipalities in their schools of art and the students who work in them. Much has been written lately of Municipal Socialism; we could, I think, do with a little more of it in this direction.

While considering the responsibilities of municipalities towards the encouragement of the arts and crafts, we may remind ourselves of the responsibilities that lie also with us. We rightly have a voice in the selection of the artists and craftsmen who work on our buildings, from the sculptor and painter who decorate them to the locksmith and upholsterer who furnish them; great encouragement may be given to the subsidiary arts if we take the trouble to find out individual artists to work with us in the various branches of the applied arts, and while fully illustrating our intentions give them sufficient freedom to carry out their own imagination and inventiveness, with their full share of credit for it. Depend upon it, great discouragement is caused to earnest workers, and much harm done, if just to save ourselves time and trouble we take the first article of commerce that comes to hand. Think what a school of craftsmen the enthusiasm of Pugin raised, producing work which is really little short of marvellous when we remember the sort of work that was being done at that time. We still feel its beneficial effects. Gilbert Scott, William Burgess, J. F. Bentley, and many others, both dead and living, have done the same; it is certainly one of the directions in which we can do incalculable good or ill to our art, and it is a responsibility of which we cannot and must not divest ourselves.

Smoke abatement is another matter this Institute may do something to assist in. The thick dark veil that falls over all our buildings is distressing in the extreme. One of the principles which Wren laid down for the rebuilding of London was: "All trades that use great fires or yield noisome smells to be placed out of the town," and we should see to it in this day that trades which cannot control this nuisance should be made to go outside.

Gentlemen, I cannot conclude without reference to one building recently erected, the Cathedral Church at Westminster, and its gifted architect, the late John Francis Bentley. The erection of a great church like this in the Metropolis is necessarily so rare an event that under any circumstances it would attract attention; but when, as in this case, the work was designed by one of the most inspired church architects of our day, and on lines different from any erected in recent times, it has naturally interested all of us, and excited in most of us an enthusiastic admiration. I do not propose here to give a critical notice of the building—that has already been done, from various points of view, by abler pens than mine—but rather to enjoy the pleasure of noting the erection of a modern building in which all can unite in finding much to admire, though it will be a matter of lasting regret that its architect was not spared in health to witness the completion of his labours, and to receive the congratulations attending the consummation of so great a work nobly, and one may say in his case heroically, carried through.

The present generation will probably have seen three cathedrals of the first class in course of construction—viz., the cathedrals of Truro, Westminster, and Liverpool—the first, nearing completion, designed by one who mastered the old Gothic methods and feeling perhaps more entirely than any of his contemporaries, and who has produced a beautiful building, which might almost, so perfect is it, have been erected in the thirteenth century, and is probably destined to mark the high-water mark of achievement in the revival of a mediæval style.

At Westminster the problem was different from that required by the traditional Gothic plan of a cruciform church, with deep choir and transepts; and this difference naturally and properly affected the whole design, and while an enormous uninterrupted area has been provided for the assembling of large masses of worshippers, the mystery so necessary for the interior of a religious building has been admirably preserved by the careful lighting, the simple intricacy of its arches, its piers, its ambulatories, and its chapels. It is a step forward in church building, nobly planned, and one for which we may be all unreservedly grateful. I would only venture to hope that some day the entrance by the removal of one or two houses, and that the interior of the building may in due course be worthily completed.

The last cathedral, Liverpool, is still one of the possibilities of the future; let us hope that it may prove, when erected, yet another step forward. I have already expressed my own opinion, that the author of the design named as the best in the first competition should have been given an opportunity of showing what he could do on the new site; it has, however, been decided otherwise. The request, in the first conditions for the second competition, that the building should be designed in a certain style was a curious instance of the inability of the public to trust architects to design for them what is most suitable, for though this condition has been since withdrawn, it is, I believe, generally understood that the promoters remain of the same opinion still. We can only hope that the best man may finally be entrusted with this great monumental work, and that, when it is completed, he may be rewarded by the unstinted admiration of his brother architects, the highest reward any of us can hope to gain.

We, all of us, lavish endless praise on old work, but are, perhaps, too chary of bestowing it upon that of our own time. If we are always contrasting the greatness of old work with the inferiority of the new, can we wonder if the public take the same view, and ask us to reproduce for them what we all so greatly admire? It is true we cannot reproduce that work; but the public do not understand that, for we do not teach them so. Great painters are not asked to paint in the style of Giotto, Fra Angelico, or Titian, and would not do so if they were. Excellent copies of these great masters are made, and in a few years are sometimes mistaken for the originals; but they are not made by our great painters, and are esteemed of little worth. Sculptors no longer masquerade as our living statesmen in Roman togas, or attempt to reproduce a Jubilee procession in imitation of the Parthenaic frieze. Why, then, should we still be asked to design in the thirteenth-century or any other bygone style? Because, we are told, we have no style of our own. But are we quite sure that a tradition once broken can never be picked up again? And are we quite certain that the Renaissance tradition has ever been entirely lost in England? I do not think so. Are we going on for ever telling our young men they must not only study but copy old work, for they can never hope to produce anything equal to it? Is that likely to give them inspiration? Are we to tell them that while painting and sculpture are alive, the last word has already been said on architecture? There cannot be an architect who holds this opinion, though, I am afraid, under present circumstances, we cannot wonder if the public do so. I am not thinking of that will-o'-the-wisp, a new style—that may or may not come, I do not know; but rather suggesting that by a generous appreciation of modern work, and by boldly and generously showing our belief in it, good contemporary work may be encouraged, and abound among us, so that the public may come to believe and be interested in it also.

There is one quality we all desire in our buildings, whether we attain it or not, *Reposé*—a quality we find alike in buildings so dis-

similar as the exterior of St. Paul's and the interior of Westminster Abbey, in St. George's Hall, and even in that ornate river front of the Houses of Parliament. It is the result of good proportion, arrived at by mature knowledge, and guided by a true artistic sense: it is entirely independent of styles, it combines simplicity without baldness and richness under control. It is a quality that can be felt, and, as Wren says, "aims at eternity."

Sir Lawrence Alma-Tadema, R.A., F.S.A., Honorary Fellow, in proposing a hearty vote of thanks to the President for his admirable address, said they had been listening to an address which was full of interest for the Institute, and, consequently, for the profession it represented. Their art was second to none, and it would always be the glory of England, if only for the beautiful cathedrals. The address was full of practical affairs—such, for instance, as the question of competitions and the question of education. In regard to education, apprenticeship had been largely done away with, to the loss of the nation, and he advised them not to do away with apprenticeship for architects. Let students study in the schools of the day, by all means, but let them have their years of apprenticeship in an office, where they could learn a great deal that could not be learnt elsewhere, and where they profited by the experience of those who had preceded them. Apprenticeship had been done away with to a large extent in the art of which he was the humble servant. There was a time when the Van Dycks and Raphaels passed through an apprenticeship, and they learnt from their masters how pictures were made. Nowadays a young man was sent to the Academy to learn how to paint, and there he had to listen to some lectures on anatomy, architecture, &c., and then he was sent into the world to make pictures, although he often did not know what a picture was. He (the speaker) was specially fortunate in having the knack of perspective, and his master let him work on his pictures. That was a great thing for him, and he profited by it greatly. The question of education had another side to it, which had a great influence upon the art of the full-grown man—for the artist was never full grown; he referred to travelling. He was convinced that it was dangerous for a young man to travel. When he was a student in Antwerp he received an offer from a friend of a sum of money for the purpose of travel, but he refused to go and remained at home. The best artists of past times did not travel. He thought architects would be much more likely to produce the new style, or the national style, if they remained a little more at home, for there was plenty of splendid architecture in the country to study. As to the new Westminster Cathedral, its architect would never be forgotten as long as the building lasted. There had been a reference in the address to the Architects' Benevolent Society, and the statement was made that many members of the Institute did not subscribe. He was one of the culprits, and if they would allow him he would become a subscriber and ask others to follow his example. [Sir L. Alma-Tadema then signed his name as a subscriber to the Architects' Benevolent Society.]

Mr. J. Macvicar Anderson, Past President, in seconding the vote of thanks, said he was sure they would all join the President in congratulating the late President on the honour and dignity that had been conferred upon him. In saying that, he also wished to go one step further and congratulate their new President on the eminent position he deservedly occupied. He had more than once expressed his opinion of what the ideal architect should be, i.e., primarily and before all things an artist; secondly, and necessarily, a scientist; and thirdly, and necessarily, a man of business. Those who knew Mr. Webb and his work must be convinced that he possesses those qualifications in an eminent degree, and he congratulated the Institute on having him as their President. As to the satisfactory increase of the membership, they must remember not merely those who had joined, but that sadder consideration, i.e., those they had lost, and when they did so, the increase in membership was very satisfactory. The alliance of the Edinburgh Architectural Association was a matter for congratulation, and the result, he believed, would be satisfactory to both societies. The President had proposed to have one or two smoking "at homes" and he (the speaker) thought he would possibly be sup-

ported in that proposal. As to the funds of the Institute, it was gratifying to hear that they were in such a satisfactory condition. The President had referred several times to "ten years ago," which was the time when he (the speaker) had the honour of being President, and he remembered suggesting an improvement in the management of the Journal and Proceedings, which he then thought would save the Institute 500*l.* a year. He had had nothing to do with the management of the Institute in recent years, and he did not know what the actual result had been, but he hoped it formed part of the diminution of expenditure which had taken place. As to the question of premises, he agreed that the present premises suited very well in many respects, and he did not think it would be wise to press forward the matter very much. The time might come when they would be compelled to get other premises, but he thought the matter might be left to develop itself. Possibly they might ultimately get what they wanted in their present premises, and it would be admitted that the situation could scarcely be improved upon. As to examinations, ten years ago it was a subject which filled their minds with considerable anxiety, for then they were considering the question of subjecting Fellows to the same ordeal as that through which Associates had had to pass for the previous ten years. That they decided to do and to elect Fellows only through the class of Associates. It was satisfactory to see so many men coming forward now for examination, for it was a subject which had been much misunderstood. As they knew, a memorial was presented to them, entitled "Architecture: a Profession or an Art?" Architecture was an art and a profession. There would never be agreement on the subject of competitions. He had always regarded them as almost unmitigated evils. As to the Architects' Benevolent Society, the figures the President quoted were remarkable. Architects were a poor lot taken all round, but there were those who could afford an annual subscription to so deserving a society who did not give it. Sir Alma-Tadema's example was a good one. As to the improvement of London, they must all wish that Sir Christopher Wren's splendid ideas had been carried out, for then London would indeed have been a city to be proud of, instead of a city of what might be called narrow lanes rather than fine streets. A good deal had been done towards the improvement of the city by widening old streets and forming new; but opportunities were sometimes lost of doing something fine. One such opportunity was in regard to the National Gallery site. He always thought that a grand improvement would be made by widening Whitehall so that the National Gallery and Nelson's Monument would have been central to Whitehall, but the question of cost prevented the idea being carried out. They must all congratulate themselves upon the fact that the latest idea of the London County Council to erect a new County Hall on the site of Adelphi-terrace and to sweep away all the characteristic work of the Adams, whose work all architects appreciated, had for the present fallen to the ground. They owed something to Mr. Statham for that result for the way he had protested against the proposal. He hoped the scheme would never be brought forward again.

Sir L. Alma-Tadema then put the vote of thanks to the meeting, and it was carried with considerable enthusiasm.

The Chairman, in briefly replying, said the ambition of most architects would be to receive some day the honest appreciation for their work from such a gathering as he saw before him that night.

The meeting then terminated.

The next meeting will be held on November 17, when Mr. F. C. Penrose will read a paper on "The Drawing of the Ionic Volute." A note will also be contributed by Dr. A. S. Murray on "A Fragment of the Parthenon Frieze."

WESTERN CONGREGATIONAL COLLEGE, BRISTOL.—A building fund has been established for the erection of a new college in place of the present temporary premises. The cost of the project is estimated at from 15,000*l.* to 20,000*l.*

APPOINTMENT OF SANITARY OFFICERS.—The Local Government Board has sanctioned the appointment of the following sanitary inspectors: Mr. G. A. Hoskins, sanitary inspector in Bermondsey; Mr. G. J. Bridel, sanitary inspector in Greenwich.

THE HELLENIC SOCIETY.

At the meeting of the Hellenic Society on Tuesday last, at the Society of Antiquaries' rooms, an interesting and important paper was read by Mr. Jay Hambidge on "The Natural Basis of Form in Greek Art, with especial reference to the Parthenon." The paper was really an attempt to formulate a new theory in regard to the geometric basis of proportion in Greek buildings. The paper can only be rightly and fully judged of when it comes to be printed in *extenso* in the Society's Transactions; but the following *résumé* gives an idea of its main argument:—

An examination of the manner in which the disposition of the elements of form in symmetrical natural objects takes place seems to justify the presumption that it is governed by definite principles. In a flower, for example, where the different parts are disposed about a central point, there is a certain simple series of proportions involved which may be expressed by circles, the length of whose radii is determined by these proportions. In a crystal, as an example of regular form from inorganic Nature, the symmetrical disposition of its planes, angles, and intercepts about its centre involves the same proportions, which may be expressed graphically by circles in the same manner as in the example of the flower.

An analysis of the best examples of Greek architecture and decoration has been made in which these simple proportions have been used as a basis for the investigation. The results of this analysis are so extraordinary that it would seem that the Greek architect and artist, consciously or unconsciously, employed the same simple proportions, which have been observed in natural symmetrical form, to determine the curves, symmetry, the due relation of the parts to the whole, and the general simplicity and harmony of such buildings as the Parthenon, the Erechtheion, the Propylæa, the choric monument of Lycrates, the temple at Bassae, the temple of the Winged Victory on the Acropolis, and other buildings of the best period of the nation's art development. The employment of these simple proportions would seem to explain how the Greek decorative artist could refine the curvature and symmetry of such ornamental motifs as the spiral of the Ionic volute, the familiar spiral and rosette of the stela, the honeysuckle ornament, the egg and dart, the tongue and groove mouldings, the bead moulding, and the different types of the meander. Wherever precision and subtlety of curvature combined with refinement of symmetry occur in the classical masterpieces of formal art, there is a most complete agreement with the proportions to be found in the regular forms of Nature.

The graphic representation of these simple proportions is made in the following manner:—A series of concentric circles is described whose radii or diameters are in a binary relationship, i.e., the diameter of the first circle is the radius of the circle next in size, and so on (fig. 1).

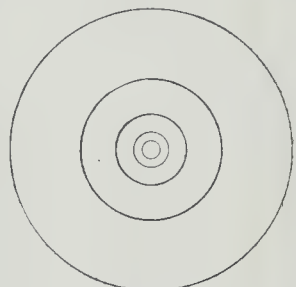


Fig. 1.

In any one of the circles so described, the figures which compose the regular polyhedra—the equilateral triangle, the square, and the regular pentagon—are inscribed. A side of each of these figures is used as a radius for describing other circles concentrically with the binary circles. The circles obtained from these figures in this manner are termed "derived circles," and it will be noticed that their circumferences fall within the space lying between

the circle from which they are derived and the next binary (fig. 2).

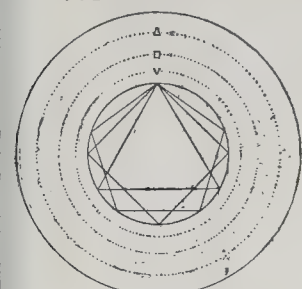




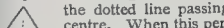


Fig. 2.

For the sake of convenience in explaining how circles described upon these radii determine the disposition of the elements of symmetrical and proportional form, the following notation is used:—

- For the binary circles, the symbol 
- For the circle derived from the side of an equilateral triangle... 
- For the circle derived from the side of a square... 
- For the circle derived from the side of a regular pentagon... 

From the equilateral triangle one other circle is obtained whose radius is the distance from the apex of the triangle to its base, as shown by the dotted line passing through its centre. When this perpendicular of the triangle is used its symbol is 

In the course of a short discussion which followed, Mr. Penrose, while highly appreciating the thought and research displayed in the paper, referred to the system of Mr. Watkiss Lloyd for explaining the harmonic proportion in Greek buildings, as being more simple and in his opinion furnishing a sufficient explanation of the facts.

Mr. Statham, while entirely concurring as to the general value and interest of the paper, said he had observed that those who set forth geometrical schemes for ancient buildings were rather apt to emphasise such lines in the buildings as coincided with the theory. Mr. Hambidge had referred to the superficial area bounded by the middle step of the Parthenon, as giving proportions exactly in accordance with his theory. But why the middle step, which was the least conspicuous? An architect setting out the proportions of the plan on a geometric basis would surely rather look to the line of the upper step, as the most prominent, and the immediate base of the architectural design.

THE ARCHITECTURAL ASSOCIATION CONVERSAZIONE.

THE annual conversazione of the Architectural Association was held for the second year in succession at the Galleries of the Royal Painters in Water Colours, on Friday last week.

Over 600 members and friends were received by the President, Mr. Henry T. Hare, and Mrs. Hare, and during the evening many old acquaintances were doubtless renewed, and fresh ones commenced.

Although these functions belong to the social side of the Association's work, the more serious part is not forgotten, and interesting screens of students' drawings and some excellent photographs taken by members of the Camera Club were exhibited.

Those showing the work of the Day school during the past session were perhaps a surprise to many who had not hitherto had an opportunity of examining the progress made under Mr. A. T. Bolton's direction, while the School of Design drawings and the work of the water colour class under Mr. P. L. Forbes clearly showed that the standard of work and draughtsmanship is steadily rising.

A double purpose is fulfilled by these meetings. The all important educational work is brought before the notice of those interested in the welfare of the Association, and the social side, by which so many old friends are enabled to keep in touch and maintain its *esprit de corps*, which alone makes the real work possible, is still further strengthened and developed.

The entertainment provided by Mr. Chester, consisting of songs, stories, and sleight-of-hand tricks, contributed to the general success of the evening.

THE INSTITUTE OF BUILDERS:

ANNUAL DINNER.

THE annual dinner of the Institute of Builders was held on Thursday last week in the "Walnut Rooms" of the Grand Hotel, Charing Cross. Mr. W. F. King, President, occupied the chair, supported by Mr. Aston Webb, A.R.A., President of the Royal Institute of British Architects; Mr. H. T. Hare, President of the Architectural Association; Mr. Arthur Vernon, President of the Surveyors' Institution; Mr. B. I. Greenwood, President of the National Education of Master Builders; Mr. Walter Smith, Master of the Carpenters' Company; Sir Henry Trueman Wood, Col. Stanley G. Bird, V.D., C.B.; Professor T. Roger Smith, Mr. E. White, L.C.C., and Messrs. H. A. Bartlett, J. Bell, J.P., J. Carmichael, F. J. Dove, Basil P. Ellis, J. S. G. Gibson, F. T. W. Goldsmith, J. Greenwood, F. Hardcastle, J. A. S. Hassall, Woodman Hill, H. F. Higgs, H. Holloway, W. C. Jones, C. E. King, W. J. Locke, H. V. Lanchester, F. May, F. Millar, R. Neill, J.P., W. A. Pite, J. Randall, E. R. Robson, W. Sapcote, W. Shepherd, Silvanus Trevail, A. W. Turnbull, C. Wall, W. F. Wallis, and others.

The loyal and patriotic toasts having been honoured (Mr. W. Sapcote suitably proposing "The Imperial Forces" and Col. Stanley Bird responding).

Mr. H. T. Hare proposed the toast of the evening, "The Institute of Builders." He said there was no body of men who entertained greater sympathy for builders than architects. One was really the complement of the other; one profession could not exist without the assistance of the other. It would be impossible in these days, as in olden times, for the architect to carry out his own designs, and it would be equally impossible for the builder to execute important works with any chance of success. The tendency of the present time was towards combination and union—rightly so, for union gave strength. The artisan had combined and endeavoured, as he was right in doing, to obtain for himself the best conditions he could, but in doing so he often trenchanted upon the rights and privileges of the employer. In order to resist what ultimately became an unreasonable demand, it was necessary for the employer to combine to protect his interests. The nearer masters could approach the strength of the workmen's unions the nearer would they approach to a just equilibrium between the two parties. The architect fully realised how important it was that the interests of the builder, the workman, and the employer should be equitably adjusted, because in so far as that was effected the smoothness and the absence of friction in work was assured. One frequently heard remarks made as to the good old times, and the work which is now done was often unfavourably compared with the good work which used to be done. That, to a great extent, was very unjust; his experience was that the best work done now is immeasurably better than the work which was done in the past.

The reason for a great deal of the inferior work carried out at the present time was because people were not prepared to pay for the very best work. People tried to get a little more—and in many cases a great deal more—than they had a right to expect for the money they were prepared to spend. Any one prepared to pay a better price could get better work done to-day than was done in the past. There were many buildings erected to-day which were better than the best ancient work.

The Chairman, in response, said the Institute of Builders was the successor of the London Builders' Society, and was incorporated in 1884 as the representative Institute of Builders, not in London only, but throughout the United Kingdom. The objects for which the Institute was incorporated were,

amongst others, the adoption of equitable forms of contract, the encouragement of technical education, leaving such questions as the rates of wages and matters affecting trades unions in London to be dealt with by the London Master Builders' Association. The first President of the Institute of Builders was Mr. Stanley Bird, and without forgetting the great men who were associated with him at the time, it was not too much to say that to Mr. Stanley Bird was chiefly due the existence of the Institute. One matter to which the Institute had given much attention was the issue of a standard form of building contract which should be fair and acceptable to architects and builders alike. Such a form was in use from 1870 to 1886, and in the latter year negotiations were begun between the Royal Institute of British Architects and the Institute of Builders, with the view of arranging a new form, which should be more adapted to modern requirements. No agreement was arrived at until 1900, when the form was drawn up with which they were all acquainted, and which was, he thought, on the whole, a very good form indeed. He did not say it was an ideal form, and in many points it was a compromise between conflicting opinions, but as it was, it was adopted by the general meeting of the Institute of Builders, and was recommended by the Council of the Royal Institute of British Architects for adoption at the general meeting of that body. That meeting, however, refused to accept the form, chiefly, he was given to understand, on account of opposition by country architects to the inclusion of clause 16 in the arbitration clause. The effect of excluding clause 16, of course, was that a builder could raise no claim before an arbitrator for any expense he may have been put to by being directed to use materials of greater value than those provided in the specification. The Institute of Builders objected to such a provision, especially as it took away a right of appeal to arbitration which existed in the old contract, as such questions could be raised on the final certificate. However, the Institute of Builders offered to meet the difficulty by accepting the exclusion of Clause 16 if these words were added:—

"Provided always that if the contractor claims that by complying with such order he has been put to increased cost beyond the cost properly attending the carrying out of the contract according to the true intent and meaning of the D. and S., he shall be entitled to recover from the employer such an amount for increased cost as the arbitrator, in case of difference shall, on the completion of the works, decide to be fair and reasonable."

The Royal Institute of British Architects refused this suggestion, and declined to discuss the matter any further. The Royal Institute of British Architects and the Institute of Builders then each issued the form of contract which had been so far agreed, except that the latter was verbatim, and the former excluded Clause 16 from arbitration. The Royal Institute of British Architects treated them with great courtesy throughout, and he thought they were as much disappointed as the Institute of Builders at the barren result. On the controversy as to Clause 16, a criticism was made that builders evidently wanted to be masters of the building instead of the architect. In answer to that he might say they did not suggest in any way to interfere with the power of the architect to decide what materials shall or shall not be used in his work. What they wanted to secure was, that if, by the architect's directions, materials are used which are of greater value than those provided in the drawings and specification, then the builder can, in case of dispute, refer his claim for such increased cost to an arbitrator. There are many cases in which, with the best of intentions, a great difference of opinion might arise. For instance—a building was specified to be faced with salt glazed bricks; the employer got hold of a sample of brown enamelled bricks, and on the builder asking for extra if those were used, the architect said bricks such as the sample were intended and must be used, and there should be no extra. Now with Clause 16 specially exempted from arbitration, where was the builder? The claim could not go to the arbitrator—the employer saw to that. The architect had decided hastily, and so was caught, as it were, between the devil of his own words and the deep sea of the contract, and the builder was left. That was the sort of thing they wished to guard against by making Clause 16 subject to the provisions of the arbitration clause. Now, the reason why

they wanted an agreement in the form of contract was that unity was strength; the forms issued separately by the Royal Institute of British Architects and the Institute of Builders did not either of them meet with general acceptance, but a form issued with the approval of both architects and builders would be very generally adopted not only by individual employers, but by public bodies, and would gradually supersede the varied and in many cases objectionable forms now in use. He was glad to hear that the National Federation of Builders had now taken this matter up. There was also the proposal of the National Federation to add optional clauses to the builders' form of contract which would apply in cases where the quantities are made part of the contract. This arrangement did not obtain generally in London, but was frequent in the provinces, and the gross injustice done in the case of Ford v. Bemoise showed how very necessary it was to have a reliable form of contract which should include the quantities. As to technical education, this had been taken up most efficiently by various societies, but there was one branch which, as far as he knew, had not received much attention, and that was the builder's clerk. He thought they might with advantage establish some kind of examination and certificate for this most valuable and necessary body of men. Considerable objection had been raised to an innovation made by some public bodies of requiring fully-priced bills of quantities to be sent unsealed with builders' tenders, especially as the quantities are tabulated and the prices compared in detail. He was in communication with Mr. Lough, the President of the Association, on the subject. The work of the Institute had progressed steadily during the year; seventeen new members had been enrolled, and they had lost one by death—Mr. Alfred Bush, who had been a member since 1889. Thanks were due to the members of the Council, with its Committees, who had given much time and attention to the affairs of the Institute, and especially to Messrs. Shepherd, Dove, and C. Wall, the Sub-Committee on Conditions of Contract. In Mr. Costigan they had a most able and indefatigable Secretary. The future of the Institute was with the young men, and he appealed to them to take up their share of the burden and carry forward the good work of the Institute.

Mr. William Shepherd then proposed the toast of "Architects and Surveyors," coupled with the names of Mr. Aston Webb, A.R.A., and Mr. Arthur Vernon. The architectural works carried out in recent times had been as important and as well-adapted to the circumstances of the times as at any period of the world's history. As to the conditions of contract, the negotiations referred to by the Chairman were carried on with every endeavour by both sides to reconcile the conflicting interests, and there was an entire absence of friction. He believed that had the general body of the Institute of Architects left the matter in the hands of their Council a very different result would have been arrived at. Having regard to modern methods of building business, they regarded surveyors as an essential element in those affairs.

Mr. Aston Webb, A.R.A., in responding for the architects, said it was to be regretted that at the present time a form of contract had not been arranged between architects and builders; but when he heard from their Chairman that the main object for which the Institute of Builders existed was to arrive at a complete form of conditions of contract, he felt he should be sorry if the Institute of Architects should interfere with the occupation of the Institute of Builders. Seriously, he could say on behalf of the Institute of Architects that the long negotiations which had taken place left no ill-feeling behind; there was no friction. For the moment they must regret that they had not completed their task, but on the other hand he thought they might say that a great deal had been done towards a complete form of contract, for with the exception of one or two points—important points, it was true—there was a large number of clauses on which they were all now agreed. The Council of the Institute of Architects thought it was inopportune at this moment to bring this matter again before the general body of members. Speaking for himself, he hoped they might be able to arrive at some understanding in the future, as reasonable men. He would like to say a word or two on the ABC of building—the architect, the

builder, and the client. No properly regulated building could be put up without those three. As Mr. Hare had said, architects had tried occasionally to be their own builders, but generally they made a mess of it; builders had often tried to be their own architects, but when he walked through the suburbs of London he confessed he thought they, too, made a mess of it; clients had from time to time tried to be their own architects and builders, and it would be agreed that they always made an egregious mess of it. That showed how dependent they were one on the other. If a building were well designed and conveniently planned, but badly built, it would tumble down; but if, on the other hand, it were badly planned, and built as well as it could be built, it would undoubtedly come down sooner or later. Therefore, in order that a building should be satisfactory to everybody, builders and architects were equally interested in securing a good and perfect building, and the more they knew each other and the more they worked together the more likely would the client be satisfied. On one occasion when he was signing a contract the client said: "Now look here; are you my man or the builder's?" and he had to explain that while it was his duty to watch his client's interests, it was also his duty to represent to the client the builder's side of the matter. In that instance the client saw the force of that, as clients usually did when the matter was put before them in a reasonable way; they saw that an architect should (and did when he did his duty) see fair play on both sides. Clients required three things, *i.e.*, that their building should be well built, quickly built, and as economically built as it could be, and those three requirements architects and builders had to try and meet. If clients were prepared to pay for it, there was not the least difficulty in getting a building well built, and he agreed that buildings were as well built now as they ever were—when they were properly paid for. But, with regard to the two other requirements, that was a much more complicated matter. A building that was quickly built was usually cheaply built—that was to say, it was cheaper to the builder to build it quickly, and no doubt he wished to build it quickly; but the difficulty with him more than the architect was in providing the special materials such as ironwork, terra-cotta, glazed bricks, &c., those difficulties were very great, and were continually on the increase, especially as to the ironwork for which the builder was often compelled to wait a most unreasonable time. Such delay architects and builders would like to avoid, but he did not know how they were to do so. As to the cost of building, the great difficulty was as to labour, and there also architects sympathised with the builder in his difficulties. He was inclined to think that were he a builder he should take this course: he would not consider so much the wages of a man, but he would endeavour to break down the idea that all men must be paid alike. He would endeavour to make a workman realise that if he were a good workman, in the case of a bricklayer, for instance, laid a larger number of bricks than another man, he would be paid more for doing so. He would go with the trade-unions in increasing the wage for work fairly and properly done, but he would fight to the end the trade-unions in the matter of limiting the output. It was not right or just to the men or the client that men should be permitted to waste their time, and encouraged to waste their time, and not to do fair work for their employers.

Mr. Arthur Vernon, in replying for the surveyors, said he hardly knew where surveyors came in in the "A B C" of building as laid down by Mr. Aston Webb. Really the builder's industry was the most ancient of all industries. It might be said that architects were evolved to save the builder's brains when he had too much work to do, and the surveyor was evolved to save his pocket. He used to wonder why Longfellow seemed to be so severe on modern architecture, as he was in his lines:

"In the elder days of Art
Builders wrought with greatest care
Each minute and unseen part
For the Gods see everywhere."

He never understood that until he went to America and saw the log hut and the wooden house of the poet. Then he realised that Longfellow was looking at it from

the American point of view, and was not thinking of the modern European buildings. Many fine buildings were erected nowadays. The business of the modern builder was a laborious one, and he suffered many masters; there was the architect, the employer, the County Councils, and not least the trade union workman.

Mr. B. I. Greenwood then proposed the toast of "The Learned Societies and Technical Institutions," coupled with the name of Sir H. Trueman Wood. He said he was not greatly prepossessed with technical institutes, for he believed that the old system of apprenticeship turned out better workmen than did the technical institutes; but as it was possible that the system of apprenticeship had practically died out before the era of technical institutes, no doubt they came forward to supply the want, and if so, they were to be welcomed. As to the form of contract, when the Institute of Builders issued their own form, after negotiations came to an end between the two Institutes, the National Federation of Builders felt that the subject was far too important to be allowed to drop, and so, with the knowledge of the Institute of Builders, they approached the Institute of Architects with a proposal which, he believed, would meet with the difficulties which exist; and in reply to that, the Institute of Architects had intimated that the present time was not opportune to reopen the matter, but they did not say that the new proposal was not agreeable. He was glad to hear from Mr. Aston Webb that a favourable result might yet be arrived at, and he ventured to hope that the time would soon be opportune. Mr. Webb deprecated the payment of the same wages to workmen irrespective of the result of their work, which meant that Mr. Webb favoured payment by results, or the piecework system. That might sound horrible. If the practice of limiting the output of workmen was to be killed, the only remedy was to allow contractors to pay workmen by the results of their work. It would have to come to that, however horrified people might be at the suggestion now.

Sir H. Trueman Wood, in response, referred to the work done by voluntary scientific and artistic societies—for instance, the Institution of Civil Engineers, which had done so much to raise the status of English engineers, and had been of benefit to the public also. It was the same with other societies and institutions. As ratepayers they felt annoyance at the rapid growth of the rates, but for his part he would welcome an addition in London if the County Council, instead of promoting Bills which had no interest for him, would build a municipal hall suitable for a city like London. He was sorry that the Adelphi scheme had fallen through, and he felt sure the ratepayers would welcome any scheme which would result in the provision of a beautiful and suitable hall in London.

Mr. Henry Holloway then proposed "The Visitors." Speaking of the subject of conditions of contract, he said that, after all, it was the man they had to deal with. With most architects he had to deal with he would just as soon work without conditions of contract at all; it was against a small number of architects they wished to protect themselves.

Mr. Silvanus Trevail, in reply, said there should be mutual reciprocity and confidence between architect and builder and client. If the client confided in his architect and the architect confided in the builder, the result would be the best possible. He had had thirty-one years' experience as an architect, and he had never had to go to law or to arbitration, although he had had a great many difficult questions to deal with. It was possible to get over such difficulties without these onerous forms of contract, some of which he would not sign if he were a builder. He would not put himself in the abject position of doing so. As a Fellow of the Institute of Architects, he was surprised that the conditions proposed by the builders had not been agreed to, but he believed that it would not be long before Clause 16 was agreed to. As to the modern system of tendering, he did not believe in it. No matter what work a man had done, he was put in competition with some one who had no reputation to lose. That was not fair to the man who had made a name for good work. He advocated a selected list from which to select in the case of important works. Small works could be put out to tender.

A musical programme was then gone through.

SANITARY INSTITUTE:

AWARDS MADE AT THE HEALTH EXHIBITION,
MANCHESTER.

The following are some of the awards made at the Health Exhibition recently held at Manchester in connexion with the Sanitary Institute Congress:—

Silver Medal.

British Sanitary Co., Glasgow (self-acting earth-
loset).
Cannon Iron Foundries, Ltd., Deepfields, near
Ilkerton (enamelled cast iron).
J. Defties & Sons, Ltd., Houndsditch, London
(saturated steam disinfecter).
William M. Glover & Sons, Ltd., Warwick (dust
van).
Horsfall Destructor Co., Leeds (Horsfall destruc-
tor).
John Jones, Carlyle Works, Chelsea, London (auto-
matic air-tight manhole cover).
Mather & Platt, Ltd., Salford Iron Works,
Manchester (water-softening apparatus).
Vernon Parker, Westminster, London (Hassall's
improved safety-pipe joint).
Shanks & Co., Ltd., Barrhead, Glasgow (cast iron
porcelain-enamelled bath with quick accessible
waste).
W. Summerscales & Son, Ltd., Keighley (laundry
machinery).

Bronze Medal.

Ames Crosta Sanitary Engineering Co., Ltd.,
Nottingham (Crosta's surface water gully, with
complete double trap. Stoneware conduits for
electric cables).
Butler & Charing Cross, Whitehall, London
(improved ball stoppers).
Chalmers & Co., Redhill (two-wheel dust cart).
Geo. A. Chaddock, Liverpool (reversible locking
window).
Didelon & Co., Rue Laugier, Paris (automatic
discharge regulator for sand filters for water purifi-
cation).
Doulton & Co., Ltd., Lambeth, London (spray
lavatory with self-regulating valve).
J. Duckett & Sons, Ltd., Burnley (flushing tank
and tipper, isolated syphonic latrines).
Ewart & Son, Ltd., Euston-road, London (im-
proved geyser apparatus with fine and dual valve).
William E. Farrar, Birmingham (adjustable
bracket, head rim lavatory basin, lattice gear quick-
opening valve).
Fireproof Plate Wall Co., Ltd., Corporation-
street, Manchester (fireproof partition walls).
Fletcher, Russell, & Co., Warrington ("Hurst"
pipe joint).
H. H. Gibbs, New Brompton, Kent (spiral
drain srapper).
Wm. M. Glover & Sons, Ltd., Warwick (rotary
watering van).
Hard York Non-Slip Stone Co., Halifax (non-slip
materials).
Wm. Harriman & Co., Ltd., Newcastle-on-Tyne
(Ford's stable channel).
George Howden & Sons, Ltd., Hanley (urinals,
white porcelain-enamelled fireclay bath, washtubs
on pedestals).
John Jones, Chelsea, London (connexion for
water-closet basins to soil-pipe, air inlet ventilator
for drains, the "Carlyle" wash-down pedestal
closet).
Frank Nicholson Law, Hollinwood (improved
dry seat).
Loco Drainage Apparatus Co., Ltd., Manchester
(rust pockets).
London Tablet Co., Sydenham, London (non-
absorbent wall and ceiling covering).
Mather & Platt, Ltd., Manchester (feed water
filter, automatic distributing and flushing valves).
Matthews & Yates, Swinton, Manchester (taps
for ventilation).
Mellows & Co., Sheffield (Mellows' "Eclipse"
glazing).
J. Oakes & Co., Alfreton, Derbyshire (glazed
stoneware pipes).
States & Green, Ltd., Halifax (salt glazed manger,
with "Give-and-Take" fastener).
C. W. Outram & Co., Woodville, near Burton-on-
Trent (the "Hassall" watercloset).
E. R. Palmer, Beckenham (ventilating column
fitted with water fan).
Vernon Parker, Victoria-street, Westminster,
London (silica filter for attaching to a domestic
tap, and brickware drainpipes).
Patent Regenerative Furnace Co., Ltd., Coleman-
street, London, E.C. (apparatus for the prevention
of smoke in steam boilers).
Pendleton Sanitary Engineering Co., Pendleton,
Manchester (movable ash-bin with metal cage).
Richard Ravenor, Newbury, Berks (Ravenors,
drain tester).
Sanitary Appliances Syndicate, King William-
street, London, E.C. (non-ball valve cylindrical
store cistern; coin-receiving lock).
Shanks & Co., Ltd., Barrhead, Glasgow (hospital
lavatory).
Slack & Brownlow, Gorton, near Manchester
(germ filters).
Slaratt (the executors of the late Wm.), Clayton,
Manchester (sanitary formaldehyde regenerator).

A. G. Thornton, Deansgate, Manchester (survey-
ing and drawing instruments).
Thos. Henry Tonge, Irlams-o'-th'-Height, Pendle-
ton, Manchester (bakery fittings).
George Barber Wilson, Brierley, York (gully and
trap dredger).

THE SANITARY INSPECTORS' ASSOCIATION:

THE QUESTION OF UNIFICATION.

AN extraordinary general meeting of this Association was held on Saturday at Carpenters' Hall, London-wall. Sir James Crichton Brown presided.

After the transaction of routine business and the election of a number of new members, the newly-elected member of the council (Mr. I. Young) delivered his inaugural address.

In introducing this part of the business of the meeting, Sir James took the opportunity to thank the members for his re-election to the presidency. The office was not, he said, a burden, but a decoration. He had a most pleasant recollection of his office during the past year, and he was sanguine of a pleasurable one to come.

Mr. Young in his address said that if there was one question more than another that he would like to see settled during his year of office it was that of the unification of all sanitary inspectors' associations. The question was, he admitted, surrounded with complexity, but he was satisfied that until that end was achieved the great object for which the Association was formed would, more or less, remain at a standstill. He believed that every member was anxious for it. He congratulated the meeting on the fact that Sir James Crichton Brown had once more accepted the office of President, and would continue the good work in public hygiene done by their first President, Sir Edwin Chadwick. As the Association had been enlightened and dignified by Sir James' presidency, let them prove worthy of it. There could be no doubt that the status of the sanitary inspector had been improved owing to the existence of that Association. Nevertheless, they had not achieved a position which their duties entitled them to. Such security as was enjoyed by medical officers of health should, for instance, be given to the sanitary inspectors. Those in London were somewhat more favourably situated than those in provincial towns. The latter were generally subjected to the condition of annual appointments. What was required also was the establishment of a State department of public health. The time was, he held, past when the question of public health should be left as it is, and cases of non-compliance with the Statute should be heard and determined by a specially arranged bench of justices, some of whose members should have technical knowledge. It might be said that they had the Local Government Board controlling the question of public health; but this Board had duties so voluminous that the demand for the creation of a separate department was justified. Having referred to the sanitary officers' superannuation scheme, which was being promoted for Parliament, Mr. Young touched upon the necessity for the appointment of a small committee to deal with any measure brought before Parliament. This duty at present devolved upon the General Purposes Committee. He advocated the appointment of a Law and Parliamentary Committee to deal with Bills. One thing they ought to strive for was to secure for Sanitary Inspectors the power to serve notices under the Public Health Act for the abatement of a nuisance on their own authority. There were many other matters in which the committee might take action. They must also strive to obtain direct representation on the Sanitary Inspectors' Examining Board. He was also inclined to the idea that they had not availed themselves of the powers they possessed to become an educational authority, and he felt that they should, either alone or in conjunction with another body, institute educational classes. Then, again, he desired to urge that some provision should be made for the Widows and Orphans Fund by means of a fixed yearly subscription.

The President, in opening the discussion, alluded to Professor Koch's recent observations at Berlin on the transmissibility of bovine and human tuberculosis. The Professor was, Sir James noted, a little more guarded than he was at the London Conference of 1901. Dr. Koch's authority was so great that had not a com-

mission been promptly appointed a dangerous doctrine would have been accepted without adequate grounds. The Commission was proceeding with its deliberations, but possibly its conclusions might be anticipated by the researches of Dr. Mocard, Professor Delapine, and Dr. Boyce, which made it almost certain that human tuberculosis was capable of being transferred to animals.

ARCHITECTURAL SOCIETIES.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.

—The annual Report of the Birmingham Architectural Association is accompanied by some very good sketches, by various members, of some of the old buildings visited during the session. The Report mentions that there has been a substantial increase during the past year in the number of members. While recording that the attendance at the meetings has shown a marked improvement, owing no doubt to the better accommodation afforded by the new premises, the Council has still to regret the absence of so many of the senior members from the general meetings, and hope that in the forthcoming session an effort will be made by them to give the lecturers a hearty welcome and to assist in carrying on the discussions which usually follow the lectures. "The lecturers are usually well known, and the subjects they choose are invariably of practical value; they must necessarily expend a considerable amount of time in the preparation, and in coming to Birmingham to give their lectures, and it is due to them that a large proportion of the senior members should be present, to increase the interest in the discussion and add to the success of the meetings. . . . Your council have again found it necessary to forward a protest to the new Housing Committee of the Birmingham Corporation, urging that municipal architectural work should be competed for in open competitions; they received in reply a letter from the chairman promising consideration for the views of the Association when any new building schemes were promoted."

MANCHESTER SOCIETY OF ARCHITECTS.—The Report of the Manchester Society of Architects shows that the present number is 193, as against 182 last year. The proposal to create a Chair of Architecture at Owens College has received much and careful consideration at the hands of the Council, and during the past year several conferences have been held on the subject. The visits arranged by the Education in Architecture Committee for the summer of 1901 were well attended, and some very good sketching work was done by students. The three days' visit to Caudebec, in Normandy, was an altogether delightful experience for the nine members who went. Other sketching visits were paid to Lichfield, Baguley Old Hall and the new hospital near it, and Port Sunlight, near Liverpool. A week-end was spent at Carlmel, with a day at Furness Abbey; and a visit was made to Bury to see the New Art Gallery and Library and other buildings in that town. Since the Report was presented, the summer visits of 1902 have been held, and the attendances again have been fairly good. Whit-week was chosen for another visit to Normandy. Caen was the headquarters, and Bayeux, Lisieux, Norrey, Ouistreham, Langrune, Bieville, Harfleur, and the fine Abbaie d'Ardenne helped to fill the sketch-books of the party. In the Report of the Competitions Committee it is stated that the Committee have formulated a scheme for appointing correspondents in the various towns in the M.S.A. area, as defined by the Royal Institute of British Architects, so that they can be informed early of any proposed competitions, and so get in communication with the promoters.

BOOKS RECEIVED.

THE GEORGIAN PERIOD: MEASURED DRAWINGS OF COLONIAL WORK. Part XI. (Batsford.)
REPORT OF DEPARTMENT OF PUBLIC WORKS, NEW SOUTH WALES. (W. A. Gullick: Sydney.)
FACTS ON FIRE PREVENTION: The results of Fire Tests conducted by the British Fire Prevention Committee. Edited by Edwin O. Sachs, architect. (B. T. Batsford.)
ARCHITECTURE, INDUSTRY, AND WEALTH: Collected Papers by William Morris. (Longmans, Green, & Co. 6s.)
WOOD: A Manual of the Natural History and Industrial Applications of the Timbers of Commerce. By G. S. Boulger, F.L.S., &c. (Edward Arnold.)

Illustrations.

LIVERPOOL CATHEDRAL: A SKETCH DESIGN.

THIS is the design which was numbered 38 in the Liverpool Cathedral Competition, and to which we drew attention in the review of the exhibited drawings in our issue of July 26, as a design of unusual power and originality. It turns out to be by Mr. Leonard Stokes, under whose name it is now published.

The design must, of course, be regarded as a sketch rather than a finished work. In regard to the motives which governed it, Mr. Stokes says (and we quite agree with him) that he felt that the quarry side, and not the street side, was the real front of the cathedral; it faces open ground with a sudden and nearly precipitous drop, affording great opportunity for architectural effect; and therefore he considered the exterior of the building mostly from this side. In the interior he has endeavoured to get a wide nave for crowds of worshippers, and the triforium he thought would make a good local museum for objects of ecclesiastical interest, without interfering in any way with the portion of the building devoted to worship. (In fact, in one or two of our cathedrals the triforium actually is to some extent used in this way.)

The twin towers, it was thought, would have a fine effect from the river, as the site stands so high. The plan, however, was the important part in the designer's mind, the elevations not having been thoroughly worked out for want of time. As it stands, however, we think most of our readers will admit that it is a fine and bold conception, with considerable novelty of idea.

A HOUSE IN OXFORDSHIRE.

THIS is a drawing which was exhibited at the last Royal Academy exhibition. The architect, Mr. C. Maresco Pearce, writes in regard to it—

"I have kept pretty much to the traditional type of the smaller Elizabethan manor house. The materials are such as are found in the western part of Oxfordshire, i.e., squared rubble walling, ashlar for the bays and dressings, and Stonesfield slates on the roofs."

MONUMENT TO THE LATE J. L. PEARSON: WESTMINSTER ABBEY.

THIS monument which has been placed in the centre of the nave floor in Westminster Abbey, was designed by Mr. W. D. Caröe, and the drawing from which the illustration is taken was exhibited at the last Royal Academy exhibition.

The monument has been executed in cast bronze laid in a bed of Derbyshire fossil. It was considered desirable to obtain a higher relief in the metal than engraving would have provided.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday afternoon in the County Hall, Spring-gardens, Sir J. McDougall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Hackney Borough Council 1,500*l.* for granite paving; Camberwell Borough Council 3,700*l.* for paving works; Chelsea Guardians 600*l.* for additions to casual wards; Metropolitan Asylums District 253,000*l.* for various purposes; and Westminster City Council sanction to a loan of 92,500*l.* for street improvement.

Receiving Houses for Lunatics.—The Asylums Committee reminded the Council that in July, 1899, they approved the principle of the establishment of receiving houses for lunatics in the county of London. The Committee now submitted a scheme for providing four such houses in the north, south, east, and west, each capable of containing some 300 patients and the necessary staff. These receiving houses would entirely supersede the lunatic wards now attached to the workhouse infirmaries, and no stigma of pauperism would attach to patients discharged from them. An ambulance system would be established for bringing and removing patients. The Committee recom-

mended that steps be taken to obtain Parliamentary powers next Session.

The Finance Committee pointed out that the full scheme involved an expenditure of 500,000*l.*, and suggested that the Council should proceed experimentally, one receiving house being completed before another was commenced. Apart from the consideration that an undertaking of such magnitude should be proceeded with cautiously, the Committee felt compelled to again remind the Council of the many schemes, involving large outlays, to which it was already committed.

After some discussion, the Committee's recommendation was adopted.

The Fire in Queen Victoria-street.—The Fire Brigade Committee submitted an adjourned Report on the fatal fire which took place in Queen Victoria-street last June. The Committee pointed out that the rescue of many persons from a height by means of movable fire-escapes must necessarily be a slow process, and could not be compared as regards efficiency with the protection afforded by structural fire-escapes. Reference was made to the unsatisfactory condition of the Factory Act, and to the desirability of making the London Building Act retrospective as regards the provision of means of escape from high buildings.

Alderman Alliston asked whether the question of the enlargement of the Walling-street station or the provision of a central fire station in the City, at or near Walling-street, was under consideration.

Mr. Allen, Chairman of the Committee, replied that the subject was at present before the Committee.

Mr. Austin moved that the Report be not received, on the ground that it was incomplete, especially as it contained no recommendation with regard to the men who were in charge of the fire-escape. He thought there was a want of alacrity and alertness on their part.

Mr. Sankey seconded the amendment. He regarded the Report as lamentably insufficient. Since the fire the Committee had been purchasing several long ladders, showing clearly that it was possible for them to be used in the City. The question of the inadequacy of the Walling-street station had been before the Committee in 1897, when the chief officer made strong recommendations with regard to it, but they did not appear to have been acted upon. He claimed that the City should receive adequate consideration from the Fire Brigade Committee.

Colonel Rotton declared that the Committee were constantly considering the City. They were always considering schemes of improvement, but they deprecated panic legislation.

Captain Hemphill argued that no amount of expenditure on the fire brigade and no improvement of appliances would guarantee the safety of life and limb unless the Factory Act was so amended as to compel the owners of all properties to provide proper means of escape from fire.

Mr. Howell Williams pointed out that in their Report the Committee aimed chiefly at exonerating themselves. From a recent visit to New York he was persuaded that in fire appliances, and especially jumping-sheets, that city was far ahead of London.

Mr. Gilbert declared that all new appliances were considered by the Committee. He complained of recent newspaper reports and comments on the conduct of Captain Wells.

Mr. Allen defended the action of the brigade at the fire, and, after further debate, the amendment was negatived.

The Report was then received.

Culs de Sac in the City of London.—The same Committee reported as follows:—

"The Council may remember that in our Reports, dated June 10 and July 15, 1902, on the large fire which occurred in the Barbican on the night of April 21, 1902, special allusion was made to the fact that the Brigade was placed at a disadvantage in coping with the conflagration inasmuch as it was unable to place men and appliances in New Zealand-avenue, a cul de sac, the entrance to which was opposite the premises in which the fire started. In our second Report we stated that we shared the Chief Officer's opinion that the existence in the City of London of many culs de sac, of which New Zealand-avenue is by no means the worst example, constituted a grave source of danger, and we mentioned that we were consulting the Building Act Committee generally on the subject. That Committee have now informed us that New Zealand-avenue was laid out in 1886 without application to, or sanction from, the then existing Metropolitan Board of Works, and that the by-law, dated May 1, 1887, as to the

formation of new streets in the Metropolis was not complied with in respect of New Zealand-avenue. The Building Act Committee further state that, having regard to the provision of Section 9(4) of the London Building Act, 1894, the Council would not now be entitled to refuse its consent to the formation of a street within the City on the ground that it would constitute a cul de sac. No list of the culs de sac in the City appears to be in the Council's possession, and the preparation of a correct and complete list would necessitate a careful survey, but from an examination of the Ordnance sheet there would appear to be at least forty-five such places within the City. Although the Council has no statutory authority to deal with the matter, we consider it advisable to report these facts for the Council's information."

Vauxhall Bridge.—The Bridges Committee submitted a further Report recommending that the resolution of 1898, directing that the new Vauxhall Bridge should be a granite bridge backed with concrete, be rescinded, and that a steel bridge be substituted. An estimate of 170,000*l.* for the superstructure was presented, making the total cost about 350,000*l.*

Consideration of the Report was deferred.

Theatres, &c.—On the recommendation of the Theatres and Music Halls Committee, the following applications were agreed to:—

Balham Empire.—Alterations, submitted by Mr. H. Percival for Mr. A. W. Deer.

London Exhibitions.—Arrangements for a boating exhibition, submitted by Mr. A. O. Collard.

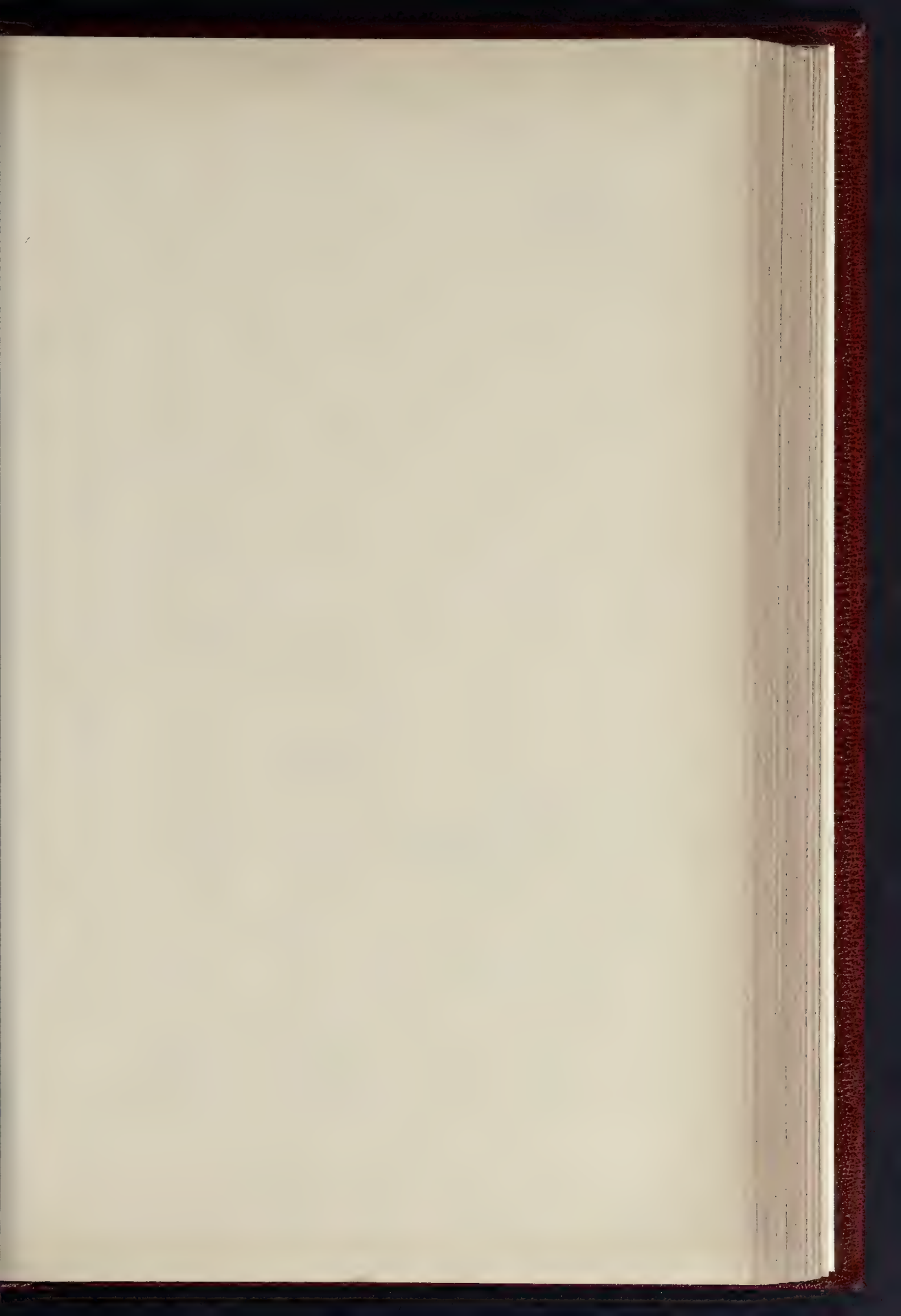
Olympia.—Arrangements for Wild West show Messrs. Bull & Bull.

Amendment of London Building Act, 1894.—The Building Act Committee submitted the following Report:—

"It will be within the recollection of the Council that in consequence of the disastrous fire at No. 67, Queen Victoria-street, the Home Secretary was asked in Parliament whether he intended to take steps by legislation or otherwise to secure the safety from fire of persons employed on the upper floors of high buildings. It will also be recollecting that the verdict of the coroner's jury at the inquest held in connection with this fire contained a rider to the effect that the London Building Act, 1894, should be made retrospective.

During the summer recess a letter was received from the Home Secretary stating that in view of the facts disclosed in the inquiry above referred to, he thought that the question of further legislation on the subject of safety from fire in high buildings required early consideration; that in his opinion the matter could not be adequately dealt with by a mere extension of the powers of the Council under the Factory and Workshop Act, 1901, and he was therefore disposed to think that any new legislation should take the form of an amendment of the London Building Act, 1894; that as this Act was a local Act any amendment of its provisions would naturally be by a private Bill promoted by the Council, and that he would be glad to assist in any proposal that might be made for that purpose at the next Session so far as it might be possible for him to do so. In order to ascertain what measure of support the Council might expect to receive from the Government if he decided to introduce a bill to amend the Building Act, our Chairman and Mr. Goddard Clark had an interview with the Home Secretary, who has since informed the Council that he would have no objection to the extension of existing buildings of the clauses with respect to means of escape from fire, under proper conditions and in suitable cases, provided adequate provision were made for allowing the owners or occupiers of existing buildings to appeal to an arbitrator or to some other tribunal; and, further, that he was of opinion that provision should be made to prevent any overlapping of the requirements of the London Building Act as proposed to be amended and those of the Factory and Workshop Act.

We would point out that we have for some time past had in view the question of amending the London Building Act generally, as the experience gained by eight years' administration has shown us several points which need amendment. We had not, however, intended proceeding with the question this year, when the letter from the Home Secretary received in August last, was considered by us after the recess, there was evidently not time to introduce a Bill in the next Session of Parliament dealing with the general question, bristling as it does with technical difficulties of all sorts. It appeared to us, however, that the Council would desire to avail itself of the support promised by the Home



LIVERPOOL CATHEDRAL

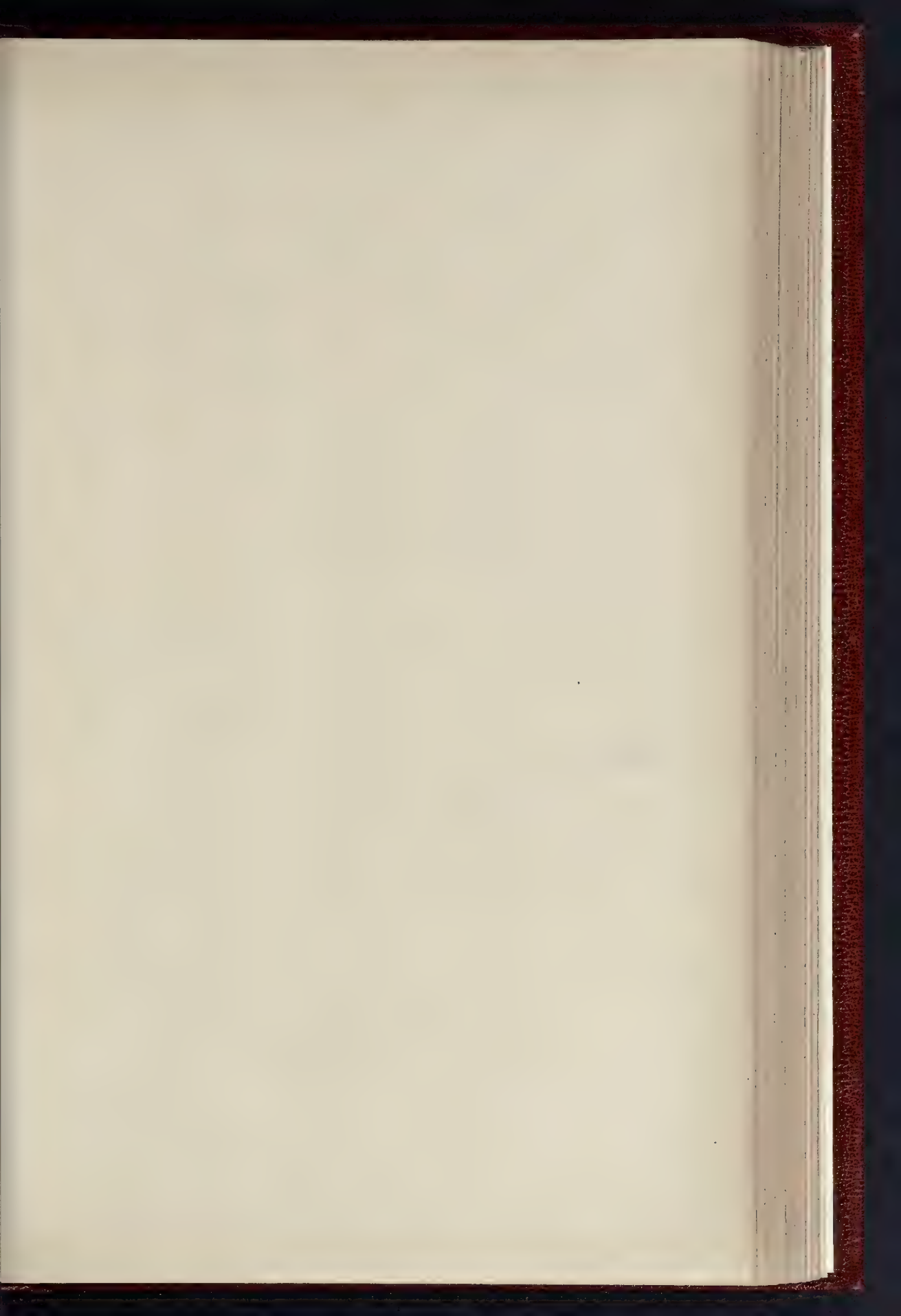
A Sketch Design

View from
the North

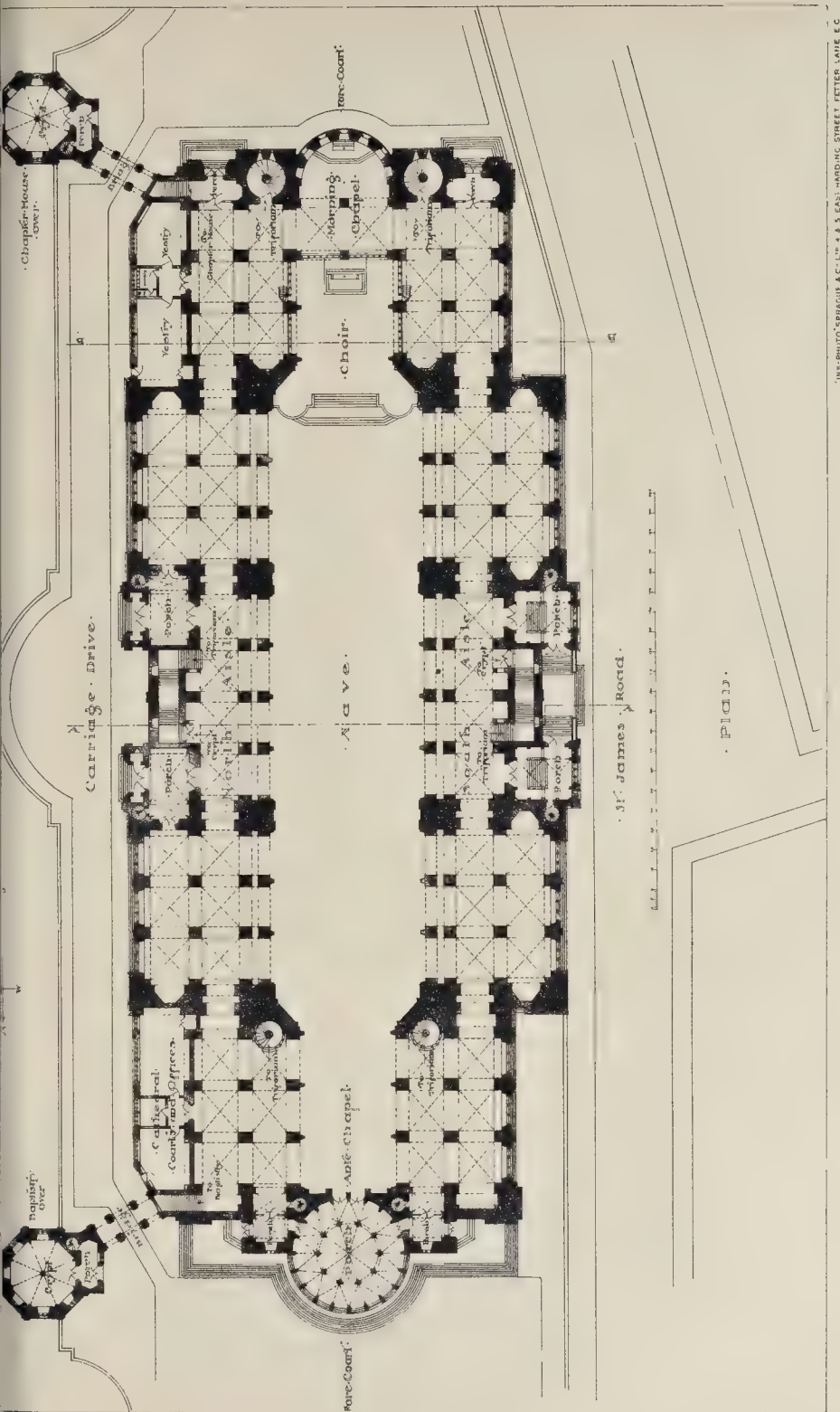




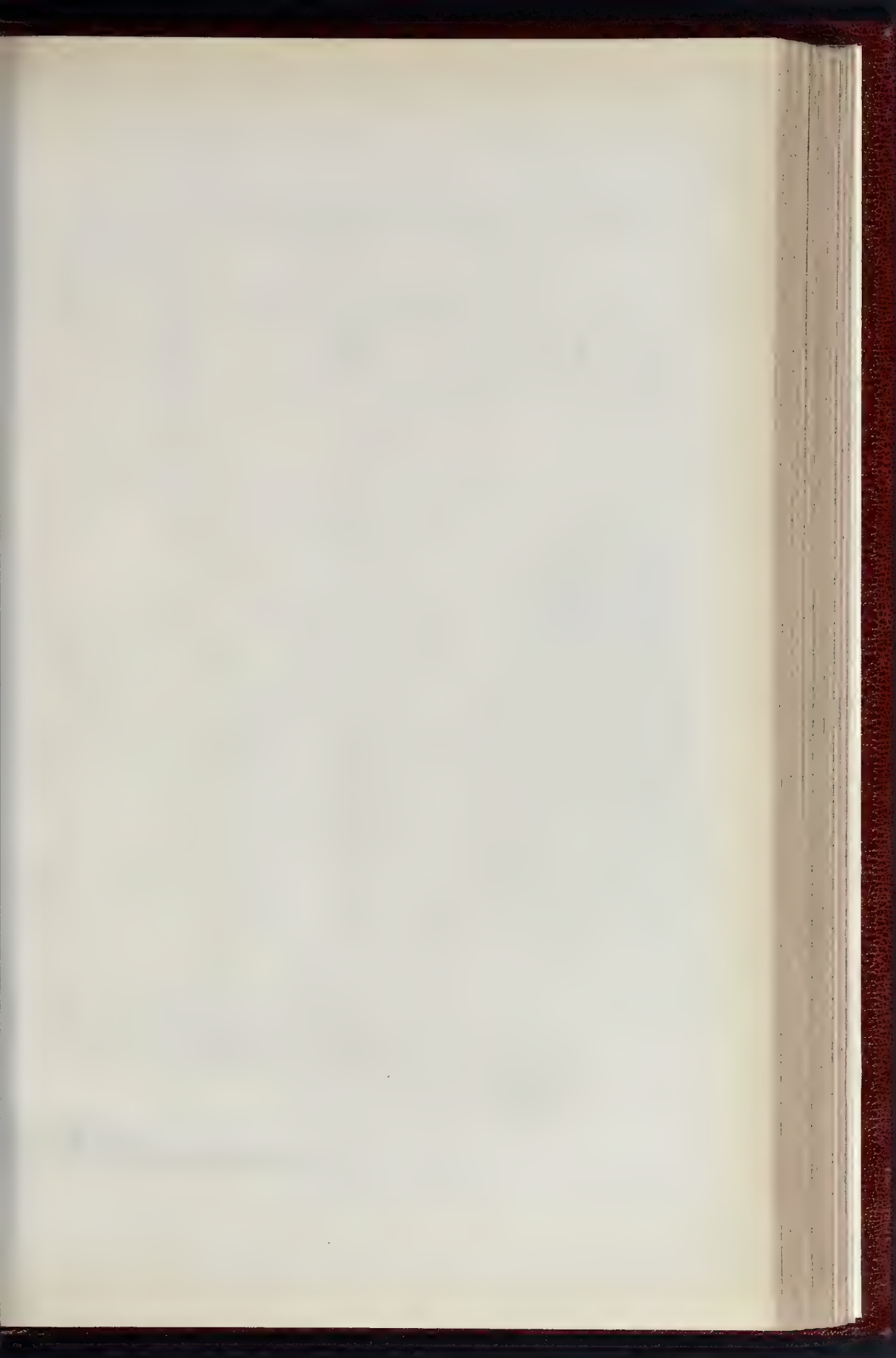
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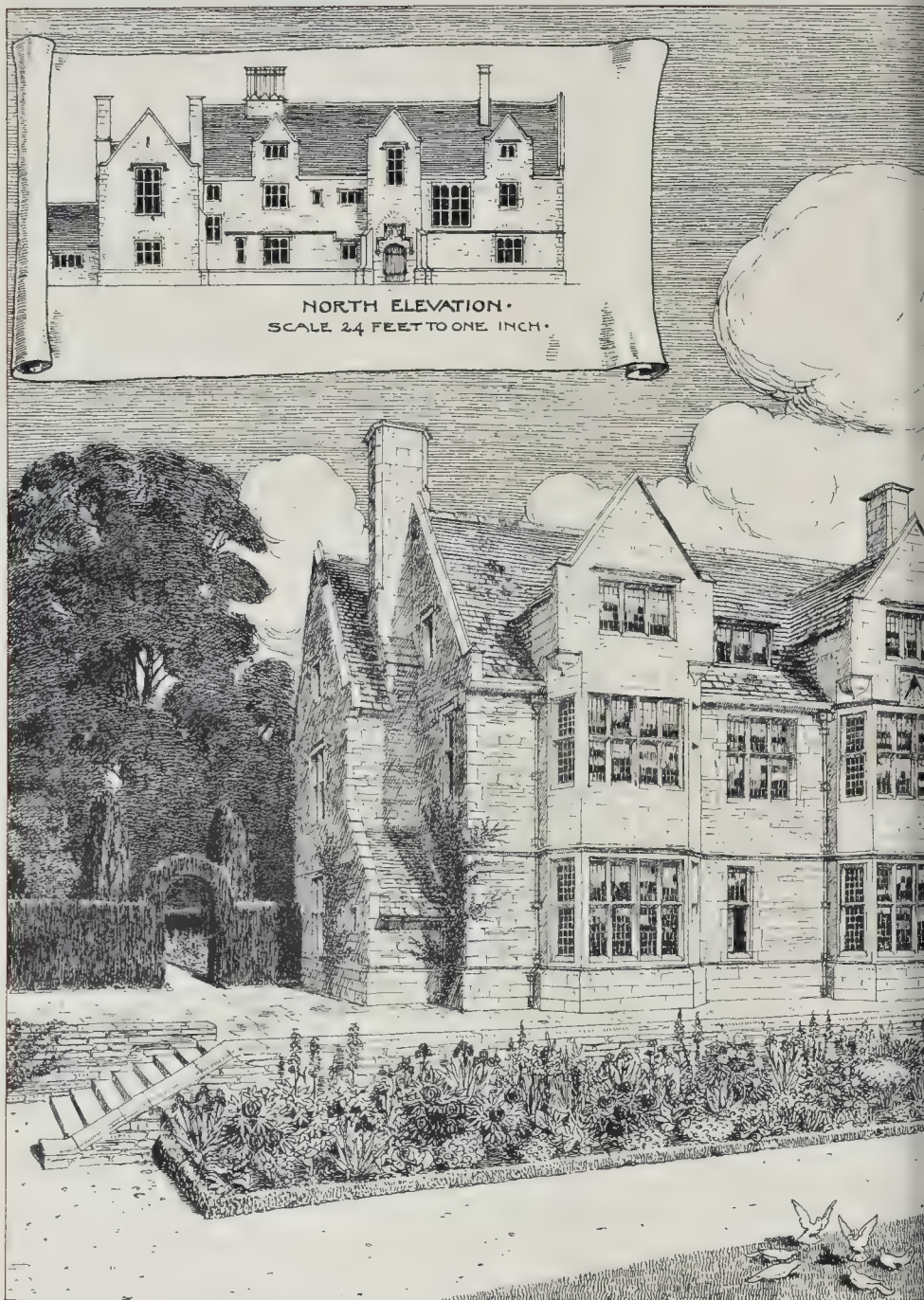


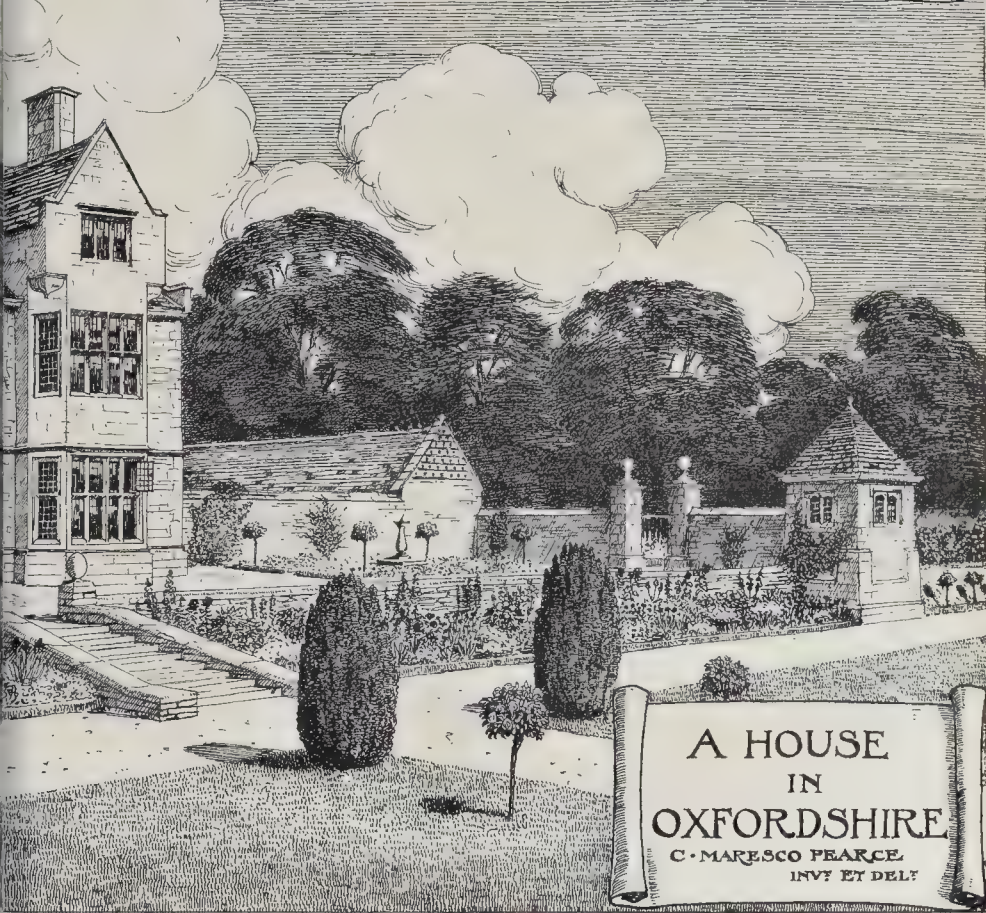
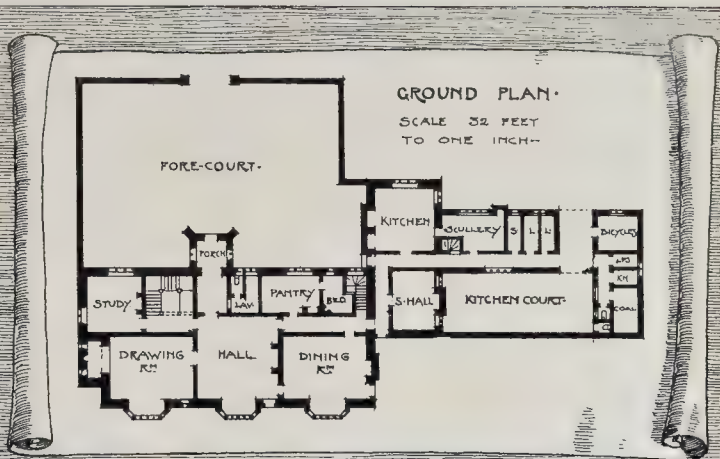
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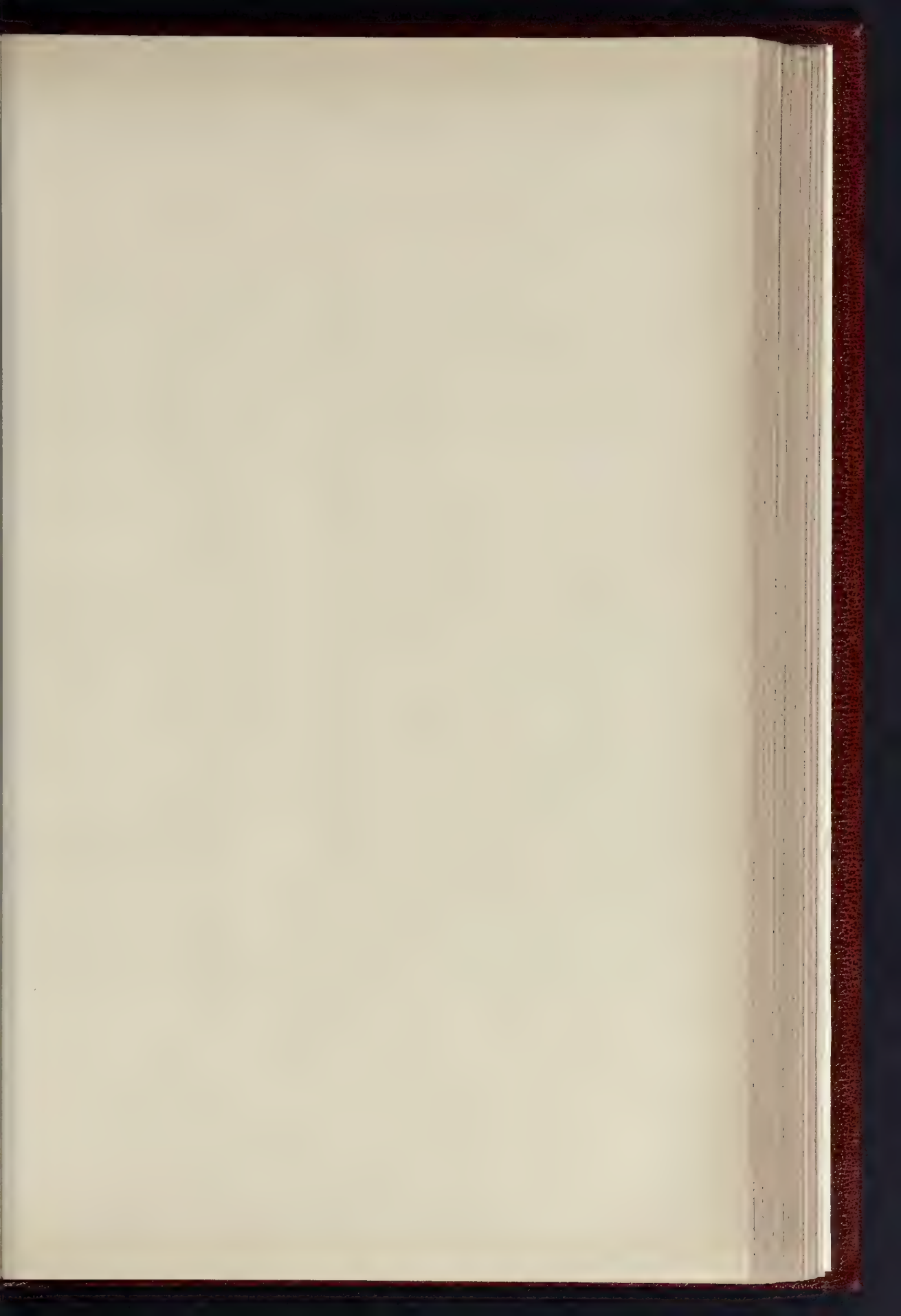


LIVERPOOL CATHEDRAL: A SKETCH DESIGN (No. 38 IN THE LIVERPOOL CATHEDRAL COMPETITION) BY MR LEONARD STOKES, F.R.I.B.A.













secretary, and that we ought, therefore, to prepare proposals to amend the provisions of Act dealing with fire prevention and means of escape from fire. We have accordingly gone very carefully into the matter, and, as the result of repeated discussions, we prepared proposals, which, if adopted, we think, will have the effect of greatly diminishing the risk to life from fire. Briefly stated, the object of our proposals, which are necessarily very technical, is to secure a reduction in the height above which the provision of special means of escape can be required in case of new buildings (not being factories or workshops coming within the provisions of Section 14 of the Factory and Workshop Act, 1901, or common lodging-houses coming within the Common Lodging-houses Acts), after a certain date, the application of similar provisions to existing buildings; the provision of means of escape from new, and, after a certain date, existing buildings, not being factories or workshops coming within the provisions of Section 14 of the Factory and Workshop Act, 1901, or common lodging-houses coming within the Common Lodging-houses Acts) in which a considerable number of persons are employed in which sleeping accommodation is provided for a considerable number; additional persons in regard to premises used in part for purposes of trade or manufacture and in part as dwelling-houses, especially where the premises are used for trade projects from the front of building (as, e.g., in a one-story shop); and to regulate the use of match-board and panelling as an internal finishing to walls, &c., and the enclosing of lifts in buildings. We may state in compliance with Standing Order No. 365 that we are advised by the Solicitor that the Council has power to propose legislation for the purpose in question. . . . We recommend:—

(a) That standing orders Nos. 363 and 364, relating to the period for considering applications to amend the provisions of the Acts, be suspended so far as may be necessary to enable the Council to consider the following recommendation with reference to an application to amend the provisions of the Acts in the session of 1903:—

(b) That a Bill be introduced into Parliament in the session of 1903 to amend the provisions of the Common Building Act, 1894, relating to safety from fire on the general lines indicated in the foregoing report of the Building Act Committee.

After a short discussion, the recommendations were agreed to unanimously.

Underground Railways.—A special report submitted from a joint meeting of the Parliamentary, Highways, Housing of the Working Classes, and Finance Committees, as to the advisability of the Council promoting in the next Session of Parliament a Bill on the subject of underground railways in London, after consulting the officers of the Council, the report arrived at the conclusion that even if it were desirable, it was impossible within the limits desired by the standing orders of Parliament for the Council to promote, in the coming session, any Bill which would require deposit of plans and sections, and a book reference. The report went on to say:—

We have therefore had to consider whether other means can be taken to act on what we have to be the object of the Council, namely, to ensure that Parliament shall not again be placed in an unsatisfactory position, in which it has recently placed itself, of having to deal with certain piecemeal schemes of private promoters, without having the opportunity of considering the problem of London locomotion as a whole, or being able to consider alternative proposals put forward on behalf of the public and in its interests only. We have come to the conclusion that the most effective method open to us is to invite the assistance of the Government. It is true that the Council on a former occasion, at a time when the tube way schemes were in their infancy stages, reached the Board of Trade and made a similar request, but the extraordinary result was brought about by the disagreements between rival promoters must have influenced the minds of those in authority, and that the Board of Trade may now with greater sympathy upon the plea that no one subject shall be authorised until the consideration than has hitherto been accorded to it. We are strongly of opinion that the Council should take for an immediate and complete inquiry into the whole subject, and that in the meantime no other projects should be allowed to proceed in

We therefore recommend the Council to pass the following resolution: 'That, with a view to obtaining such inquiry as above mentioned, a deputation

do wait upon the President of the Board of Trade and ask him to assist in obtaining the appointment of a commission to hold such inquiry, with power to consider all proposals that may be brought before them for the construction and supervision of underground railways in London, and to report as to the desirability of establishing some authority to prepare and issue provisional orders for confirmation by Parliament authorising the construction of such underground railways as such authority may be satisfied will be for the public benefit, and in the meantime to use his influence to obtain the suspension of any Bills that may be introduced into Parliament for the construction of tube railways in London.' In order that the Council may be in a position to lay full information before the Commission, we have instructed the officers to prepare a complete scheme of locomotion for London, and in particular to report as to what proposals would be most likely to relieve congested and insanitary districts, provide the best means of opening up new areas, and afford the greatest convenience to the travelling public.'

This report did not come before the Council until a late hour, and at the suggestion of Mr. Dickinson, chairman of the joint meeting, it was decided to postpone the consideration of it until next week.

The Council, then adjourned.

METROPOLITAN ASYLUMS BOARD.

The fortnightly meeting of this Board was held on Saturday, Mr. Henson presiding.

Acting under the authority of the Managers, the Works Committee reported that they had replied to the Local Government Board's letter requesting information as to the comparatively large cost per bed in the case of the proposed isolation hospital at Darenth Asylum. Upon this question Messrs. Newman & Newman wrote as follows:—'There appears to be some error in the Local Government Board's letter as to the cost of the hospital. They state the cost to be 7,725*l.*, whereas our estimate, exclusive of architects' and surveyors' fees, is 7,000*l.*, making the cost per bed 380*l.*, against 420*l.* stated by the Local Government Board. If the cost per bed has to include the charges of the architects and surveyors, then we think the approximate fees for the architects should be added to the cost of the Levensden Hospital, which is being carried out by your surveyor, Mr. Dance. As regards the cost of the building, it must be borne in mind that the extra number of separation wards and male as well as female attendants' accommodation provided will, to a great extent, increase the cost per bed of this (the Darenth) hospital.'

ENGINEERING SOCIETIES.

THE INSTITUTION OF CIVIL ENGINEERS.

At the first ordinary meeting of the eighty-fourth session, held on Tuesday, the new President, Mr. John Clarke Hawshaw, M.A., on taking the chair, delivered an address to the members. Having alluded briefly to the growth of wet docks during the nineteenth century, the President passed to the main subject of his remarks, namely, the world's supply of timber. Engineers could not do without timber, and it was worth while considering whether the supply of that material was likely to continue to be equal to the demand. Important uses of timber in large quantities were for pit-props and for sleepers. It was calculated that the number of sleepers on the railways of the whole world did not fall short of 1,495 millions, and a low estimate of their value was 180,000,000*l.* The substitution of metal for timber sleepers progressed but slowly, and as the maximum life of timber sleepers in England was twenty-four years, the quantity of the material needed annually for renewal of sleepers alone constituted a serious drain on the timber supplies of the world. These and other considerations emphasised the need of attention to forestry, which at present was neglected in this country. After touching upon the possible sources of supply in all parts of the world, and remarking that the only country which could be looked to for timber was Canada, and even on its resources the wood-pulp industry was a considerable tax, the President reviewed the measures which had been taken in other countries to secure the control of forests and their management on scientific principles, and expressed the hope that the labours of the Committee recently appointed by the Board of Agriculture, and at present sifting would result in removing from Great Britain the reproach of being the

most backward country in respect to forestry. Turning to means of cheap transport, and the services likely to be rendered in the future by steam-driven vehicles on roads, the President suggested that the time was coming when the main roads should be placed under one management throughout the country, and become a national charge instead of a charge on the local rates. Good roads, with organised steam-traction, would be more useful to farming than would light railways. Considering next the generation of power, the President referred in turn to wood fuel and its systematic production, to the increasing use of oil-fuel in locomotives and steamships, and to the various methods of utilising peat. As regards coal, apart from supplies nearer home, enormous quantities existed in China, and there was coal sufficient to meet the world's requirements for many years to come; but even if that were not the case, the increasing use of water-power was rendering the world less dependent on fuel. Water-power possessed important advantages in its cheapness and also in its certainty, which was assured as regards the minimum supply; moreover, its cost was practically independent of the fluctuating cost of fuel and labour. Up to the present it was the electro-chemical industries which had taken most advantage of cheap water-power, and some of its applications in this direction were briefly alluded to. The difficulties connected with the utilisation of water-power arose out of the necessity of storage for regulating the flow, a matter of little difficulty where lakes could be used for storage in uncultivated country, but entailing works of almost prohibitive cost where any alteration of the accustomed water-level led to interference with vested interests. The address concluded with some remarks on the relation of the biological sciences to the work of the engineer; and several instances were adduced to show how his designs and methods of construction were influenced and guided by the working of lowly forms of life. After presenting the medals and prizes awarded by the Council for the past session, the President held a reception of members and others attending the meeting in the library.

SOCIETY OF ENGINEERS.—At the meeting of this Society, held at the Royal United Service Institution, Whitehall, on Monday evening, Mr. P. Griffith, President, in the chair, a paper was read on "The Effect of Segregation on the Strength of Steel Rails," by Mr. Thomas Andrews, F.R.S., M.Inst.C.E., F.C.S. The author observed that in the course of his wide experience as consulting analytical chemist and metallurgical testing engineer to several English railway companies, he had had exceptional opportunities of studying some of the sources of weakness leading to the fracture of steel rails. In order to more fully investigate on a large scale some of the causes of the loss of strength in such rails, he undertook the present research on the effect of segregation on the strength of steel rails. In the course of his paper the author treated of the nature and primary causes of segregation in steel rails and demonstrated by elaborate chemical, physical, and high-power microscopic experiments the influences of local transverse and longitudinal segregation on the loss of strength in such rails. The position of the maximum area of segregation was also demonstrated in course of the paper. He observed that the microscopic portion of the investigation had further specially indicated some of the latent sources of weakness which occurred in segregated steel rails leading to their premature fracture in main-line service. The methods of detecting segregation were also explained and illustrated. In course of the research numerous chemical, physical, and high-power microscopic examinations were made on a considerable number of rails in which local segregation of some of the chemical constituents had been detected, and the result of the author's investigations have demonstrated that local segregation of this nature distinctly reduces the general physical strength and main-line endurance of steel rails in which segregation exists. The experiments have also indicated the relative extent of the segregation of the various chemical constituents in steel rails. Reference was also made by the author to the importance, in the interests of public safety, of detecting and eliminating from service, as far as practicable, rails having a tendency to segregated chemical composition. The author has in course of his experience examined many rails which have fractured in

main line service, in tunnels, on bridges, and on other parts of the permanent way, and he has been able in many instances to trace the cause of these fractures to local segregation of some of the chemical constituents which had led to premature physical weakness in the mass structure of the rails when under the vibratory stress caused by heavy traffic. It has been generally assumed that the chemical and physical properties of steel rails are fairly uniform throughout their longitudinal and transverse mass structure, but the author has shown in this research that such is not uniformly the case. Hence the importance of eliminating, in course of manufacture, as far as practicable, any tendency to local segregation in steel rails, which leads to non-homogeneity of structure. Some idea of the magnitude of the experiments will be obtained when it is stated that they have taken nearly seven years to carry out, and that in the course of research complete chemical analyses, physical tests, and high-power microscopic examinations have been made on a very considerable number of steel rails, the samples experimented upon having been selected from large bulks of rails as supplied to various railway companies. The general results of the research have shown the importance, in the interests of the public safety, of railway companies having careful chemical, physical, and microscopic tests regularly made on rails, selected from the bulk after delivery to the railway companies, prior to their going into main-line service, so that a tendency to a locally segregated chemical composition may be detected and avoided. Much may be done in avoiding a segregated condition in rails by having them made in accordance with the author's chemical and physical specification and tests.

THE INSTITUTION OF JUNIOR ENGINEERS.—On the 30th ult. the members of this Institution were afforded the opportunity of visiting the headquarters of the Electrical Engineers (R.E.) Corps of Volunteers, Regency-street, Westminster, and a large number availed themselves of it. They were received by the Commanding Officer, Major R. S. Erskine, and staff. A short description of the general work of the corps was first given. Their duties consist principally of the running of searchlights at different positions round the coast. There are at present nine such stations equipped with apparatus for the use of the corps, and no member is considered efficient unless he has served a period of training at one of these stations. The corps have given a good account of themselves in the operations in South Africa, and Lord Roberts has stated that by their services in supplying light for the reconstruction, during nighttime, of the damaged bridges, &c., before Pretoria, he had been able to make his entry into that town some days earlier than would otherwise have been possible. Captain J. H. S. Phillips explained the construction and working of the 25-h.p. Hornsby-Ackroyd oil engine, which is used for driving the compound wound dynamo, giving a current of 80 volts and 200 amperes. This plant is the standard set installed at the stations for instructional purposes. The facility with which the engine could be started was shown. One of the portable searchlight sets which has done duty in South Africa was connected up, and the special features of the mounting of the lamp and general equipment were indicated. Three other lamps were also inspected, and an interesting object was a small lamp used by the Boers, fitted with a shutter by means of which signaling by the Morse code could be carried out; but, as it was only of small power, its utility to any extent seemed open to question. The Morris tube range, armoury, and other departments were also shown.

BUCCLEUCH HOUSE, RICHMOND.—This property was withdrawn at 17,000*l.* from the sale by auction on October 23. The house forms a well-known feature in the view of the river-side above Richmond Bridge, and the lawn, which extends to the bank of the river, is the only break in the towing-path and right of way between Putney and Kingston. It was built about one hundred years ago, and was for a long period occupied by the Dukes of Buccleuch. Some while ago the Town Council of Richmond acquired the Terrace-gardens, an estate of which Buccleuch House and grounds constituted a portion, and sold the latter property to Sir John Whitaker Ellis, who at the same time purchased and laid out some extensive gardens on the opposite side of the river, close to the Marble Hill Estate, as part of 'de demesne.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Holborn.—A projecting oriel window to the men's lodging house, Drury-lane, Strand (Mr. R. Robertson for the Housing of the Working Classes Committee of the Council).—Consent.

Hackney, North.—One-story school buildings on the playground of the Northwood-road Board School, at the corner of Gledston-road, Hackney (Mr. T. J. Bailey for the School Board for London).—Consent.

Hampstead.—An iron and glass hood over the entrance to No. 13, Aberdare-gardens, Hampstead (Mr. J. D. Hunter for Mr. I. Goldman).—Consent.

Hampstead.—Two-story bay-windows and wood and tile pent roofs in front of proposed houses, Nos. 1 to 15 (odd numbers only inclusive), Rondo-road, Hampstead (Messrs. Done, Hunter, & Co. for Mr. H. Neal).—Consent.

Hampstead.—Projecting balconies at the first-floor level in front of three proposed houses on the south-east side of Park-fair-road, West Hampstead (Mr. E. W. Jackson for Mr. Beck).—Consent.

Lewisham.—A Baptist church on the south side of Brownhill-road, Catford, with projecting porches and tower (Messrs. J. Clark and S. Pearce for the London Baptist Association).—Consent.

Lewisham.—A house on the west side of Well-meadow-road, Hither Green, Lewisham, abutting upon Downhill-road (Mr. E. J. W. Hilder for Mr. F. Taylor).—Consent.

Peckham.—One-story shops on part of the forecourts of Nos. 656-672 (even numbers only) inclusive, Old Kent-road, Peckham (Messrs. Holman & Goodham for the Royal London Friendly Society).—Consent.

Peckham.—A building on the south side of Meeting-house-lane, Peckham, westward of No. 80a (Mr. G. D. Stevenson for Messrs. C. Blyton & Sons).—Consent.

St. Pancras, South.—A building on a site abutting upon Euston-road, Southampton-street, and Warren-street, St. Pancras (Mr. E. C. Mapherson for Mr. H. Regnart).—Consent.

Wandsworth.—A block of residential flats on the east side of Eglington-road, Putney, at the corner of Erpingham-road (Mr. H. G. Leslie, for Messrs. Coleman).—Consent.

Lewisham.—The retention of a wood and glass covered way at the entrance to No. 11, George-lane, Lewisham, abutting on Chesnut-road (Mr. C. Marks).—Refused.

Canterbury, North.—Residential flats on the east side of Langton-road, Brixton (Messrs. C. C. Lennard & Co. for Mr. F. Day).—Refused.

Hammersmith.—A two-story addition to No. 3, Evesham-street, Latimer-road, Hammersmith (Mr. C. Moore for Mr. G. Moore).—Refused.

Haggerston.—A warehouse, with a one-story shop in front upon the site of No. 227, Hackney-road, Shoreditch (Mr. C. E. Jackson for Messrs. E. Lucas & Sons).—Refused.

Hampstead.—Two-story bay-windows and wood and tile pent roofs in front of proposed houses Nos. 162 to 172 (even numbers only) inclusive, Fordwych-road, Hampstead (Messrs. Done, Hunter, & Co. for Mr. H. Neal).—Refused.

Lewisham.—Dwelling-houses on the north side of Hazelbank-road, Hither Green, with the end houses to abut upon Broadfield-road and Well-meadow-road (Mr. R. Stewart for Mr. A. Cameron Corbett, M.P.).—Refused.

Width of Way.

Battersea.—A stable building at the rear of Nos. 63 and 65, Ux-road, Battersea, at less than the prescribed distance from the centre of the roadway of the mews at the rear of those houses (Messrs. J. A. J. Woodward & Sons for Mr. A. W. Gosden).—Refused.

City.—A one-story addition on the forecourt of No. 4, Wine Office court, Fleet-street, City, with the external walls at less than the prescribed distance from the centre of the roadway of the street (Mr. J. M. Knight for Messrs. Slater & Palmer).—Refused.

Width of Way and Lines of Frontage.

Brixton.—Buildings on a site abutting upon Canterbury-road, Poplar-road, and Industry-street, Brixton, with the external walls of the northernmost building at less than the prescribed distance from the centre of the roadway of Industry-street (Mr. W. E. Hazell for the London, Gloucester, and North Hants Dairy Co., Ltd.).—Consent.

Woolwich.—Five houses, with shops on the ground floor, on the south side of High-street, Eltham, at the corner of Park-place (Messrs. Kennard Brothers for Mr. C. F. Barratt and themselves).—Refused.

Hampstead.—A projecting wooden porch at the front entrance to the Eagle's Nest, Haverstock Hill, Hampstead, and to the erection at the side entrance way in Enfield-lane, of a wood and glass covered way, and of a wood and glass shelter and corridor at the

rear (Mr. W. D. Tucker for Mr. G. Monro).—Refused.

Width of Way and Construction.

Peckham.—An open playground at the Woods-road Board School, abutting upon Harder's-road, Peckham (Mr. T. J. Bailey for the School Board for London).—Consent.

Line of Frontage and Construction.

Hampstead.—A wood and iron fire station building on part of the forecourt of No. 138, Maida Vale, Kilburn (Mr. C. C. Winmill for the Fire Brigade Committee of the Council).—Consent.

St. Pancras, East.—Permission to retain two wood and iron buildings on a site on the south side of Hampden-street and west side of Purchase-street, St. Pancras (Mr. E. Proctor).—Refused.

St. Pancras, North.—A wood and iron timber-drying shed on land at the rear of Nos. 19-27, Highgate-road, St. Pancras (Mr. F. Mason for Messrs. Maple & Co., Limited).—Refused.

Formation of Streets.

Hackney, South.—That an order be issued to Mr. H. Brodey, refusing to sanction the formation of laying out of new streets for carriage traffic, out of the south side of Ashenden-road, Hackney (for Messrs. A. & A. Simpson).—Refused.

* * * The recommendations marked † are contrary to the views of the Local Authorities.

Correspondence.

LEITH PARISH POORHOUSE COMPETITION.

We have been requested to publish the following correspondence, which speaks for itself:—

Copy of Letter from the Edinburgh Architectural Association to the Clerk to the Leith Parish Council, dated October 2, 1902.

Proposed Poorhouse at Leith.

"DEAR SIR,—Some of the members of the Edinburgh Architectural Association have brought before the Council of that body the general instructions and conditions to be observed in the preparation of competitive plans, issued by the Leith Parish Council, and have more particularly directed attention to Clauses 10, 11, 12, 13, and 14 and pointed out certain conditions which they consider unsatisfactory.

The Council has now carefully examined the clauses referred to, and begs to lay the following suggestions before the Parish Council with a view to making the conditions more equitable to competitors, and more likely to lead to satisfactory designs being sent in, and to the most suitable plans being adopted for such an important range of public buildings.

(1) Clause 10.—The labour involved in preparing the drawings to a scale of one-eighth inch to the foot is very great, and would be of no advantage to the Parish Council or its Assessor in deciding on the best design. A scale of one-sixteenth inch to the foot is suggested.

(2) Clause 11.—It is suggested that the best method to arrive at the relative cost of the various designs is to place the completed designs in the hands of a competent surveyor to report.

(3) Clause 12.—The premiums are small and might reasonably be increased in number and amount to 150*l.*, 100*l.*, and 75*l.* are suggested.

(4) Clause 13.—While no objection can be raised to the Parish Council protecting itself in the event of the buildings not being proceeded with, it is not considered reasonable for competitors to risk so much labour and expense in the preparation of designs without an assurance that one of their number will be employed to carry out the work if it is gone on with. It is suggested further that the name of the neutral architect should be given now, so that competitors may know beforehand his position and standing in the profession.

Further, it would be more satisfactory that the Parish Council should employ the best skill possible to assist them, and that the decision of the assessors should be adhered to, and in the event of the author of the design to which the first premium is awarded being able to satisfy the Joint Committee as to his ability, fitness, and experience to act in the capacity of architect for the proposed buildings, he will be duly appointed in that capacity.

(5) Clause 14.—The commission to be paid should be 5 per cent. on the cost, and this sum should cover the services as detailed in the enclosed schedule as prepared by the Royal Institute of British Architects, and which forms the usual basis for the charges of architects both here and elsewhere.

It would further be more equitable if the premium did not merge in such commission, as the cost of preparing competitive plans is so much greater than for the usual sketch designs.

In submitting these suggestions, the Council of this Association take the liberty of enclosing a set of conditions issued for an important competition

another public body, the terms of which received approval. As bearing, upon the points raised in this letter, attention is directed to Clauses 1, 3, 8, and 13 in these conditions.

We shall be glad if you will lay this letter before the Parish Council, and trust that they will give full weight and effect to these views of the Council of the Edinburgh Architectural Association.—Yours faithfully,

(Signed) A. HUNTER CRAWFORD,
Hon. President.

(Signed) WILLIAM M. PAGE,
Hon. Secretary.

Copy of letter from James Miles, Esq., Inspector, Leith Parish Council, to the Hon. Secretary, The Edinburgh Architectural Association, dated October 14, 1902.

New Poorhouse.

Dear Sir,—I submitted your letter of the 2nd ult., with relative enclosures, to a meeting of this Council yesterday, when I was instructed to inform you that the Council is not prepared to reconsider the general instructions and conditions therein referred to.—I am, dear sir, yours truly,

(Signed) JAS. MILLS,
Insp."

FIRE INSURANCE.

SIR,—With regard to Mr. J. Jameson Lamont's letter in your issue of the 1st inst., it is much to be regretted if some correspondents were to state their personal experiences in connexion with losses. To lead off, here are a few of my own.—

The professional assessor is paid by the insurance companies, is under their direction, and his conduct in every respect depends upon his capacity to put claims advantageously for his clients. I prepare quantities for every loss I have to do with, file the fire insurance company's valuator reduces my measurement and every price that he possibly can, but any errors made by me which tell against clients' interest are carefully ignored.

I thought for weeks with an insurance company "brown repute," on behalf of a public body, to some loss added to a claim to cover contingencies (which, as eventualities proved, was more than exceeded), and only got it after spending a month of my time and ultimately threatening to withdraw the whole of the policies and embark on litigation, their assessor refusing arbitration.

Where a total loss is undoubted the assessor insists on the fullest details being given. He measures the work in the fullest detail, and, of course, this increases his own remuneration. Many small losses could be adjusted very economically for his sides if the assessor would accept rough-and-ready calculations. Full details mean considerable expense.

A wall fell in a manufactory at a recent fire, damaged a neighbouring property. The fire was not quite extinguished, and still smouldered, but the insurance company who covered the property refused to give compensation on the plea of non-liability for consequential damage. Has a trader to insure his neighbour's property, as in consequence?

The depreciation of machinery and utensils is a serious matter. The whole machinery in a factory is entirely destroyed by fire. The trader only got depreciated value, and was financially unable to state with the sum recovered, although he was insured. The old machines were in good working order. Why could a man not value the value of new installation of machinery in the same way as he gets a new building?

There is constant friction with the insurance company's assessor as to walls partly damaged, and the claimant cannot afford to wait, while the company can, there is no alternative but to settle for a less sum than the just sum or go into expensive arbitration.

I have this complaint also to make against the insurance companies. Whenever a certain class of insured is not to pay, all the traders in that class live in intimidation of the withdrawal of their policies. It is often very difficult to get them insured in any good insurance company, even at an increased premium.

—NORFOLK.

GENERAL BUILDING NEWS.

ESLEYAN CHURCH, WORCESTER.—The new Wesleyan church and schools, erected in Pump Court, Worcester, at an estimated cost of 8,000*l.*, was dedicated recently. The new church is built in the Bath stone dressings, in the Renaissance style. On the left of the main entrance is a tower, 105 ft. high. On the right is a lesser tower, about 40 ft. high, while from the central part, over the main entrance, is a stone cross. An entrance in each of the towers is a stair to the gallery. Within the church doors proper stables, paved with Minton tiles, is separated from the church by a wooden screen glazed with leaded lights. The length is 70 ft. and the width 30 ft. The open seats are divided by aisles from right and left entrances, and will seat about 600 persons. The gallery above, with accommodation for some 250 more, is supported by iron pillars. At the rear of the chancel to the left will be the organ.

At the rear of the church is an assembly-room, 60 ft. by 37 ft., without the four classrooms, which are connected by folding doors. In this the Sunday-school will be held. Adjacent is an infants' school, and a room above this, of equal size, will be used as a ladies' parlour and other social gatherings. A minister's vestry and lavatories complete the equipment of the building, which is supplied by electricity and warmed by hot-water apparatus. Mr. J. Jameson Green (Liverpool) was the architect, and Mr. W. Hopkins (Birmingham) the contractor.

METHODIST CHURCH, ROTHERHAM.—A new Methodist church is being erected at Rotherham in Old Talbot-lane. The new church will have a tower and spire rising to a height of 130 ft. The roof is of open timber-work, wagon-headed. The entrance vestibule will be laid with mosaic. The church will provide sittings for about 900 persons, and will consist of nave, transepts, and chancel, with an organ in a recess at the side. A gallery will run round three sides of the church. Ministers' and choir vestries are provided, and in the basement will be a ladies' parlour, two class rooms, kitchen, &c., as well as cloak room and lavatory accommodation. The builder is Mr. Robert Snell, of Rotherham, and the architects are Messrs. W. J. Morley & Son, of Bradford.

CATHOLIC CHURCH, STROUD GREEN, LONDON.—In 1896 the Austin Canons procured plans for a new church from Canon Scoles, of Basingstoke, who was the architect before he became a priest. It was decided to carry out part of these plans, and the building of the south aisle of a church was commenced, and seating accommodation for 150 worshippers was thus provided. The Austin Canons, having used the south aisle for some time, determined to go on with the rest of the church with the exception of the sanctuary. The other aisle and nave were finished in due course, and the edifice, complete with the exception of the sanctuary, has just been opened. The sanctuary will be added in the future. The entire cost has been 5,400*l.* The new church is at the corner of Womersley and Dashwood roads, in Stroud Green, in connexion with the parish of St. John's. The church consists of five bays, formed by columns and arches of stone with double lancet clearstory windows, now filled with cathedral tinted glass, which will ultimately give place to stained glass. The ceiling is panelled with wooden ribs. There is an organ gallery. The new aisle, along the north side of which is a series of arches for chapels and confessionals, is lighted by cinquefoil windows. This aisle terminates with the Blessed Sacrament chapel, fitted with a stained-glass window and an altar, the work of Mr. A. B. Wall, of Cheltenham. The church will seat 500.—*Catholic Times.*

LABORATORIES, UPPER SULLIVAN SCHOOL, HOLYWOOD, BELFAST.—The new laboratories provided in these schools in connexion with the Technical Instruction Department, were declared open on the 33rd ult. The architects were Messrs. Young & Mackenzie. The builder was Mr. Wm. Millar.

SCHOOL ENLARGEMENT, STANFORD.—The National Schools at Stanford have just been reopened after enlargement. The new school has been extended, so as to make it almost double its former size, and a new cloakroom has been built in place of a passage. The buildings have been carried out by Mr. Knock, of Ashford, from plans by Mr. A. Lacey.

CLUB, BYKER.—A new social club, to be known as the Byker and Heaton Union Club, Limited, was opened on the 24th ult. by the Mayor of Newcastle at Byker. The premises are situated at the extreme end of Shields-road. The work has been carried out by Mr. W. Thompson, contractor, Byker, from designs by Mr. T. T. Hill, architect, Heaton.

BUSINESS PREMISES, ABERDEEN.—New business premises are to be erected in Broad-street, Aberdeen, for Mr. H. Gray. Mr. W. E. Gauld is the architect. The cost of the new buildings, which are to be known as Greyfriars-buildings, will be over 5,000*l.*

BUILDINGS IN ABERDEEN.—The Plans Committee of the Town Council has sanctioned the plans of the following new buildings:—Four dwelling-houses on the south side of Leith-road for Mr. Benjamin Main, per Messrs. Walker & Dunlop, architects; dwelling-house on the north-west side of Erskine-street for Mr. George Dawson, per Messrs. Sutherland & Pirie, architects; pavilion in lane on the north side of Queen's-road for the Aberdeen Bowling and Tennis Club, per Messrs. Sutherland & Pirie, architects; alterations and additions in connexion with Devanha Brewery, for Messrs. William Black & Co., per Mr. Charles Doug, architect, Elgin; addition to dwelling-house, No. 626, King-street, for Mr. John Alexander, per Messrs. Cameron & Watt, architects; alterations and additions in connexion with Rotunda Lodge, Polmuir-road, for Messrs. J. & S. Fyfe, per Mr. John Rust, architect; addition to fishmonger's premises at South Esplanade West, for Messrs. Stewart, Sons, & Co., per Mr. Duncan Hodge, architect; addition to premises on the east side of Raik-road, for Messrs. Allan & Dey, per Messrs. Brown & Watt, architects; addition to fishmonger's premises on the south side of Sinclair-road, for Mr. James Blair, per Mr. Duncan Hodge, architect; reconstruction and extension of boiler-house at Sandilands Chemical Works, for Messrs. John

Miller & Co., per Messrs. Jenkins & Marr, architects; fishmonger's premises at South Esplanade West, for Messrs. Boyd & Murray, per Messrs. Cameron & Watt, architects; addition to bakery on the north side of Berryden-road, for the Northern Co-operative Co., Ltd., per Mr. R. G. Wilson, architect; addition to fishmonger's premises at North Esplanade East, for Messrs. Wood & Brothers, per Mr. Duncan Hodge, architect; additions to fishmonger's premises on the east side of Clyde-street, for Messrs. J. & G. Michie and Mr. John Lees, per Messrs. D. & J. R. McMillan, architects.

NEW POORHOUSE, FALKIRK.—The foundation-stone of a new poorhouse for Falkirk parish was laid on the 25th ult. The building is being erected in the Blinksbonny district of Falkirk from plans prepared by Mr. William Black, architect, Falkirk, at a cost of about 20,000*l.* The new structure will replace the old Falkirk poorhouse, built over fifty years ago, and which has been considered inadequate for the purpose it serves and out of date.

PARISH HALL, SOUTH SHIELDS.—On the 20th ult. the memorial stone was laid of a new parish hall and institute which is in course of erection in connexion with St. Aidan's Church, South Shields. The building, which is to cost about 2,000*l.*, is being erected on the piece of ground adjoining the church, and provision will be made for 600 children in the Sunday-school. The new building comprises a hall 60 ft. by 40 ft., and on the ground floor there will be rooms for the various classes in connexion with the parish. The plans have been prepared by Mr. J. M. Dingle, architect, and the contractor is Mr. J. Nichol, of South Shields.

GLASGOW TECHNICAL COLLEGE.—From the annual report of the Glasgow and West of Scotland Technical College we learn that contracts, amounting to about 150,000*l.*, have been entered into for the erection of the first section of the proposed new buildings, and the ground for this section, adjoining Montrose-street and George-street, has now been cleared. The section will comprise about 72 per cent. of the whole structure, and fully three years will be occupied in its erection. The wing facing Montrose-street will accommodate the departments of natural philosophy, biology, and architecture, and part of the department of prime movers, as well as a portion of the library and several workshops for the trade classes. Two wings parallel to it will be occupied mainly by the departments of electrical engineering and metallurgy and the large examination hall, while the connecting wing will contain the remaining portion of the department of prime movers, rooms for mathematics, mining, geology, and the bakery school. The departments of chemistry and technical chemistry will extend over the whole of the top floor. The second section, which will occupy the greater part of the frontage to George-street, will provide for the departments of mechanics, machine design, civil engineering and industrial arts, and will also contain the library, the museum, the administration rooms, and common rooms for the students and staff. The architect, Mr. David Barclay, has succeeded in designing a building requiring no extravagant expenditure on mere ornament, and providing for the ample lighting of every room, an essential condition in a building of this character. Considerations of cost and durability led the Governors to adopt red sandstone from Dumfriesshire quarries for the walls facing the streets; white enamelled bricks will be used for the other external walls, so as to secure as much light as possible for the corridors and the centre rooms. With the same object, red tiles will be made in the interior of white tiles, which will also provide a surface that can be readily, thoroughly, and economically cleansed.

ORPHANAGE, IPSWICH.—It is proposed to erect additional buildings at Hope House Orphanage, Ipswich. Plans have been prepared by Messrs. Eade & Johns, and the work which the general committee would like to carry out would, it is estimated, involve a cost of about 800*l.* It is not proposed to interfere materially with the present structure, but to utilise a part of the present ground at the east end, where a playground, 22 ft. by 32 ft., would be provided, and, attached to this, on the playground side, would be a lavatory and other accommodation. On the first floor a new dormitory, the size of the playground, would be formed. The old dormitory over the schoolroom would be divided by continuing the corridor to the new dormitory, which will give on the south side a workroom 17 ft. by 18 ft., and an occasional dormitory, 10 ft. by 18 ft.

FREE LIBRARY, GREEN-LANES, BIRMINGHAM.—The new buildings occupy an area of 2,165 square yards, and adjoin the branch free library erected in 1893 from designs prepared by Mr. Henry Martin (the architect appointed for the erection of both buildings), and is situated at the junction of Green-lane and Little Green-lane. The front or principal elevation is in a style and general character with the elevation of the free library. The front of the buildings is divided into a central two-story block, flanked on each side with the lofty and well-proportioned gable-ends of the first and second class swimming-baths. This central building provides accommodation on the ground floor for the women's private baths department, and on the first floor immediately over a committee-room has been

provided for the use of swimming clubs or for any other purpose, together with private apartments for the use of the resident money-taker, but with a separate staircase leading thereto. There are three entrances to the buildings from Green-lane, viz.:—One with a separate corridor communicating with the first-class swimming-bath and the men's first-class private baths; the central entrance communicates with the women's private baths department and the ticket-office only; the third entrance, with its separate corridor, communicates with the second-class swimming-bath and the men's second-class private baths department respectively. The roofs over the four principal bath departments are supported on cast-iron semicircular arches, with lantern roofs above. The whole of the floors throughout the several bathrooms, corridors, and promenades have been laid with mosaic terrazzo paving, with the addition of a special border of ribbed adamantite tiles laid round the promenade of each swimming-bath (next to the coping stone of the bath) for the purpose of preventing the bathers slipping thereon. The accommodation provided includes the first-class swimming-bath, 81 ft. in length by 33 ft. in width; thirty-four men's private hot and cold water baths, divided into first and second class departments, each bathroom measuring 7 ft. 6 in. in length by 6 ft. 4 in. in width, and fitted with one white enameled bath; men's second-class swimming-bath, same size as first-class bath; women's private bath department consisting of four private bathrooms for first-class bathers and six rooms of similar dimensions for second-class bathers. The whole of the private bathrooms throughout the establishment are fitted up with electric bells for communicating with the bath attendants, and shower baths have also been provided in each of the departments for the bathers making application for them. Incandescent gas lighting has also been adopted throughout the building, except in the case of the three 24-light chandeliers immediately over each swimming-bath, where the ordinary "Parkinson" burner is used. The buildings have been erected by Messrs. E. Whitehouse & Sons, of Monmouth-road; the iron work has been supplied by the Griffin Foundry Co.; the enamelled bricks by Messrs. Edwards & Son, of Ruabon; the terra-cotta and pressed bricks by Messrs. King, of Stourbridge; the terrazzo paving by Messrs. Geary-Walker & Co.; the lead-light glazing by Messrs. O. C. Hawkes & Co.; the casement gear-work by Mr. Henry Hope; the sanitary fittings by Messrs. Twyford & Co.; and the granolithic work and plastering by the Birmingham Adamant Co.

NORTH BRITISH RAILWAY HOTEL, EDINBURGH.—This building, at the east end of Princes-street, which has taken nearly seven years to erect and furnish, is now completed. In 1895 the directors of the railway selected out of some half a dozen competitive plans for the hotel those of Mr. W. Hamilton Beattie, Edinburgh, who did not live to see the completion of his work. The hotel is the only building on the south side of East Princes-street above the street level. The site is on two sides 150 ft. in length, and on the other two 190 ft. The architectural treatment of the exterior of the building is a free rendering of the Renaissance period. The main elevation is to Princes-street. Here the frontage is 190 ft. in length, and the building rises six stories from the street level to a height of over 100 ft. at the crown of the roof. This elevation has for its distinguishing feature a great square tower occupying the centre of the facade, and rising to the height of 190 ft. above the street level. It has clock faces on each side. Angle pavilions, ending in cupolas, surrounded by turrets, at the roof level, flank the tower at each corner of the building. On the east elevation to North Bridge-street, there is a line of shops on the street level and a mezzanine floor above. There are four stories below the level of Princes-street; and the building being practically four square, has a central court in the interior about 70 ft. square. The principal public rooms of the hotel are on the street and first floors on the south, west, and north fronts. The main entrance to the hotel is placed in the centre of the principal facade to Princes-street. A portico and remand boys' wards, and a little further off is the chapel. Admission to the quarter and block is obtained opposite the receiving ward, and here are the masters', clerk's, and committee rooms, and radiating from it are the corridors whence all the other departments are reached. These comprise separate blocks for the aged men and women, for the able-bodied inmates, the imbeciles, short-period lunatics, old married couples, and the infirm. The administration block is in the centre of the main buildings, and includes stores, matron's office, cutting-out rooms, sewing-room, dayroom, dry goods store, laundry, workshops, bakery, wood store, sawyers', tailors', shoemakers', and carpenters' rooms. The engine-room is fitted with plant to drive all the machinery and in a separate block is a tric light with which the buildings are to be illuminated. All the blocks are fireproof, and have fire-escape staircases provided. The house is designed for 800 persons. It has been built by Messrs. J. Dorey & Sons, of Brentford, from plans by Mr. W. H. Ward, of Birmingham, at a contract price of £82,531. The total cost, including furnishing, is calculated at 100,000.

CO-OPERATIVE PREMISES, ANFIELD PLAIN, DURHAM—New premises have just been added to

Princes-street, 71 ft. 6 in. long by 21 ft. wide. The ceiling and walls of this room are paneled, and the chimney-pieces have overmantels with mirrors. The west side of the first floor is devoted to a suite of public rooms, including a ladies' drawing-room, private drawing-room, and music-room. The remainder of the space on this floor is set apart for superior bedrooms, private sitting-room accommodation, and the other floors of the hotel are devoted to bedrooms, sitting-rooms, and bathrooms, en suite, or to single bedrooms and general lavatory accommodation. On the top floor of the hotel accommodation is provided for the female staff and servants of the hotel. On the first basement below Princes-street are placed the smoking lounge, the billiard-rooms, American bar, couriers'-rooms, &c., and also lavatory accommodation. A part of the second basement is utilised as a preparatory department for the kitchen; and on this level is the arrival hall from the Waverley Station, which is in connexion with the station by means of a long covered corridor and lifts. The arrival hall is divided into six compartments, having alabaster columns supported by a dado of Numidian marble which is carried round the walls. On the third basement are the boilers for heating purposes, and stores, and the fourth basement will be used as coal stores. The principal rooms and bedrooms on the external walls have been fitted with double windows. The high level of the compartment of hot air; efficient methods of ventilation have been adopted, and artificially the whole building will be lighted by electricity. The lifts and other mechanical contrivances will be worked by electric motors, light and electric power being taken from the Edinburgh Corporation. The building, it is understood, will cost £100,000, and will be furnished, something like 350,000.—*Scotsman.*

ISOLATION HOSPITAL, WORKSOP.—On the 23rd ult. a meeting of the joint committee of the Worksop and Blyth and Cuckney Isolation Hospital District was held at the Town Hall, when tenders were received for the erection of the proposed new isolation hospital for the combined districts. The site of 100 acres has been acquired on the Carlton glebe land, about 2½ miles from Worksop, and the estimated cost of the whole scheme is 6,000l. The buildings, which are to be built to the plans of Mr. Frederick Hopkinson, Surveyor to the Blyth and Cuckney Rural District Council, will comprise four blocks—administrative, twelve-bed ward block, four-bed ward block, and a laundry block—and will be of bricks, with Broseley tiling. Out of ten contractors, Messrs. C. Hett & Son, of Worksop, secured the contract at 4,745l.

DISPENSARY, PAISLEY.—The new public dispensary erected in Paisley to commemorate the sixtieth year of the reign of the late Queen Victoria was formally handed over to the directors of the Royal Alexandra Infirmary, Paisley, on the 24th ult. The dispensary is attached to the new Royal Alexandra Infirmary. The elevation is of one story, and the frontage is entirely in Neilston-road. The architect is Mr. T. Graham Abercrombie, Paisley.

TECHNICAL INSTITUTE, TUNBRIDGE WELLS.—The new Technical Institute, Tunbridge Wells, situated in Monson-road, has just been opened. The total cost of the erection will be about 13,000l. The building is of red brick, with stone facings. To the right of the entrance is the library, open to all students, also a drawing-room, offices for the secretary, lavatories, cloakrooms, and rooms for manual instruction, 50 ft. by 23 ft. On the second floor are the dressing-room, chemistry, and other lecture rooms, a laboratory, &c. On the top floor are the art and drawing rooms. Four large rooms are devoted to art. Cookery classes will proceed in specially-designed rooms, with gas-stoves and glazed tiles. The building is lighted by electricity and heated by radiators. Mr. H. T. Hare, of London, is the architect; and Messrs. Davis & Leamy, of Goudhurst, are the builders; and the clerk of works Mr. Taylor.

WORKHOUSE, ISLEWORTH, MIDDLESEX.—A new block of workhouse buildings has been erected at Isleworth. At the entrance gates is the porter's lodge, near which is the receiving and disinfecting and remand boys' wards, and a little further off is the chapel. Admission to the quarter and block is obtained opposite the receiving ward, and here are the masters', clerk's, and committee rooms, and radiating from it are the corridors whence all the other departments are reached. These comprise separate blocks for the aged men and women, for the able-bodied inmates, the imbeciles, short-period lunatics, old married couples, and the infirm. The administration block is in the centre of the main buildings, and includes stores, matron's office, cutting-out rooms, sewing-room, dayroom, dry goods store, laundry, workshops, bakery, wood store, sawyers', tailors', shoemakers', and carpenters' rooms. The engine-room is fitted with plant to drive all the machinery and in a separate block is a tric light with which the buildings are to be illuminated. All the blocks are fireproof, and have fire-escape staircases provided. The house is designed for 800 persons. It has been built by Messrs. J. Dorey & Sons, of Brentford, from plans by Mr. W. H. Ward, of Birmingham, at a contract price of £82,531. The total cost, including furnishing, is calculated at 100,000.

CO-OPERATIVE PREMISES, ANFIELD PLAIN, DURHAM—New premises have just been added to

the Anfield Plain Co-operative Society's Central Branch at Anfield Plain, at a cost of about 5,000l. The block of buildings comprise on the ground floor adjacent to the old stores a greengrocer's shop and also a jewellery department; while immediately behind is a greengrocery warehouse. Upstairs is the large Co-operative Hall, capable of seating 600 people. It contains a ante-room and platform. The top of the building adjoining the Board school, embrace on the ground floor a drapery department, 65 ft. long by 26 ft. wide, with oilcloth stores, millinery shop, and a milliners' workshop at their rear. There is, moreover, a tailoring department, a tailors' fitting-room, and a tailors' workshop, together with the necessary lavatory and other accommodation. Upon the upper floor there are manager's, secretary's, and clerk's offices, a committee-room, and a billiard saloon. There is likewise a reading-room, 20 ft. 9 in. long and 25 ft. in width. The designs were prepared by Mr. George Thomas Wilson, architect, of Blackhill; while the whole of the contract was carried out by Messrs. Wm. Ayton & Sons, Bendside.

SANITARY AND ENGINEERING NEWS.

HANLEY SEWAGE DISPOSAL.—A Local Government Board inquiry was held by Mr. A. G. Hale, M.P., and continued on the 16th ult., at the Council Chambers, Hanley, in respect of an application by the Corporation for sanction to a loan of 74,000l. for an scheme of sewage disposal for the borough, which has been prepared by Messrs. Wilcock & Raikes, civil engineers, of Birmingham. Mr. Wilcock attended, and fully explained the scheme, which embraces a complete system of biological treatment of the sewage, and the means of disposing of the sewage and storm water to be treated being estimated at 12,000,000 gallons per day. From the main outfall sewer the sewage will be discharged into screening and detritus chambers, and thence to the tanks, which will have a capacity of 4,000,000 gallons. After passing through the tanks, the tankage will be specially prepared to kill the bacteria, the area of these being 9 acres, the effluent being afterwards discharged direct into the stream, as, owing to the unsuitable nature of the land in the Potteries district, the Local Government Board were asked to waive their usual requirements with regard to treating the filtered effluent on land, and consent to hold an inquiry without this provision being made.

PROPOSED BRIDGE ACROSS THE STRAND.—A scheme has just been prepared by Sir John Wolfe-Barry for the construction of a bridge across the Strand at the bottom of Wellington-street, so as to enable the north and south traffic to pass independently of the east and west traffic. Sir John Wolfe-Barry's solution of the problem of congested traffic is to make a street adjoining Wellington-street on its western side, starting from Tavistock-street, which would rise from that point to a gradient of about 1 in 30, to construct a bridge across the Strand with a headway of about 16 ft. 6 in., and to continue the roadway on the east side of the bridge, which should fall at a gradient of about 1 in 20 to 1 in 30, and join Waterloo Bridge at its northern end. He suggests that Wellington-street should remain as at present with a width of 50 ft., and that the new street should also have a width of 50 ft., the two streets running side by side at right angles to the Strand. The scheme involves the building of shops along a considerable portion of the west side of Wellington-street, below the new street, and along the raised road there would also be a frontage of commercial value which would be of great importance in connexion with the expense of the project. In the event of the Westminster City Council considering that the matter is one that should receive careful investigation by their own officers, Sir John Wolfe-Barry has expressed a desire to submit to those officers a more satisfactory plan than the one submitted, which has been hurriedly drawn. It appears to the committee that, before committing the Council to the scheme, it will be necessary to obtain reports upon its estimated total cost, including the promotion of a Bill in Parliament, and the acquisition of property and buildings; upon the estimated return of lettings or sales; and upon the question of traffic and cross traffic at the intersection of the Strand and Wellington-street; and then to consider whether the matter is not one that should be referred to the London County Council, and, if so, whether that body should be invited to consider it.

FOREIGN.

JOHANNESBURG.—From information which we have lately received from our correspondents in South Africa, it is quite evident that already there has set in a building activity in Johannesburg and other large centres of the Transvaal Colony. The very large requirements of the Government and of the various municipalities have already had a stimulating effect upon the building and allied trades. Owing to the excessive railway rates and transport difficulties, the erection of much-needed dwellings and business houses at Johannesburg is proceeding at a very slow pace, but this state of affairs will

likely undergo a change for the better when railway and other transport rates are reduced. The vision of the tariff rates in the Transvaal is not yet in force for a sufficiently long time to enable anyone to spot to judge its effect upon the cost of building materials. Judge, however, from what our correspondents say, we imagine the cost of buildings, and rents is still enormously high, and residents in the country are anxiously looking forward to the coming of a month or so, a big opening in the building trade, which must of course have a marked effect upon the rents at present charged. It goes without saying that Johannesburg and its already big suburbs are going to develop enormously in the very near future. Every week batches of emigrants are leaving the old world to find a new home in South Africa; and as the majority of them have as an object the Golden City, it stands to reason that the accommodation will have to be found for them. Looking at the position, therefore, from a standpoint, one is forced to the conclusion that there are bright times ahead for the exporters of materials and portable requisites for buildings allied trades. Although eventually substantial and other industries of the country stand to gain that at the very beginning, and for some time to come, there is certain to be a big demand for portable houses, of both wood, iron, and steel, in all the principal towns of the Transvaal and Orange River Colonies; and to those who have not already taken steps to obtain a share of business now offering we earnestly commend the idea of erecting a temporary change of new markets know of their existence and the nature of their manufactures. These are go-ahead times. The old times and methods of doing business rapidly vanishing into oblivion. If British manufacturers are desirous of increasing their clientele, or even keeping their present connexion—they must push their goods continuously, make their names and manufactures as well known in the new countries as in the old. If the more for buildings at Johannesburg is so going at the present moment, what is likely to when the city resumes its normal position, and the old and other industries of the country are revived? Buildings will have to be erected to meet requirements of the Government and the needs of the municipal and other authorities. Last, by no means the least, dwellings for the large working population which is steadily growing must be provided if the industries of the country—mining, industrial, and agricultural—are to develop prosperously.

AUSTRALIA.—A convent is to be erected at Rockingham, New South Wales; Mr. J. Nangle, of Sydney, the architect. The Master Builders' Association of New South Wales have passed a resolution to the effect that the prevailing practice among timber merchants of supplying "stock sizes" slightly less than the true size is undesirable, and they suggest steps be taken to ensure the timber suppliers supply of the full size named in the order or invoice. A large building, to be called the Fisher Library, is to be erected on the University ground in Sydney. A church erected at Greenwich, New South Wales, has recently been opened. The architect is J. T. McCarthy, of North Sydney. The Minister of Works has determined to have one of the royal pavilions at the Prince Alfred Hospital, Sydney, erected by his own staff. The State Parliament has voted £5,000 towards the execution of the work, and tenders were advertised for, but the Government failed to secure any tenders, as builders of opinion that the buildings as designed would involve a much larger expenditure. The Queensland Cabinet has given much consideration to the Report by Mr. A. B. Brady, Government Architect, on the best site for the proposed Brisbane University. The Governor of Queensland has recently unveiled a statue erected to the memory of the late Hon. T. J. Byrnes in Brisbane. The figure is of bronze, and 9 ft. 6 in. in height. It stood on a pedestal 22 ft. in height. The sculptor is Mr. Bertram Mackennal, and the work was carried out in London, except the pedestal, which was executed by Mr. E. L. Thumm, of Brisbane, out of local granite.

GERMANY.—The Emperor William has been dining with Herr Gehrke, the artist, the desirability of reviving the style of medieval majolica for native purposes. The Emperor, who has for some time been interested in the matter, has decided to give the movement his active support.

RUSSIA.—The Czar has authorised the raising of monuments throughout the Russian Empire for the erection of a monument in commemoration of "the months' heroic defence of Sevastopol." The means to commemorate the Crimean War also contemplated along the old lines of defence of the town mentioned. The site has been practically untouched since 1856 the principal monument at present is on the Malakoff.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.

Messrs. Green & Son, auctioneers and surveyors, have removed their offices from 28 and 29, St. Swinburn-lane, to No. 17 in the same street.

LANCASTER MASTER BUILDERS.—At the King's Arms Hotel, Lancaster, recently, the members of the Lancaster and District Master Builders' Association held their annual dinner. Mr. G. Wright, President, was in the chair. The loyal toasts having been duly honoured, Mr. Till proposed "Success to the Lancaster Master Builders' Association." The Federation in Lancaster was still flourishing, he said, and was in a most satisfactory condition. They ought to congratulate themselves that every member of the trade in the town was in the Federation. The masters were on good terms with all the men. The President, whose name was coupled with the toast, in responding, referred to the harmonious feeling that existed amongst the builders of the town. He believed a good deal had grown from being affiliated together. The men federated, they combined, and quite right; he believed they should have absolute freedom in combining. At the same time, the masters must follow suit. The men thoroughly weighed up their demands, and they were so outrageous now that had a Masters' Association to meet. He believed that because they were federated the men were better off. The masters looked at things more broadly than if they looked at them merely from their own standpoint. Mr. T. Mawson gave "The Health of the President." Mr. Wright, in briefly responding, said he earnestly desired that anything that was done should be for the mutual benefit of the whole, and not for individuals. Mr. Hatch proposed "The Architects," and said the relations between the architects and the members of that Federation were the most cordial. Mr. Harris replied to the toast. "The Visitors" was proposed by Mr. R. Wilson, and responded to by Mr. Cross and Mr. Ireland.

SCHOOL OF ART, BLOOMSBURY.—The institution at 43, Queen-square, Bloomsbury, which calls itself by the rather absurd title, "The Royal Female School of Art" (why not "School of Art for Women?") held on Friday and Saturday last week its annual display of students' work in drawings, modelling, wood carving, &c. The title of the institution is the only thing one can complain of, except the absence of complete figure study, drawings from the life consist only of heads. But as far as it goes the students' work seems very good and the effect of good teaching. The collection of still life studies for a special prize were especially noticeable for careful and conscientious character of work.

THE ROADS IMPROVEMENT ASSOCIATION.—At a meeting of the Council of the Roads Improvement Association, Incorporated, held at 45, Parliament Street, recently, it was reported that the Government were giving favourable consideration to a request of the Association for the appointment of a small Departmental Committee to inquire into the existing system of highway administration, and to some extent clear the ground for the appointment next year of a Royal Commission dealing with the general question of internal communication. In a letter from the Association, handed to the Prime Minister by the Hon. Arthur Stanley, M.P., the following reasons were assigned for this request:—1. The suburban areas of the large towns are being built over without reference to any general design under which new main roads would be formed, with the result that these areas are little more than a chaos of short, mean streets, which take no share of the through traffic, and serve only to feed the few main arteries which exist at the beginning of the last century. It is impossible to modify the resulting evils by building new trunk roads, for when the turnpike system was abolished no alternative machinery was provided for the construction, either by public or by private enterprise, of new arteries of traffic through and out of the great towns. 2. Under the existing system of highway administration the care of the roads is divided up among many authorities, so that it is impossible to obtain a uniform system of management, with the result that, although large sums of money are spent upon the maintenance of our roads, their condition leaves, in some cases, much to be desired. There are many instances in which a main trunk road in the course of twenty miles is administered by no less than ten or twelve different authorities. Some improvements were made by the Local Government Acts of 1888 and 1894. In particular, the County Councils in many districts have done much to improve the roads, but the usefulness of the County Councils would be increased largely by an extension of their powers in highway matters. The system of highway administration is closely bound up with the housing and transport questions, and a large number of Members of the House of Commons (of whom a list was attached) are of opinion that the time is now ripe for a public inquiry into the existing system with a view of ascertaining what legislative and administrative alterations and economic changes have rendered necessary. The Council of the Association have also resolved to approach the Home Secretary with reference to the regulation of street traffic in London. The Hon. Arthur Stanley, M.P., was elected the Vice-President of the Association.

It was reported that among the contributions to the funds of the Association received since the previous meeting of the Council was one of 50l. from Mr. J. R. Baillie, of Hampstead.

ROYAL ASYLUM FOR THE DEAF AND DUMB.—Having removed their asylum for deaf and dumb poor to Margate, the governors of this charity have resolved to dispose of their block of freehold buildings situated in Old Kent-road, nearly opposite the Bricklayers' Arms public-house. The asylum, instituted in 1792, was established in 1807 in Old Kent-road, where the premises were enlarged twelve years afterwards to receive 300 inmates. A branch asylum was opened at Margate forty years ago, and in 1886 the asylum in Old Kent-road was rebuilt.

NIGHTINGALE-STREET, MARYLEBONE.—The notices of the London County Council requiring the inhabitants to vacate the premises have now expired. For the time, the London County Council stand in the technical position of "owners," and we understand that the officers of that Council are empowered to close as soon as practicable the worst houses, and to make a few others temporarily habitable while the work of reconstruction goes on. The new Nightingale-street buildings, when completed, will add yet another block of artizans dwellings to the district, and at least house, under favourable conditions, as great a number of persons as those who have been displaced by the scheme.

NEW LYCH GATE, ST. ANDREW'S CHURCH, NORWICH.—The lych gate which has been erected over the main entrance to the churchyard of St. Andrew's Church, Norwich, of the late Canon Copeman was dedicated on the 23rd ult. In accordance with the designs of Mr. Herbert J. Green, it has been built of English oak in Gothic design. The roof is covered with Broseley tiles, and is gable-fronted, with ornamental barge boards.

GLASGOW BUILDING TRADES' EXCHANGE.—The annual meeting of the Glasgow Building Trades' Exchange was held in the Exchange on the 1st ult. Colonel Bennett presiding. Mr. David Cook, writer secretary, read the ninth annual report on the affairs of the Exchange. The accounts showed that there was a credit balance on the year's working of 11. 0s. 0d. While the Exchange was financially in quite a healthy condition, the report continued, a strong effort would require to be made to increase the income. Efforts should be directed towards endeavouring to increase the membership and to obtain a number of new exhibits for the sample-room. Towards the building fund of the new Technical College the Exchange collected a sum of 653l. 3s. 6d. over and above the sums contributed by the Hon. President and President, or in all a sum of 2,153l. 3s. 6d. In connexion with the appointment of a Commission to inquire into the housing question, the Executive asked that Mr. James Goldie's name be added to the Commission. This request was granted, and Mr. Goldie would keep the Exchange in touch with the inquiry. During the year a discussion was entered upon in Parliament with reference to a pernicious Bill prepared and brought in by Sir Charles Dilke, entitled "A Bill to Legalise the Peaceful Conduct of Trade Disputes," and in this connexion the Executive caused their secretary to address a letter on the subject to most of the Scottish Members of Parliament.

HOUSING, MILLBANK ESTATE & POPLAR, LONDON.—The Housing of the Working Classes Committee of the London County Council recently reported that the whole of the seventeen blocks of dwellings on the Millbank estate had been completed for occupation. The dwellings contain 805 tenements capable of accommodating 4,450 persons. In view of the fact that sixteen of the seventeen blocks of dwellings have been erected in connexion with the Clare-market scheme and the Holborn Strand and Westminster-embankment improvements, they reported at the meeting on Tuesday that "the Council may be interested to know from what districts the tenants have been drawn. Of the 805 tenements no fewer than 38, or 65 per cent, have been occupied by persons who have moved from other parts of Westminster. This number includes twenty-two tenants who have been displaced from the area of the Westminster-embankment improvement, and three who have been displaced from the Clare-market area. As tenements become vacant further tenants are being accepted from the area of the Westminster-embankment improvement. Of the remaining 307 tenants, ninety-seven came from Lambeth, thirty-six from Battersea, twenty-two from Camberwell, twenty from Chelsea and Southwark, sixteen from St. Pancras, fourteen from Fulham, twelve from Paddington, nine from Kensington and St. Marylebone, and thirty-one from other Metropolitan boroughs while twenty-one came from districts outside the county of London. These latter were only accepted as tenants at times when there was a dearth of applicants for tenements. The above information has been prepared on information given by the tenants in occupation of the dwellings on October 1, 1902." They also reported as follows:—We have to report that Sydney Road, Melbourne buildings, Ann-street, Poplar, are now almost ready for occupation. The Ann-street scheme which will be completed by the opening of these dwellings, was framed in 1893 under Part II. of the Housing of the Working Classes Act, 1890, and has

THE STUDENT'S COLUMN.—Our Student's Column (—"The Chemistry of Building Materials") is ably held over until next week.

been carried into effect by the Council with the aid of a contribution of 4,400l. from the Poplar District Board (now the Metropolitan Borough Council of Poplar). In all, three blocks of dwellings have been provided, and the first of these (Adelaide-buildings) was completed and occupied in September, 1901. The two blocks of dwellings now nearly completed provide accommodation for 440 persons in sixty-five tenements of two rooms, and thirty tenements of three rooms. With the completion of these buildings accommodation under the Ann-street scheme will have been provided for 630 persons, as against 261 displaced.

WORKING-CLASS DWELLINGS, ST. PANCRAS, LONDON.—The Mayor, Aldermen, and Councillors of the Borough of St. Pancras inaugurated on the 20th ult. a scheme for the removal of insanitary areas and the amelioration of the conditions of residence of the working-classes of the district. The particular occasion was the laying of the foundation-stone of new artisan dwellings in Great College-street. The proposed buildings will be situated at the extreme west corner of the street, facing the municipal offices. The Rev. C. Enser Walters, Chairman of the Public Health Committee of the borough, opened the proceedings with an account of the origin of the movement for the better accommodation of the poorer classes. Probably there was no better borough in London, he said, in which the housing problem pressed more hardly for solution than in St. Pancras. It contained particular causes of overcrowding. Its area was immense, stretching from the north-west—where they had healthy open spaces which were probably unparalleled in London—to the centre of West Central London. In the Southern centre of the borough the great railway schemes had of necessity torn great gaps in the already overcrowded areas, and side by side they had created workshops, dwellings, and Board schools, which had intensified the evil. He was not complaining. They were necessities to the busy life of London; they were only causes of the insanitary areas. Taking the period between 1881 and 1891, the number of houses decreased by 262, whilst between 1891 and 1901 the number decreased from 24,511 to 23,715, whilst the population increased by 568 persons, so that they had a larger population dwelling in less cubic space than ten years ago. He was perfectly well aware that the final solution of the question was to get the workers to the distant outskirts, but, remembering the large number who were obliged to live near their work, the Borough Council had realised their duty of making the house accommodation for them as central as possible, and wherever possible to erect additional dwellings. They were met to lay the foundation-stone of dwellings which were but part of a larger scheme. These buildings were part of what was known as the Brantome-place and Prospect-terrace scheme. The area to be demolished under that scheme was amongst the most insanitary in London. There were 1,174 persons residing upon them. Their scheme provided for 520, still leaving 654 for whom there was no accommodation. It was to house these people that the buildings, the foundation-stone of which the Mayor was about to lay, were being erected. They would cost 6,500l. The total cost of the entire scheme would be 17,734l.

MEMORIAL BRONZE, GIVER STOWEY, SOMERSETSHIRE.—A memorial has just been placed in the chancel of the parish church in memory of the son of Mr. E. J. Stanley, M.P., of Quantock Lodge, near Bridgwater, who fell in South Africa. It consists of a large bronze, resting upon a slab of mottled and polished Devonshire marble. Above the inscription is the badge of the Somerset Yeomanry, whilst below are emblazoned the arms and crest of the Stanleys, together with the family motto. This memorial has been carried out in the studios of Messrs. Harry Hems & Sons, of Exeter, and has within the last few days been placed *in situ*.

THE SONNING BRIDGES.—A quarterly meeting of the Oxfordshire County Council was held a few days ago under the presidency of Lord Valentia, M.P., when the question of the rebuilding of Sonning bridges was discussed at some length. The Roads and Bridges Committee reported that, under the authority given to the Committee by the Council, the Committee had accepted the following tenders for rebuilding the three consecutive bridges at Sonning according to the plans prepared by Mr. T. H. T. (the County Surveyor), as architect, which had been approved by the Thames Conservancy.—Mr. McCarthy Pitt, of Reading, for builders' work, 2,287l.; Messrs. Keay, of Birmingham, for iron and steel work, 4,085l.; Sanitary Pavement Co., London, for paving, 504l. 12s.; Messrs. Free, of Maidenhead, for paths and kerbs, 104l. 17s. 6d.—total 7,071l. 9s. 6d. The Committee of the Council requested that the seat of the Council might be applied to contracts for carrying out these tenders under the supervision of the Architect. The Committee had given every consideration to the adverse public criticism to which the design of their Architect had been subjected. It was, however, undeniable that the present bridges were unsafe and incapable of repair or reconstruction, and that a bridge of brick arches or of wooden construction would be wholly impracticable owing (a) to the flatness of the roadway, and (b) to the fact that in the winter floods the water rises to the level

of the wooden bearers and submerges the lower portion of the present bridges. In face of these facts, the Committee had decided to adhere to the plans for an iron bridge. An alternative plan was placed before the Council providing for the substitution of brick piers for iron supports, with narrower spans, and the effect of the plan was to be decided in lieu of a lattice parapet.—Lord Jersey asked the object of having two designs before the Council that day?—The Chairman said the reason, he must admit, was this—that the Committee had, he understood, yielded to the agitation which had appeared in the newspapers and elsewhere, and to the adverse criticism of the original design approved by the Committee and confirmed by the Council. It was felt that, if there be any reason for saying it was vandalism to erect the modern bridge approved by the Committee, some modification ought to be accepted, if possible.—Lord Jersey said it placed them in rather a difficult position, because they now found two plans on the table, and, according to the Report, the Committee only asked the Council to carry out the plan which was settled last August. He must say himself, looking at the two plans, he should have no hesitation whatever in preferring the alternative one.—Alderman Darell-Blount asked if brick piers could be substituted for the two iron pile piers that were shown in the original plan. Instead of having the more ornamental and numerous brick piers with the lattice girders, could they have 50 ft. spans with brick piers substituted for the iron piles? The iron piles formed, he believed, the chief objection to the design of the first bridge.—Sir G. Dashwood suggested that as there appeared to be some doubt in the mind of the Committee and the Council with regard to the bridge the plans should be referred back to the Committee.—Mr. A. W. Hall supported the suggestion.—Colonel Baskerville thought it would be a pity to put the work off for another three months. He proposed that the Council should instruct the Committee to accept the alternative plan.—Mr. A. Brasse, M.P., considered the alternative plan the more economical, and the plans could be submitted to the Committee, and he would suggest they should adopt the one they thought most desirable. The difference in the expense was 1,000l., but that was spread over a considerable time, and he did not think in a bridge which was likely to be a permanent eyesore or the reverse that it was consistent that question.—After some further discussion, it was unanimously resolved that the rebuilding of Sonning bridges be referred back to the Committee with power to adopt the plan that was approved by them at an expenditure of not more than 9,000l.

CAPITAL AND LABOUR.

BRICKLAYERS' STRIKE, KIDDERMINSTER.—A strike of bricklayers in the Kidderminster district, which began in April, has been ended by an award given by his Honour Judge Austin, of Bristol, who was appointed arbitrator by the Board of Trade. He has decided in favour of the men, given them a halfpenny per hour advance, and also certain concessions on other points.

BUILDING TRADE ARBITRATION, BURTON-ON-TRENT.—At the beginning of July in the present year the operative stonemasons at Burton-on-Trent came out on strike for an advance of 1d. per hour on the current rate of wages, and certain alterations in the working rules. After refusing to listen to the employers' offer to submit the points at issue to the executive of the Midland Trade Employers and the executive of the Friendly Society of Operative Masons for settlement, or to arbitrate through the Board of Trade under the Conciliation Act, 1896, the men remained on strike for two months. Ultimately they accepted the later proposition, and returned to work at the beginning of September, the employers agreeing to pay the men any advance that might be awarded, from the time they resumed work. Application was made to the Board of Trade to appoint an arbitrator, and on October 13 his Honour Judge Austin, of the Bristol County Court, sat in this capacity at Burton-on-Trent. His Honour has now given his award. He failed to find that the operatives had made out their case for an advance of wages, but several alterations of a minor character have been made in the working rules. The award is binding on both sides till July, 1905.—*Birmingham Gazette*.

LEGAL.

THE BUILDING OF A THEATRE

ON the 31st ult. Mr. Clavell Salter applied to the Lord Chief Justice and Justices Wills and Channell, sitting as a Divisional Court of King's Bench, that the hearing of motions arising out of a dispute between Sir Charles Wyndham and Messrs. Kirk & Randall, who are building a theatre for him, might be expedited. The learned counsel stated that Sir Charles Wyndham had declined to honour an architect's certificate for 2,000l., and explained that, on that matter being submitted to one arbitrator, and then to another, two different awards had been made. These it was now sought to set aside. There was consequently a deadlock, and no money could be paid. The work, however, was going on.

The Lord Chief Justice said that if the work was going on there was not much harm done, and he declined to grant the application. The application was accordingly refused.

LITIGATION BETWEEN CONTRACTORS.

THE case of Bow, McLachlan, & Co., Ltd., v. Dutlich, Smith, & McMillan, called on for judgment by the Court of Appeal, composed of the Master of the Rolls and Lords Justices Romer and Mathew, Monday last, on the appeal of the plaintiffs from a decision of Mr. Justice Jelf in Chambers staying the action, and allowing the action to go to arbitration.

Mr. Hamilton, K.C., in support of the appeal, said the plaintiffs were electrical engineers carrying on business in Glasgow, and the defendants were a firm of electrical engineers who had a big contract from the Southend Corporation for the installation of the electrical tramway system in that town. They sub-let the engineering part of the contract to the plaintiffs, the total amount of which sub-contract was about 8,000l. The present claim was for 3,000l., the balance alleged to be due under the sub-contract, and 900l. for extras. The defendants, in their affidavit, shadowed forth a counterclaim for 3,500l. Under the contract any dispute arising between the parties was to be referred to the arbitration of the Southend Corporation Borough Engineer. Mr. Fidler, and Mr. Justice Jelf, in view of this, stayed the action started by the plaintiffs, and referred the matter to the arbitration of that gentleman. Hence the present appeal of the plaintiffs, who contended that Mr. Fidler's interests were so fully mixed up in the dispute that he could not approach the matter with a sufficiently open mind to give an unbiased decision on the matter. The learned counsel said that the dispute had reference to the supply by the plaintiffs of two engines, each capable of producing 200 kilowatts of electricity, and a third engine of 125 kilowatts. Although these engines had been working the tramways for the last twelve months without a breakdown, Mr. Fidler complained that they did not work properly, and had entered into a contract for what he termed "repairing" the two larger engines and for replacing the smaller engine, the amount of that contract being the amount counterclaimed for 3,500l. The plaintiffs' suggestion was that if anything was wrong with the machinery—it was the boilers which the Borough Engineer himself supplied that were in fault. Under these circumstances, the learned counsel contended that Mr. Fidler was not the proper person to arbitrate on the case.

Mr. Roskill, for the defendants, submitted that Mr. Fidler was in no different position to any other Borough Engineer who might be named in a particular contract as arbitrator. It was well known that, in case of a dispute arising, he would be in possession of the facts, and it had not been shown that he had done anything extraordinary in this matter.

Judgment was reserved.

IMPORTANT TRADE UNION APPEAL.

IN the Court of Appeal, composed of the Master of the Rolls and Lords Justices Stirling and Cozens-Hardy, on the 4th inst., a considered judgment was delivered in the case of Read v. The Friendly Society of Operative Stonemasons and Others, on the appeal of the defendants (other than K. E. Saunders) from a judgment of a Divisional Court of King's Bench, composed of the Lord Chief Justice of England, Mr. Justice Darling, and Mr. Justice Channell ordering a new trial of the action tried before Judge Eardley Wilmot, the County Court Judge of Ipswich, in which he gave judgment for the defendants. There was also a cross appeal by plaintiff asking that judgment might be entered for him. (The arguments on the appeal were reported in our issue of August 16, 1902.)

The action was brought by the plaintiff, Read, the son of a mason, against the defendants for damages for wrongfully and maliciously inducing Messrs. Wigg & Wright, of Ipswich, to whom the plaintiff had been bound apprentice for three years as a stonemason, to break the contract of apprenticeship. The deed of apprenticeship was entered into on June 1, 1900, at which date the plaintiff was twenty-five years of age, and by the deed the plaintiff covenanted to serve his employers for three years, and at 15s. a week, and that the employers covenanted to teach him the trade. Messrs. Wigg & Wright and the men in their employ were members of the defendant Society. Certain rules had been drawn up between masters and men, and these rules Messrs. Wigg & Wright had agreed to and signed. Rule 6 for Ipswich and district was as follows:—"Apprentices.—That boys entering the trade shall not work more than three months without being legally-bound apprentices, and in no case to be more than sixteen years of age, except masons' sons and stepsons. Employers to have one apprentice to every four masons on an average." At a lodge meeting of the defendant Society on August 13, 1900, it was resolved that if the plaintiff started work for Messrs. Wigg & Wright as a mason, one of the employees was to report the fact in two hours. Owing to the action of the defendant Society from August 3, 1900, to May 20, 1901, Messrs. Wigg & Wright did

13,776. — WINDOW-SASH FASTENINGS: J. B. Mugley. — To render sash-cords unnecessary the frame is fitted with racks, having angular teeth turned upwards, for engagement with spring catches secured to the sash which one cannot lower unless the catches have been withdrawn, though the catches allow of the sash being raised. AS the

racks of the lower sash do not reach to the bottom of the frame the catch will engage underneath it and so prevent the sash from being lifted until the catch has been freed—the engagement of the catch may also be effected with a screw or recess in the rack. The teeth of the racks are made square when the working of the catches is to be dispensed with. In the former mode the catch should comprise a spring-loaded bolt that works in a tube and has a handle.

13,793.—**MAKING OF CEMENT:** *H. Pastow*.—To the cooled and ground slag of the raw ingredients (for which cement No. 12,778 of 1900 is added from 3 to 5 per cent. of lime, after hydrate water has been removed with heat, but the addition of the lime will depend upon the absence of free lime from the mass which should be tested by mixing the ground product with water and exposing it to the action of carbonic acid. If no increase of temperature ensues the mass contains free lime.

13,813.—**APPARATUS FOR LOCKING THE HANDING-SHOES OF LIFTS:** *G. Hall*.—For locking the rope at the opening of a well-door it is passed through a guide on the cage-top, and in its plane are set two cams, one upon an axle mounted upon a pivoted link and the other on a fixed axle. The arm of a weighted and pivoted well-crank or an engaged wheel on the former axle, and the lever is linked to the core of a solenoid to be energised at every opening of the door, the axle being then shifted towards the left hand. If the rope moves the cam will be turned, and together with it, through teeth, the other cam on the fixed axle so as to jam and lock the rope. Under normal conditions both upon the two cams are opposite one another, whereby the weight of the core will act so as to draw the cam on the linked axle from contact with the rope.

13,814.—**MEANS OF ESCAPE FROM FIRE:** *P. Macrae*.—Gearing from a main shaft extends or contracts, and turns about a vertical or a horizontal axis, a fire escape which is similar in construction to a crane having a lazy tongs. An extension ladder is hinged at the top, and ladders are attached to the links of the lazy tongs. A rope wound upon a windlass supports a lowering cage.

13,817.—**FLOORING IN MOSAIC AND PARQUETRY:** *E. Wuhmann*.—Blocks or prisms roughly cut from green wood are firstly dried and then finished in a planing machine, with tools and files. For making boards or slabs, wooden blocks are nailed cross-wise to one another in such a manner that the ends of the nails meet in the middle and turn one another aside, whilst other nails are driven lengthwise both above and below them. The specification includes a machine for driving in the nails, of which the hammers for the transverse nails are forced outwards with double crown cams against the pressure of springs. A hopper, a notched roller, and a shoot, feed the other nails to a forked carrier, which is sustained in its upper and lower places by cams, and notched bars hold up an abutment plate behind the blocks, which is shifted one notch at a time.

13,821.—**IMPROVEMENTS IN STEP LADDERS:** *R. N. Smith, S. Page, and S. H. Horneham*.—In one form the inventors cause stay-rods to slide between pivoted discs that are clamped with screws and wing-nuts, the sliding of the rods within the discs being restricted with heads at the ends of the rods. In another form the stay-rods are supplanted with slotted stay-links that are pivoted on to the sides and back supports of the ladder, and are clamped to one another in any position desired with a wing-nut threaded upon a screw.

13,835.—**PROCESS OF MOULDING CONCRETE PAVING BLOCKS, SLABS, AND SIMILAR GOODS:** *G. P. Willis*.—The side of each mould is secured to a carriage mounted upon rails, the movable closing-side is slotted for engagement with the two ends which are pivoted on to the first-named side, and is worked with a hand-wheel, eccentrics, and worm-gearing. Moisture can escape through a perforated and loose bottom-plate, wherein are recesses that take lifting-bars for handling and stacking the slabs. An endless rope moves the moulds between the plungers of the press. The mould can be attached on to either side of the rope, and be moved in either direction, by means of clutches upon the mould-carriage that are worked with hand-wheels.

13,856.—**BUILDING BLOCKS, &c., FOR INSULATING PURPOSES:** *T. W. McFarland*.—In order to obviate the transmission or interchange of heat in buildings, storage plants, and similar constructions, closed wooden boxes made with paper divisions consisting of two thin flat sheets spaced with a corrugated sheet are devised for building-blocks, into which wooden distance-pieces are inserted. A fireproof and water-proof composition, such as silicate of soda treated with chloride of calcium, is applied as a coating to the partitions, joints, and casings. A layer of coarse cloth or fibre is interposed between the blocks in the course of building, and their surfaces are coated with the composition.

13,880.—**A METAL-WORKER'S PATTERN PROTRACTOR:** *J. M. McFarland*.—The instrument is intended for use by metal-workers in laying out patterns for pipe elbows and so on, and to facilitate the accurate determination of edges curved in accordance with certain scales and measurements. The body has a lower straight-edge, from which the measurements are taken as a base, and parallel with it is a base-line from which all measurements on the

instrument are calculated. From one end of the base-line, and close to the left (vertical) edge, which is at 90 deg. to the straight-edge, is a degree scale. At the right end of the base-line is a pivoted arm having a straight-edge that from the pivot as a centre are struck a quadrant, with its tangent, and a line at 45 deg. The arc of the quadrant is divided into equal parts, and from those points on the arc are drawn vertical lines to the base-line. Perpendicular lines are drawn from the base-line at distances from the pivot centre of $\frac{1}{2}$ in., 1 in., $1\frac{1}{2}$ in., which distances are the radii of pipes having diameters of 1 in., 2 in., 3 in. The degree-scale up the vertical edge is graduated at points which are respectively twice the angles made by the pivoted arm and the base-line. The pivot centre and the vertical lines at their points on the base-line have sunken cavities for taking the points of compasses or dividers. There are other measuring lines on the body for describing the edge curves of the elbow pattern or section required, and a graduated semi-circle on the back of the plate serves as an ordinary protractor.

13,890.—**PANELS FOR FLOORS, CEILINGS, PAVING, AND LININGS FOR BUILDINGS:** *W. T. Cross*.—The panels consist of boards, which have laths that have dovetailed ends and will interlock with one another; they are then fastened together with cement, nails, glue, or rivets. The invention is applicable for parquet panels, which may be cut skew-wise or be squared.

13,940.—**ELECTRICAL LIGHT INSTALLATION:** *Moore Electrical Co.*—The inventors use an alternating current having a frequency of 100 cycles per second, relatively low frequency and potential in vacuum-tube lighting. For a reduction of striation in the luminous tubes the generator should have a minimum of self-induction. The slots are much wider than are the teeth in the stator of the dynamo, and an annulus—or, in another form, a ring—that will take the place of the stator and the magnet. A toothed ring on a disc carried on the shaft turns between one edge and a laminated toothed ring which is fitted upon the other edge. The installation will comprise incandescent lamps.

13,948.—**IMPROVED MECHANISM FOR LOCKS AND LATCHES:** *R. W. H. Rodney and J. H. Parkes*.—The inventors discard levers and springs. The body of the latch bolt is pivoted on a guide block, and a guide block is pivoted on to the casing, and its edge is fashioned with recesses and projections that will register with the bit of the key. They arrange an engaging projection from the bolt with which the key will engage in such a manner that one cannot move the bolt unless the bit corresponds exactly with the shape of the latch bolt excepted. A guide block is pivoted on to the casing, and its edge is fashioned with recesses and projections that will register with the bit of the key. They arrange an engaging projection from the bolt with which the key will engage in such a manner that one cannot move the bolt unless the bit corresponds exactly with the shape of the latch bolt excepted.

13,958.—**AN INDICATOR FOR ELECTRICAL MEASUREMENT AND OTHER PURPOSES:** *C. D. Haskins*.—A line which is set at an angle to a linear scale is to be moved crosswise, and an observation is taken of the point of intersection of the line and the scale edge. The line may consist of a curved steel or aluminium strip upon arms on an axle, or of a slit in a hollow cylinder illuminated from within, or it may be drawn obliquely upon a cylinder of some light material. The scale may be marked upon an opaque plate with a slot parallel to the axis of the cylinder through which the light is projected, and a magnifying glass or use with any measuring apparatus will be provided by drawing the indicating line by calibration of the instrument.

13,968.—**A FASTENING FOR DOORS AND SIMILAR USES:** *J. Hooper*.—The bolt of a spring-catch is fashioned in one piece with a block which fits on the face of a plate. Projections from the block engage with cam-shaped parts on to which the handle is pivoted; one can withdraw the bolt when the handle has been lifted. A straight movement of the bolt is effected by means of spiral or leaf springs that act upon the block, and are either placed in recesses or disposed around pins which are guided in recesses cut in the block.

MEETINGS.

FRIDAY, NOVEMBER 7.

Architectural Association.—Mr. F. C. Eden on "Roof Coverings." 7.30 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Mr. Max Clarke on "Calculations, Measurements, and Plans and Sections." 7 p.m.
Egypt Exploration Fund. Address by the President, Sir J. Evans, K.C.B., and address by Professor Petrie. 4 p.m.
Leedsingham Architectural Association.—Mr. R. Johnson, M.Inst.C.E., and Mr. H. E. Werner on "Armoured Concrete." 7 p.m.

SATURDAY, NOVEMBER 8.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at Richmond Main Sewerage Pumping Station and Purification Works, New Gardens. 2.15 p.m.
Leedsingham School, 137, Clapham Road, Bethnal Green, E.—Mr. C. Spooner on "The Study of Old Furniture, with some Suggestions for Modern Work" (with lantern illustrations). 8.30 p.m.

MONDAY, NOVEMBER 10.

Surveyors' Institution.—Opening address by the President, Mr. Arthur Vernon. 8 p.m.

London Institution.—Professor Sir R. Ball on "The Earth's Beginning." Illustrated. 5 p.m.
Clarks of Works Association (Carpenters' Hall). Monthly meeting. 7.30 p.m.
Sanitary Institute (Lectures for Sanitary Officers). Mr. Max Clarke on "Sanitary Appliances." 7 p.m.

TUESDAY, NOVEMBER 11.

Institution of Civil Engineers.—Messrs. Charles H. Kinison, B.Sc., Bertram Hopkinson, B.Sc., and Ernest Talbot on "Electric Tramways." 8 p.m.

WEDNESDAY, NOVEMBER 12.

St. Paul's Ecclesiological Society (Chapter House, St. Paul's).—The Rev. H. Bedford Pim on "Some Notable West Norfolk Churches." Illustrated by line-drawing. 8 p.m.

A.A. Camera and Cycling Club.—The Royal Photographic Society's Affiliation Lecture on "Architectural Photography," to be read by Mr. G. H. Lovegrove. 7.30 p.m.

Northern Architectural Association.—Address by the President, Mr. F. Caws. 7.30 p.m.

Institution of Sanitary Engineers, Ltd. General Purposes and Finance Committee at 4 p.m.; Election Committee at 5.15 p.m.; Council meeting at 7 p.m.
Sanitary Institute (Lectures for Sanitary Officers). Mr. Max Clarke on "House Drainage." 7 p.m.

THURSDAY, NOVEMBER 13.

Institution of Electrical Engineers.—Premi-awarded for papers read and published during the Session 1901-1902 will be presented. The President, Mr. Jax Swinburne, will deliver his inaugural address. 8 p.m.
Manchester Society of Architects.—Mr. Halsey Ricard on "The Revival of Gothic Architecture." 6.45 p.m.

FRIDAY, NOVEMBER 14.

Sanitary Institute (Lectures for Sanitary Officers). Mr. J. E. Worth on "Water Supply, Sources of Supply and Distribution." 7 p.m.

SATURDAY, NOVEMBER 15.

Institution of Junior Engineers.—Visit to Messrs. J. W. Williams and Marine Engineering Works, Poplar. Train leaves Fenchurch-street 9.13 a.m.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection of the Sewage and Destruction Works, Ealing. 2.15 p.m.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

October 11.—By W. R. J. GREENSLADE (at Taunton).
Buckland St. Mary, Somerset.—Buckland Farm, 156 a. r. 36 p., f. y. r. 121. 4,250
October 14.—By J. W. SAITH & SONS (at Abergavenny).
Skenfrith, Monmouth.—The Wayne Estate, 212 a. r. 6 p., f. y. r. 121. 2,100
October 23.—By JAMES SMITH & SONS (at Bristol).
Piling, Glos.—The Kookery Farm, 80 a. r. 20 p., f. y. r. 121. 4,250
By G. E. H. SMITH & SONS (at Bishop's Cleeve).
Hunsdon, Herts.—Spellers Farm, 23 a. r. 23 p., f. y. r. 121. 2,100
October 24.—By A. J. SHEPHERD.
Freehold gravel pit, f. a. 3 p. 5 b., f. y. r. 121. 2,100
F.g.r. 84, reversion in 124 yrs. 2,100
October 24.—By A. J. SHEPHERD.
Southwark.—Burman st., freehold premises and stabling, e. a. 3 p. 5 b., f. y. r. 121. 2,100
Muswell Hill, Barnard Hill, &c., two plots of building land, f. y. r. 121. 2,100
October 25.—By G. E. HILLIARD & SON (at Colchester).
Chappel, Essex.—Pope's Farm, 125 a. r. 39 p., f. y. r. 121. 2,100
October 25.—By JAMES SMITH & SONS (at Bristol).
11th rent charge of 62, 121. 2,100
Aldridge, Essex.—Eastwood Field, f. a. 3 p. 5 b., f. y. r. 121. 2,100
October 27.—By ALDRIDGE & LEVER.
Crouch Hill.—Nos. 56 and 58, f.g.r. 84, reversion in 50 yrs. 2,100
October 27.—By JAMES SMITH & SONS (at Bristol).
Notting Hill.—13, 14, 23, and 25, Prince's-rd., f. y. r. 121. 2,100
By JONES, SON, & DAV.
Mile End.—127, St. Dunstons-rd., f. y. r. 121. 2,100
Linehouse.—6, Lockley-st., 501 yrs., f. y. r. 121. 2,100
31. 18, y. r. 351. 2,100
Poplar.—26, Stanbury-rd., 238 yrs., f. y. r. 121. 2,100
Canning Town.—Becton-rd., two plots of building land, f. y. r. 121. 2,100
Linehouse.—98, Narrows-st., f. y. r. 121. 2,100
October 27.—By WEAVER & GREEN.
Bromley.—45 to 60 (even), Staple-st., f. y. r. 121. 2,100
127. 88. 2,100
Peckham.—2 to 18 (even), Oglander-st., f. y. r. 121. 2,100
21, 31, 7, 15, 17, and 19, Atwell-rd., 62 yrs., f. y. r. 121. 2,100
20 to 41 (odd), 51, 53, and 55, Atwell-rd., f. y. r. 121. 2,100
Battersea.—1, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521, 523, 525, 527, 529, 531, 533, 535, 537, 539, 541, 543, 545, 547, 549, 551, 553, 555, 557, 559, 561, 563, 565, 567, 569, 571, 573, 575, 577, 579, 581, 583, 585, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, 625, 627, 629, 631, 633, 635, 637, 639, 641, 643, 645, 647, 649, 651, 653, 655, 657, 659, 661, 663, 665, 667, 669, 671, 673, 675, 677, 679, 681, 683, 685, 687, 689, 691, 693, 695, 697, 699, 701, 703, 705, 707, 709, 711, 713, 715, 717, 719, 721, 723, 725, 727, 729, 731, 733, 735, 737, 739, 741, 743, 745, 747, 749, 751, 753, 755, 757, 759, 761, 763, 765, 767, 769, 771, 773, 775, 777, 779, 781, 783, 785, 787, 789, 791, 793, 795, 797, 799, 801, 803, 805, 807, 809, 811, 813, 815, 817, 819, 821, 823, 825, 827, 829, 831, 833, 835, 837, 839, 841, 843, 845, 847, 849, 851, 853, 855, 857, 859, 861, 863, 865, 867, 869, 871, 873, 875, 877, 879, 881, 883, 885, 887, 889, 891, 893, 895, 897, 899, 901, 903, 905, 907, 909, 911, 913, 915, 917, 919, 921, 923, 925, 927, 929, 931, 933, 935, 937, 939, 941, 943, 945, 947, 949, 951, 953, 955, 957, 959, 961, 963, 965, 967, 969, 971, 973, 975, 977, 979, 981, 983, 985, 987, 989, 991, 993, 995, 997, 999, 1001, 1003, 1005, 1007, 1009, 1011, 1013, 1015, 1017, 1019, 1021, 1023, 1025, 1027, 1029, 1031, 1033, 1035, 1037, 1039, 1041, 1043, 1045, 1047, 1049, 1051, 1053, 1055, 1057, 1059, 1061, 1063, 1065, 1067, 1069, 1071, 1073, 1075, 1077, 1079, 1081, 1083, 1085, 1087, 1089, 1091, 1093, 1095, 1097, 1099, 1101, 1103, 1105, 1107, 1109, 1111, 1113, 1115, 1117, 1119, 1121, 1123, 1125, 1127, 1129, 1131, 1133, 1135, 1137, 1139, 1141, 1143, 1145, 1147, 1149, 1151, 1153, 1155, 1157, 1159, 1161, 1163, 1165, 1167, 1169, 1171, 1173, 1175, 1177, 1179, 1181, 1183, 1185, 1187, 1189, 1191, 1193, 1195, 1197, 1199, 1201, 1203, 1205, 1207, 1209, 1211, 1213, 1215, 1217, 1219, 1221, 1223, 1225, 1227, 1229, 1231, 1233, 1235, 1237, 1239, 1241, 1243, 1245, 1247, 1249, 1251, 1253, 1255, 1257, 1259, 1261, 1263, 1265, 1267, 1269, 1271, 1273, 1275, 1277, 1279, 1281, 1283, 1285, 1287, 1289, 1291, 1293, 1295, 1297, 1299, 1301, 1303, 1305, 1307, 1309, 1311, 1313, 1315, 1317, 1319, 1321, 1323, 1325, 1327, 1329, 1331, 1333, 1335, 1337, 1339, 1341, 1343, 1345, 1347, 1349, 1351, 1353, 1355, 1357, 1359, 1361, 1363, 1365, 1367, 1369, 1371, 1373, 1375, 1377, 1379, 1381, 1383, 1385, 1387, 1389, 1391, 1393, 1395, 1397, 1399, 1401, 1403, 1405, 1407, 1409, 1411, 1413, 1415, 1417, 1419, 1421, 1423, 1425, 1427, 1429, 1431, 1433, 1435, 1437, 1439, 1441, 1443, 1445, 1447, 1449, 1451, 1453, 1455, 1457, 1459, 1461, 1463, 1465, 1467, 1469, 1471, 1473, 1475, 1477, 1479, 1481, 1483, 1485, 1487, 1489, 1491, 1493, 1495, 1497, 1499, 1501, 1503, 1505, 1507, 1509, 1511, 1513, 1515, 1517, 1519, 1521, 1523, 1525, 1527, 1529, 1531, 1533, 1535, 1537, 1539, 1541, 1543, 1545, 1547, 1549, 1551, 1553, 1555, 1557, 1559, 1561, 1563, 1565, 1567, 1569, 1571, 1573, 1575, 1577, 1579, 1581, 1583, 1585, 1587, 1589, 1591, 1593, 1595, 1597, 1599, 1601, 1603, 1605, 1607, 1609, 1611, 1613, 1615, 1617, 1619, 1621, 1623, 1625, 1627, 1629, 1631, 1633, 1635, 1637, 1639, 1641, 1643, 1645, 1647, 1649, 1651, 1653, 1655, 1657, 1659, 1661, 1663, 1665, 1667, 1669, 1671, 1673, 1675, 1677, 1679, 1681, 1683, 1685, 1687, 1689, 1691, 1693, 1695, 1697, 1699, 1701, 1703, 1705, 1707, 1709, 1711, 1713, 1715, 1717, 1719, 1721, 1723, 1725, 1727, 1729, 1731, 1733, 1735, 1737, 1739, 1741, 1743, 1745, 1747, 1749, 1751, 1753, 1755, 1757, 1759, 1761, 1763, 1765, 1767, 1769, 1771, 1773, 1775, 1777, 1779, 1781, 1783, 1785, 1787, 1789, 1791, 1793, 1795, 1797, 1799, 1801, 1803, 1805, 1807, 1809, 1811, 1813, 1815, 1817, 1819, 1821, 1823, 1825, 1827, 1829, 1831, 1833, 1835, 1837, 1839, 1841, 1843, 1845, 1847, 1849, 1851, 1853, 1855, 1857, 1859, 1861, 1863, 1865, 1867, 1869, 1871, 1873, 1875, 1877, 1879, 1881, 1883, 1885, 1887, 1889, 1891, 1893, 1895, 1897, 1899, 1901, 1903, 1905, 1907, 1909, 1911, 1913, 1915, 1917, 1919, 1921, 1923, 1925, 1927, 1929, 1931, 1933, 1935, 1937, 1939, 1941, 1943, 1945, 1947, 1949, 1951, 1953, 1955, 1957, 1959, 1961, 1963, 1965, 1967, 1969, 1971, 1973, 1975, 1977, 1979, 1981, 1983, 1985, 1987, 1989, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021, 2023, 2025, 2027, 2029, 2031, 2033, 2035, 2037, 2039, 2041, 2043, 2045, 2047, 2049, 2051, 2053, 2055, 2057, 2059, 2061, 2063, 2065, 2067, 2069, 2071, 2073, 2075, 2077, 2079, 2081, 2083, 2085, 2087, 2089, 2091, 2093, 2095, 2097, 2099, 2101, 2103, 2105, 2107, 2109, 2111, 2113, 2115, 2117, 2119, 2121, 2123, 2125, 2127, 2129, 2131, 2133, 2135, 2137, 2139, 2141, 2143, 2145, 2147, 2149, 2151, 2153, 2155, 2157, 2159, 2161, 2163, 2165, 2167, 2169, 2171, 2173, 2175, 2177, 2179, 2181, 2183, 2185, 2187, 2189, 2191, 2193, 2195, 2197, 2199, 2201, 2203, 2205, 2207, 2209, 2211, 2213, 2215, 2217, 2219, 2221, 2223, 2225, 2227, 2229, 2231, 2233, 2235, 2237, 2239, 2241, 2243, 2245, 2247, 2249, 2251, 2253, 2255, 2257, 2259, 2261, 2263, 2265, 2267, 2269, 2271, 2273, 2275, 2277, 2279, 2281, 2283, 2

By GARVEY & COOK.
m. Surrey.—1 to 6, Poynter-cottages, and plot of land adjoining, f. w. r. 148.
m.—35 and 37, Charlwood-rd., ut. 19 yrs.
g. r. 41, y. r. 67.
Hammersley, Kennedy, & Co.
endish-cottages, Harrow-rd., the Dyson
Hill, ut. 13 yrs, y. r. 800, including good-
will, furniture, &c.
By ERNEST DOWNS.
upstead.—84 and 85, Broad-st-gdns., ut. 79
yrs, g. r. 204, y. r. 1304.
By PEACEY & FULLER.
ser, Middlesex.—Harrow-rd., Rodmersham
House, f. p.
By WALTON & LEE.
at Marlow, Bucks.—Mill-lane, Thames Lawn,
f. p.
bbury.—163, Highbury New-pk., ut. 47 yrs,
g. r. 154, p. 1.
ut. 1 to 6, Avoon-rd., f. w. r. 174.
bbury.—144, Hemingford-rd., ut. 40 yrs, g. r.
21, e. r. 554.
Barnsbury-ter., ut. 40 yrs, g. r. 61, 108,
g. r. 444.
By T. Woods (at Isleworth).
worth, Middx.—1 and 2, Rolence villas, f.
w. r. 491, 88.
5, Maynard cottages, f. w. r. 912, 168.
and 2, Kent villas, f. w. r. 674, 128.
5, Trebor cottages, f. w. r. 100, 28.
and 59, Newry-rd., f. w. r. 231.
H. & J. Johnson & Co. (at Masons' Hall
Tavern).
nal Green.—Bethnal Green-rd., Bethnal
Green, ut. 35 yrs, y. r. 1604, with
goodwill.—1 to 6, Avoon-rd., f. w. r. 174.
SCHOFIELD, EVANS, & Co. (at Masons'
Hall Tavern).
ico.—Vaughan Bridge-rd., The Duchess of
Clarence p-h., ut. 14 yrs, y. r. 124, with
goodwill.
October 29.—By EDWIN EVANS.
bledon.—London-lane, f. g. r. 634, 58, re-
version in 98 yrs.
tham.—Penrit-st., f. g. r. 274, reversion in
5 yrs.
nham.—High-rd., f. g. r. 550, 48, reversion
in 64 yrs.
Crescent, f. g. r. 324, reversion in 64 yrs.
f. g. r. 184, reversion in 24 yrs.
reversion in 17, 24, and 27 yrs.
arbithe.—Odessa-st., f. g. r. 474, 128, ut. 73
yrs, g. r. 234.
tham.—Sandwich-st., The Norfolk Arms
h., pepper-corn g. r., reversion in 45 yrs.
By DAVIS, SON, & HILTON.
-harlton, Kent.—Charlton-rd., High Combe
and Little Combe, area 7.5, f. p. 3104.
Sydenham.—1 to 9, Lee-ter., area 2.4, f.
r. 204, 28, subject to rent charge of 354.
ingham, Kent.—14, The Park-rd., ut. 92
yrs, g. r. 104, 208, y. r. 604.
-28 and 30, Manor-lane, ut. 92 yrs, g. r. 124,
160.
High-rd. (S), ut. 69 yrs, g. r. 94, 108, y. r.
104.
By GILLOWS.
ea.—1 to 3, Clover-mews, ut. 73 yrs, g. r.
104, y. r. 204.
By HUMBERT & FILIP.
rd, Herts.—Park-rd., Elm Grove and 1 a.
October 29.—By R. TIDY & SON.
Newington.—51, Milomay-grove, ut. 47
yrs, g. r. 61, 184, y. r. 454.
all—56, Blackboy-lane, ut. 754 yrs, g. r.
184, w. r. 364, 88.
Green.—12 to 28 (even), Wilsdon-rd.,
t. 98 yrs, g. r. 264, y. r. 1124.
ton.—37, Noel-st., f. r. 504.
lon.—135, Stockwell Park-rd., ut. 304 yrs,
r. 74, y. r. 384.
Hill.—119, Sunderland-rd., ut. 57 yrs, g. r.
14, p. 1.
By BRADSHAW BROWN & Co.
ood.—53, Alexander-rd., ut. 54 yrs, g. r. 61,
y. r. 454.
Gate.—22 and 24, Lorne-rd., f. g. r. 524,
all—53 and 55, West Ferry-rd. (S), ut. 154
yrs, g. r. 61, y. r. 734.
7, and 9, Janet-st. ut. 264 yrs, f. r.
108, y. r. 101, 88.
way.—52, Spelhurst-rd., ut. 304 yrs, g. r.
108, y. r. 304.
By CURTIS & SHARP.
g Town.—21 to 33 (odd), Clarkson-st.,
t. 83 yrs, g. r. 264, 154, w. r. 1234.
—61 and 63, Gough-st., ut. 46 yrs, g. r.
y. r. 784.
ing Town.—154, Barking-rd. (shop and post
office), ut. 61 yrs, g. r. 124, 524, 108.
fam.—The Pavement (S), ut. 80 yrs,
184, 88, y. r. 254.
By IZARD & IZARD.
abone.—1 to 6, g. r. 234, 154, g. r. 124.
ctory), ut. 60 yrs, g. r. 234, 154, g. r. 124.
By KEMBLEY.
rd Green, Essex.—High-rd., Forest House
ld block of building, land, f. p. 1.
rd., Fifehill, g. r., ut. 66 yrs, g. r.
rd.—36 and 38, Elm-gr., ut. 66 yrs, g. r.
r. 364, 88.
stone.—19, 27, and 10, Mord-rd., f. w. r.
168.
By MARK LIEBL & SON.
edon.—13, 23, 43 (odd), Wandl-rd., ut.
yrs, g. r. 304, w. r. 124, 128.
y.—32, Riles-rd., f. w. r. 234, 88.
y-by-Bow.—69 and 71, Donald-st., ut. 30
yrs, g. r. 304.
Donald-st., f. w. r. 184, 88.
7 and 28, Loyal-rd., ut. 47 yrs, g. r. 61,
184.
-14 and 16, Wylden-st., ut. 70 yrs, g. r.
rd., w. r. 674, 128.
am.—46 and 48, Kippell-rd., ut. 954 yrs,
84, 88, w. r. 504, 148.

By LOWE & GOLDSCHMIDT.
Camden Town.—165, Great College-st. (shop and
slaughter-house), f. y. r. 124.
Hampstead.—1, 2, and 3, Squire's Mount-cottages,
f. y. r. 1104.
t to 7, Wildwood-gr., w. r. 2504, 88; also f. g. r.
81, ut. 634 yrs, g. r. 254.
By A. F. POCCOCK.
Brookley.—134, Drake-fell-rd., ut. 63 yrs, g. r.
61, 65, y. r. 404.
Brixton.—6, Endymion-rd., ut. 77 yrs, g. r.
71, 108, y. r. 384.
Forest Hill.—11, Allenby-rd., ut. 74 yrs, g. r. 64,
y. r. 344.
155, Devonshire-rd., ut. 70 yrs, g. r. 61, y. r.
354.
By ROBINS, GORE, & MINCEY.
Charing Cross-rd.—1 to 5, Denmark-pl., ut. 5 yrs,
g. r. 534, w. r. 1734, 128.
October 30.—By STIMSON & SONS.
New Bond-st.—Avery-row, The Coach and Horses
p-h., Corporation lease, g. r. 71, 158, 344, y. r.
y. r. 1404.
Shaftesbury-ay.—4, Dansey-rd. (warehouse), f.
y. r. 1404.
Westminster.—16, Dartmouth-st. (S), f. y. r. 1004.
Notting Hill.—20, Horbury-cres., f. y. r. 654.
Wandsworth.—19, 21, 23, 25, 27, 29, 31, 33, 41, 43,
and 47, Wakehurst-rd., ut. 74 yrs, g. r. 604,
y. r. 3504 (in lots).
Old Kent-rd.—44, Avenale-sq., ut. 52 yrs, g. r.
61, 108, e. r. 404.
Camberwell.—39 and 41, Jardin-st., ut. 28 yrs,
g. r. 61, w. r. 654.
Bermondsey.—50, Ambrose-st. (S), ut. 34 yrs,
g. r. 54, y. r. 384.
435 and 437, Southwark Park-rd., ut. 50 yrs,
g. r. 61, w. r. 654, 48.
Deptford.—37 and 39, Ravensbourne-st., ut. 63
yrs, g. r. 74, w. r. 774, 158.
By J. A. & W. THARP.
Poplar.—34, Elberhorpe-st., ut. 41 yrs, g. r.
34, 38, w. r. 314, 48.
Canning Town.—46 and 48, Burnham-st. (S), f.
w. r. 504, 158.
55 and 57, Edward-st., ut. 72 yrs, g. r. 12, 108,
w. r. 444, 48.
Stepney.—104 and 106, Stepney Green, f.
744, 28.
By HOOKER & WELLS (at Croydon).
Waddon.—Jennet-rd., f. g. r. 144, 58, reversion in
71 yrs.
Addiscombe.—16 to 21, Hastings-rd., f. w. r.
107, 88.
Grand-rd., freehold plot of building land, f. w. r.
40, 108, 34.
Thornton Heath.—30, 31, and 33, Pridham-rd.
East, ut. 65 yrs, g. r. 74, 58, 94, w. r.
394, 108, 34.
Croydon.—144, High-st., and 1 and 3, Corney's-
rd., area 4, 400 ft. f. p. 1.
28 and 30, Northcote-rd., f. r. 524.
22 and 24, Lambert-st., f. w. r. 334, 158.
Lebanon-rd., Alfriston and Annadale, f. w. r.
504, 108.
October 31.—By ABEL & CO.
Bethnal Green.—45, Pollard-st., f. w. r.
454, 158.
By DUNCAN & KIMPTON.
Holloway.—54, Alexander-rd., ut. 51 yrs, g. r.
61, y. r. 324.
By GREEN & SON.
Hackney Wick.—Kieselghur Wharf, f. g. r. 1004,
ut. 61 yrs, g. r. 304, ut. 64 yrs, g. r. 224.
Jessop's Wharf, f. g. r. 604, ut. 64 yrs, g. r. 224.
Wharf and factory premises, f. g. r. 1504, ut.
64 yrs, g. r. 224.
Hammersmith.—The Creek & Co., Creek Wharf,
area 5,000 ft. f. p. 1.
By MAY & PHILPOT.
Brixton.—50 and 52, Tulse Hill, ut. 15 yrs, g. r.
334, e. r. 1304.
By G. PEACE & SON.
Hoxton.—59, Grange-st., ut. 31 yrs, g. r. 54, 58,
y. r. 344.
50, Alms-st., ut. 28 yrs, g. r. 54, y. r. 384.
By F. & W. STOCKER.
Deptford.—10 to 45 (even), Hale-st., f. w. r.
284, 68.
27 to 37 (odd), Hale-st., f. w. r. 894, 28.
Lewisham.—53, 55, and 55A, Loampit-vale (S), f.
y. r. 194.
10 to 27 (odd), Vian-st., f. w. r. 894, 28.
Greenwich.—8, 9, and 10, Thornham-st., f. w. r.
524.
5, Greenwich (S), f. y. r. 424.
454, Blackheath, ut. 73 yrs, g. r. 84, y. r. 424.
Deptford.—58, 60, 71, and 73, Napier-st., ut. 43
yrs, g. r. 81, w. r. 854, 108.
26, 28, and 30, Stunton-st., and 23, Wotton-rd.,
ut. 418 yrs, g. r. 44, 158, w. r. 1074, 184.
New Cross.—13, 15, 16, 26, 31, 33, and 35, Mor-
rington-rd., ut. 49 yrs, f. r. 144, w. r. 254, 108.
Brookley.—129, Manor-rd., ut. 65 yrs, f. r. 61,
y. r. 304.
By WESTBROOK & YOUNG.
Anerley.—1, The Arcade, f. e. r. 854.
Contractions used in these lists.—f. g. r. for freehold
ground-rent; l. g. r. for leasehold ground-rent; f. r. for
f. for freehold; c. for copyhold; l. for leasehold; e. r. for
estimated rental; w. r. for weekly rental; y. r. for yearly
rental; u. r. for unexpired term; p. a. for per annum; y. r.
for years; st. for street; rd. for road; sq. for square; pl.
for place; ter. for terrace; cres. for crescent; av. for
avenue; gds. for gardens; yd. for yard; gr. for grove.

PRICES CURRENT OF MATERIALS.

*Our aim in this list is to give, as far as possible, the
average prices of materials, not necessarily the lowest.
Quality and quantity obviously affect prices—a fact which
should be remembered by those who make use of this
information.
BRICKS, &c.
s. d.
Hard Stocks — 13 0 0 per 1,000 alongside, in river.
Rough Stocks and
Grizles — 12 0 0 " " " "
Facing Stocks — 21 0 0 " " " "

PRICES CURRENT (Continued).

BRICKS, &c.
s. d.
Shippers — 5 0 0 per 1,000 alongside, in river.
Fletons — 2 8 0 " " " " at railway depot
Red Wire Cuts — 12 0 0 " " " "
Best Farham Red — 12 0 0 " " " "
Best Red Pressed — 12 0 0 " " " "
Ruabon Facing — 5 5 0 " " " "
Best Blue Pressed — 5 5 0 " " " "
Staffordshire — 4 5 0 " " " "
Do. Bullnose — 4 11 0 " " " "
Best Stourbridge — 4 8 0 " " " "
Fire Bricks — 4 8 0 " " " "
GLAZED BRICKS.
Best White and
Ivory Glazed
Stretchers — 13 0 0 " " " "
Headers — 12 0 0 " " " "
Quoins — 12 0 0 " " " "
and Flats — 17 0 0 " " " "
Double Stretchers — 19 0 0 " " " "
Double Headers — 16 0 0 " " " "
One Side and two
Ends — 19 0 0 " " " "
Two Sides and one
End — 20 0 0 " " " "
Splays, Chamfered,
Squints — 20 0 0 " " " "
Best Dipped Salt
Glazed Stretchers
and Headers — 12 0 0 " " " "
Quoins, Bullnose,
and Flats — 14 0 0 " " " "
Double Stretchers — 15 0 0 " " " "
Double Headers — 14 0 0 " " " "
One Side and two
Ends — 15 0 0 " " " "
Two Sides and one
End — 15 0 0 " " " "
Splays, Chamfered,
Squints — 14 0 0 " " " "
Second Quality
White and Dipped
Salt Glazed — 8 0 0 " " " " less than best:
Thames and Fitz Sand — 7 0 0 per yard, delivered.
Thames Ballast — 7 0 0 " " " "
Best Portland Cement — 31 0 0 per ton, delivered.
Best Ground Blue Lias Lime — 22 0 0 " " " "
Note.—The cement or lime is exclusive of the ordinary
charge for sacks.
Grey Stone Lime — 20s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 27s. 6d. per ton at rly. dep.
STONE.
s. d.
Ancaster in blocks — 2 11 1/2 per ft. cube, deld. rly. depot
Bath — 1 7 1/2 " " " "
Farleigh Down Bath — 1 8 " " " "
Best in blocks — 1 6 " " " "
Grinshill — 1 6 " " " "
Brown Portland in blocks — 2 10 " " " "
Darley Dale in blocks — 2 4 " " " "
Red Corshill — 2 5 " " " "
Closeburn Red Freestone — 2 6 " " " "
Red Mansfield — 2 4 " " " "
YORK STONE.—Robin Hood Quality.
Scappled random blocks — 2 10 " " " "
6 in. sawn two sides land-
ings to sizes (under
40 ft. super.) — 2 3 per foot super.
6 in. Rubbed two sides
Ditto, Ditto — 2 6 " " " "
3 in. Sawn two sides
slabs (random sizes) — 0 11 1/2 " " " "
3 in. to 2 1/2 in. Sawn one
side slabs (random
sizes) — 0 7 1/2 " " " "
1 1/2 in. to 2 in. ditto, ditto — 0 6 " " " "
Best HARD YORK
Scappled random blocks — 3 0 per ft. cube
6 in. sawn two sides,
landings to sizes (under
40 ft. sup.) — 2 8 per ft. super.
6 in. Rubbed two sides
Ditto — 2 11 1/2 " " " "
3 in. sawn two sides
slabs (random sizes) — 1 2 " " " "
2 in. self-faced random
flags — 0 5 " " " "
Hopton Wood (Hard Bed) in blocks — 2 3 per ft. cube,
deld. rly. depot.
" " " " 6 in. sawn both
sides landings — 2 7 per ft. super,
deld. rly. depot.
" " " " 3 in. do. — 1 2 1/2 " " " "
SLATES.
s. d.
20x10 best blue Bangor — 13 6 per 1,000 of 1200 sq. ft. dep.
20x12 " " " " 13 7 6 " " " "
20x12 " " " " 12 15 0 " " " "
20x12 " " " " 13 10 0 " " " "
16x8 best " " " " 7 0 0 " " " "
20x10 best blue Portmadoc — 12 5 0 " " " "
16x8 best blue Portmadoc — 12 5 0 " " " "
20x10 best Eureka un-
fading green — 15 0 0 " " " "
20x12 " " " " 15 0 0 " " " "
18x10 " " " " 16 10 0 " " " "
18x8 " " " " 8 7 6 " " " "
20x10 permanent green — 10 10 0 " " " "
18x10 " " " " 9 0 0 " " " "
10x8 " " " " 6 5 0 " " " "
TILES.
s. d.
Best plain red to chug tiles — 42 0 per 1,000, at rly. depot.
Hip and valley tiles — 3 7 per doz.
Best Broseley ti les — 30 0 per 1,000 " " " "
Do. Ornamen: al tiles — 52 6 " " " "
Hip and valley tiles — 4 0 per doz. " " " "
Best Rubbo: Red, brown or
brindle 1 Do. (Edwards) — 57 6 per 1,000 " " " "
Do. ornamental Do. — 60 0 " " " "
Hip tiles — 4 0 per doz. " " " "
Valley tiles — 3 " " " "
Best Red or Mottled Staf-
fordshire Do. (Peakes) — 51 0 per 1,000 " " " "
Do. Ornamental Do. — 51 6 " " " "
Hip tiles — 4 1 per doz. " " " "
Valley tiles — 4 " " " "
See also page 121

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
* Designs for University Buildings, Cape of Good Hope	Agnt.-Gen. for Cape of Good Hope	400 <i>l</i> , 200 <i>l</i> ., 100 <i>l</i> .	Jan. 31

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Street Works, Gwynnd-street	Glyncorwg U.D.C.	W. E. Jones, Surveyor, Council Offices, Cymmer, Port Talbot	Nov. 10
Baths, &c., at Infirmary	Belfast Guardians	Young & Mackenzie, Engineers, Belfast	Nov. 11
Sewer, &c., at Ribworth Beachamp	Sheffsbury Corporation	W. C. Eddowes, Borough Surveyor, The Square, Shrewsbury	do.
Broken Granite (200 tons) Drill	Market Harborough R.D.C.	J. B. Everard, Civil Engineer, 9, Millstone-lane, Leicester	do.
House, Stottfield, near Egin	Long Crendon R.D.C.	W. Parker, 2, High-street, Thame	do.
Nurses' Home	* F. Fairbank & W. W. Wicket, Architects, Egin	Martin & Fenwick, Civil Engineer, 1, Park-place, Leeds	do.
Street Works, The Hexagon, Fraserburgh, N.B.	Newton Abbot Guardians	S. Segar, Architect, Union-street, Newton Abbot	do.
Offices, Harbory-street, &c.	Cardiff Corporation	A. G. Brown, Wichenill, Fraserburgh	do.
Sewerage Works, Woolton-road, Gaywood	Cardiff Corporation	W. Harpur, Civil Engineer, Town Hall, Cardiff	Nov. 12
Sewerage Works, High Oakham-road	Manchester Town Council	W. Cross, Contract Officer, 1, Church-lane, Manchester	do.
Road Works	Birkenhead Corporation	R. E. Vallance, Borough Surveyor, Town Hall, Manchester	do.
Laying Cast-iron Pipes	Manchester Town Council	C. Brownridge, Civil Engineer, Town Hall, Birkenhead	do.
Flagging, paving, &c.	Northampton R.D.C.	R. F. Vallance, Borough Surveyor, Manchester	do.
Bridge, Blackley	Manchester Corporation	C. Brownridge, Civil Engineer, Town Hall, Birkenhead	do.
Schools, Parkstone, Essex	Manchester Corporation	F. Fairbank & W. W. Wicket, Architects, Egin	do.
Additions, &c., to House, West Green, Crawley	Aberdare School Board	J. W. Starr, Architect, Colchester	Nov. 13
Schools, Ynydd	Ramsey School Board	W. Buck, Architect, Hortham	do.
* New Schools, &c., at Parkstone, Essex	Borough of Hampstead	T. Roderick, Architect, Clifton-street, Aberdare	do.
Stable Foundations	Preston Corporation	J. W. Starr, Architect, Colchester	do.
Additions to Offices, Tille Barn, West	Omagh R.D.C.	W. Cairncart, Board-room Workhouse, Omagh	Nov. 14
Road Works	Messrs. Linster Bros. & Co.	A. Bryant, Architect, Longmynd	Nov. 15
Thirty Houses, Llantwit Yardre, Wales	Bradford Corporation	F. E. F. Edwards, Architect, Chapel-lane, Bradford	do.
Factory, Belview-avenue, Londonderry	Bradford Corporation	F. E. F. Edwards, Architect, Chapel-lane, Bradford	do.
Baths, Drummond-road	Bradford Corporation	F. E. F. Edwards, Architect, Chapel-lane, Bradford	do.
Additions to Workhouse, Rocking	Harr-gate Corporation	E. W. Dixon, Civil Engineer, 14, Albert-street, Haringate	do.
1 mile under Mastham & Grewellthorpe Motors	G.N.E. (Ireland) Co.	F. H. Richardson, Surveyor, Kenneworth	Nov. 17
Bridge, Bullingham Beck	Monaghan (Ireland) R.D.C.	T. Morrison, Amiens-street Terminal, Dublin	do.
Station Buildings, Ballybeg	Watches (Ireland) R.D.C.	W. M. Mahon, Engineer, Clones	do.
Fourteen Cottages	Chesham Guardians	W. T. Douglas, Engineer, 15, Victoria-street, S.W.	do.
Harbour Works	G.N. Railway Co. (Ireland)	Chancellor & Son, Architects, Chalmford	do.
Cottages, Newry	Ponitla R.D.C.	I. Morrison, Amiens-street Terminal, Dublin	do.
Reservoir, Cast-iron Main, &c.	Darby School Board	J. Graham, Engineer, Bank-street, Carlisle	do.
Cottages, &c., Heddon-terrace, Croydon	Rev. F. Healy	F. S. Antill, Architect, Draycott, Derby	do.
Presbytery, Gortin, Co. Tyrone	Kingston-on-Thames Guardians	E. J. Toye, Architect, Waterloo-place, Londonderry	do.
Iron Staircases, &c., at Workhouse	Amersham (Bucks) R.D.C.	W. H. Hope, Civil Engineer, Hampden Wick, Middlesex	do.
Sewerage Works, &c.	Boyd Corporation	Taylor & Co., Engineers, 17, Arden-street, Westminster, S.W.	do.
Boundary Wall, &c., Pine Grove	G.N.E. Co. (Ireland)	I. Morrison, Amiens-street Terminal, Dublin	do.
Bridge Works, Newry	Boyle Corporation	Borough Engineer, Town Hall, Boyle	do.
Three Cottages, Tynan Station	Newhaven U.D.C.	E. Knightley, Council Officer, Newhaven	Nov. 18
Cart shed, storerooms, &c., Pine Grove	Corporation of London	Engineer to the Corporation, Guildhall, E.C.	do.
Grants Road Metal	Borough of Lewesam	Surveyor, Town Hall, Oxford, S.W.	do.
Repairing Sewer in London Wall	Borough of Lewesam	Surveyor, Town Hall, Oxford, S.W.	do.
Iron Fencing	Boleyn U.D.C.	C. G. Barnett, Town Hall, Lifford	do.
Sewerage Works, Shafton Two Gates	Boleyn U.D.C.	W. D. Sang, Civil Engineer, Kirkcaldy	do.
Sewerage Works, Chisney	Boleyn U.D.C.	Wm. Bell, Architect, York	do.
Sewerage Works, Windygaen, near Kirkcaldy	Boleyn U.D.C.	E. M. Chart, Surveyor, Town Hall, Croydon	Nov. 20
Additions, &c., to Railway Station, Hull	South-eastern Railway Co.	Borough Engineer, Town Hall, South-east	do.
Road Works, Grove-road, Mitcham	Boleyn U.D.C.	Works Department, Admiralty, Northumberland-avenue, W.C.	Nov. 21
Sea Walls, &c.	Boleyn U.D.C.	R. E. Wilson, 65, Victoria-street, Westminster, S.W.	do.
Consignee Buildings, at Grove Point, Portland	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	Nov. 22
Revised Tenders for General, Sta. Offices & Car Shed	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Two Concrete & Brick Gasholder Tanks, Polshill Wks.	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Works at Villars, Fudysvonn Estate, Belfast	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Flats and Kitchens	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Making-up Glasgow, Tweedmouth, Stirling, &c., roads	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Electric Lighting Works	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Superstructure of Museum, South Kensington	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
* Bldgs., &c., Waterside Wharf, Jew's-row, Wandsworth	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
House and Stabling, Clare-don-road, Watford	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Reminding 6 and 7, St. John's-square, Cardiff	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Villa, Belgrave-road, Brindlington	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Shop, Clumber-street, Nottingham	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Car sheds, Portwood Tram Depot	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Twelve Pairs of Houses, Long Eaton, Notts	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Six Villas, Long Eaton, Notts	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Business Premises, Grey-street, Newcastle-on-Tyne	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Two Shops, Cowell-street, Llanelli	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Seven Houses, Gilbert-road, Llanelli	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Additions to the Ashburnham Hotel, Llanelli	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.
Alterations at Workhouse	Boleyn U.D.C.	F. H. Collier, Architect, 8, Brudenell-gate, Nottingham	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Applications to be received
Two quantity Surveyor's Assistants	London County Council	2 <i>l</i> . 2 <i>s</i> . per week	Nov. 1
Sanitary Inspector	Metropolitan Borough Woolwich	11 <i>l</i> . and rise to 140 <i>l</i> . per annum	do.
Electrician	Hackney Borough Council	2 <i>l</i> . 2 <i>s</i> . per week	Nov. 1
Inspector of Drawing	Secretary of State for the Colonies	1,000 Rupees per annum	Nov. 2
Watering Under-Foreman	Portsmouth District Water Co.	Not stated	Nov. 2

Those marked with an asterisk (*) are advertised in this Number.

Continued, pp. 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

Public Appointments, viz.

TENDERS.

METALS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under \$500, unless in some exceptional cases and for special reasons.]

BRIGHTON.—For the supply of granite, kerbing and channelling, for the Town Council. Mr. F. J. C. May, C.E., Town Hall, Brighton:—

			Per ton, in London.		
			£	s.	d.
Sheet Iron, Galvanised, flat, ordinary quality—					
Ordinary sizes 6 ft. by 2 ft. to 3 ft. to 22 g.			12	15	0
" " 22 g. and 24 g.			13	5	0
" " 25 g.			14	5	0
Sheet Iron, Galvanised, flat, best quality—					
Ordinary sizes to 20 g.			16	0	0
" " 22 g. and 24 g.			16	10	0
" " 25 g.			18	0	0
Galvanised Corrugated					
Ordinary sizes, 6 ft. to 8 ft. 20 g.			12	15	0
" " 22 g. and 24 g.			13	5	0
" " 25 g.			14	5	0
Best Soft Steel Sheet, 6 ft. by 2 ft.					
" " 22 g. by 20 g. and thicker			12	0	0
" " 22 g. and 24 g.			13	0	0
" " 25 g.			14	5	0
Cut mills, 3 in. to 6 in.				9	15

(Under in, usual trade extras.)

LEAD. &c

Per ton in London.

LEAD, &c.		Per ton in London.			
		£	s.	d.	
LEAD—Sheet, English, 3 lbs. & up.	16	7	6	0	
Pipe in coils	13	6	0	0	
Soft Pipe	16	7	6	0	
Compo Pipe	16	7	6	0	
ZINC—Sheet	16	7	6	0	
Vicille Montagne	25	0	0	0	
Silesian	24	10	0	0	
COPPER—					
Strong Sheet	0	10	11	0	
Thin	0	10	11	0	
Copper nails	0	11	0	0	
BRASS—					
Strong Sheet	0	10	11	0	
Thin	0	10	11	0	
TIN—English Ingots	0	1	3	0	
SOLDER—Flumbers	0	0	6	6	
Timber's	0	0	6	6	
Blowpipe	0	0	0	0	

ENGLISH SHEET GLASS IN CRATES.

15	oz.	thirds	2d.	per ft. delivered.
11		fourths	1d.	10 37
21	oz.	thirds	3d.	10
11		fourths	2d.	10 39
26	oz.	thirds	4d.	11 41
31		fourths	3d.	10 10
32	oz.	thirds	5d.	11 10
11		fourths	4d.	10 10
Fluted sheet, 15	oz.	oz.	4d.	11 10
11		21	10	11 10
1		Hartley's Rolled Plate	13d.	10 10
1		11	10	10 10
1		11	10	10 10
1		11	10	10 10

5. &c.

f e d

		OILS, &c.		£	s	d.
Raw Linseed Oil	in pipes or barrels	..	per gallon	0	2	6
"	"	"	"	0	2	6
Boiled	"	"	"	0	3	5
"	"	"	"	0	2	8
Turpentine,	in barrels	..	"	0	3	3
"	in drums	..	"	0	3	3
Genuine Ground English White Lead			per ton	21	0	0
Red Lead, Dry			"	20	0	0
Best Linseed Oil Putty			per cwt.	0	8	6
Stockholm Tar			per barrel	1	12	0

VARNISHES, &c.

per gallon.

VARNISHES, &c.	Per gallon.
Fine Pale Oak Varnish	8
Superfine Pale Oak	10
Pale Copal Oak	10
Superfine Pale Oak	10
Fine Extra Hard Church Oak	12
Superfine Hard-drying, Oak, for Seats of Churches	10
Superfine Pale Orange	14
Superfine Pale Elm	12
Fine Pale Maple	16
Finest Pale Durable Copal	18
Superfine Pale Red Oak	18
Eggshell Flating Varnish	18
White Copal Enamel	20
Extra Pale Paper	18
Fine Japan Gold Size	16
Best Black Japan	16
Oak and Mahogany Stain	18
Brunswick Black	18
Griffin Black	18
Knitting	16
French and Brush Polish	6

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving advice.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. No receipt by the author of a proof of an article in this journal does not constitute an acceptance.

All communications regarding literary and artistic matters should be addressed to **THE EDITOR**; those relating to advertisements and other exclusively business matters should be addressed to **THE PUBLISHER**, and not to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under \$500, unless in some exceptional cases and for special reasons.]

BRIGHTON.—For the supply of granite, kerbing and channelling, for the Town Council. Mr. F. J. C. May, C.E., Town Hall, Brighton:—

Description of Granite.	Flats No. 10, 11, 12, by 6 in. at per 1000 run.		Channel 12 in. by 6 in. at per 1000 run.		Channel 20 in. by 6 in. at per 1000 run.	
	s.	d.	s.	d.	s.	d.
Manuelle & Co., London	1	2	1	3	1	1
W. Wilson	1	3	1	3	1	1
Stichfeldt & Co., London	1	3 ³ / ₄	2	2 ³ / ₄	1	2
Van Praagh & Co., Woodbridge & Co.	1	3 ³ / ₄	1	3 ³ / ₄	1	2
R. Robinson	1	3 ³ / ₄	1	3 ³ / ₄	1	2
Watson & Co., Ltd.	1	3	1	2	1	0
W. Cottrell	1	4	1	4	1	0
Manuelle & Co., London	1	6	1	5	1	4
Trunton & Son	1	6	1	5	1	4
The Road Maintenance and Stone Supply Co., Ltd.	1	3	1	2 ³ / ₄	1	2 ³ / ₄

[illegible]

CARDIFF.—For the erection of public conveniences, Llanerford-road and Fair-oak-road, Roath, for the Corporation. Mr. W. Harpur, C.E., Town Hall, Cardiff. Quantities by Engineer:—

	Beresford- road Convenience.	Fairoak- road Convenience.
F. Small	£18 1	£15 1
A. W. Cadwallader	207	160
Gough Bros.	177	125
W. T. Morgan	176	126
Knox & Wells*	165	121
	[All of Cardiff.]	

CARLTON (Notts.).—For the erection of an isolation hospital, for the Workshop and Blyth and Cuckney District Isolation Hospital Committee. Mr. Fred. Jackson, architect, 40, Bridge-street, Workshop. Quantities by architect.

Rowell & Son	£6,590	o Gill & Son	£4,977
Phillips & Leverton	6,390	o Green & Co.	4,895
Shaw & Son	6,375	o Huddsworth &	
Wickers, Ltd.	5,990	o Son	4,778
o Wright	5,825	o Ilett & Sons,	
Phillips & Son	5,760	o Workshop	4,745

[Architect's estimate, £4,920.]

CRADLEY HEATH (Staffs.).—For the construction of stoneware pipe sewers, High-street, &c., for the Quarry and Urban District Council. Mr. W. Fiddian, engineer, and Bank Offices, Stourbridge. Quantities by engineer:—

R. Rowland & Sons	£1,497	0	0	Saunders & Son	£982	17	0
Hobrough	1,180	11	6	E. Moore	257		
Mackay	1,096	6	2	Beardwood			
Vale	1,024	9	1	road Smithwick*			
A. Meredith	1,061	12	3				
A. Allsopp	987	0	0			958	12

CROUDON. For the erection of a house at Purley for						
Mr. Alfred Harley	Mr. F. Owen Moore, architect, 12, Cornford-grove, Baltham, S.W.					
Mr. Manning ..	£1,698	0	0	Chapman & Son £1,096	0	0
Mr. Roberts ..	1,367	0	0	W. Hine ..	1,071	1
Mr. Robinson ..	1,434	0	0	Executors ..		
Mr. Walker ..	1,205	0	10	E. Goulder ..	1,770	0
Mr. Smith & Sons	1,183	0	0	Mr. Simmons & Co.	1,050	0
Mr. Westbrooke	1,140	0	0	Mr. Gathercole		
Mr. Mart & Sons	1,124	10	6	Bros., Nor-		
Mr. H. Baldwin	1,118	15	5	bury	1,029	0
Mr. G. Wright	1,110	13	5			

ECCLES (Lancs).—For the erection of mortuary buildings, Patricroft, for the Corporation. Mr. T. S. Picton, E., Town Hall, Eccles :—
Hardman & Jones, Eccles £228 16

LEEDS.—For the erection of a shed, Antwerp Mills,
Armley. Mr. C. S. Nelson, architect, 15, Park-row,
Leeds:—
Masonry and Bricklaying.—Esdras
Wales, Armley, Leeds*
Carpentering and Joinery.—J. Trukitt &
Son, Bramley*
Foundry.—L. Cooper, Leeds*
Painting.—J. Lindley, Leeds*
Plating.—J. Atkinson & Son, Leeds*
Scaffolding.—E. Greaves, Leeds*
£2,760 13 "

[See also next page.

METALS

Per ton, in London.

		Per ton, in London.					
		£	s.	d.	£	s.	d.
Common Bars		7	15	0	8	5	0
Staffordshire Crown Bars, good merchant quality		8	5	0	8	15	0
Staffordshire "Marked Bars" ..		10	10	0	-	-	-
Mild Steel Bars		9	0	0	9	10	0
Hoop Iron, basic price		9	5	0	9	10	0
" galvanised		16	0	0	-	-	-
(* And upwards, according to size and gauge.)							
Sheet Iron, Back		-	-	-	-	-	-
Ordinary sizes to 20 g.		12	0	0	-	-	-
" " 24 g.		11	0	0	-	-	-
" " 28 g.		12	10	0	-	-	-

WATCLIFFE (Yorks).—For the erection of four houses, near the Old Church, for Mr. Wilkam Wood, Heskethe-pend, Lightcliffe, near Halifax. Messrs. Walsh & Nicholas, architects, Museum-chambers, Halifax :—
Masonry.—Butterworth & Smith..... £597 15 0
Wyke..... 142 0 0
Joining.—M. Woodhead, Lightcliffe..... 39 12 6
Plastering.—S. Jagger, Lightcliffe..... 29 10 0
Slatting.—A. Firth, Brighouse..... 40 8 6
Painting.—G. E. Firth, Halifax..... 12 10 0

LONDON.—For three lantern louvres on roofs over steam generating dust destructor building, Wentworth-street, E., for Metropolitan Borough of Stepney. Mr. N. W. Jameson, Borough Engineer :—
 Calman & Son..... £165
 J. I. Robey..... 149
 Watts, Johnson, & Co. 137

LONDON.—For the manufacture, delivery, and erection of surface condensing plant, with all accessories complete, on the eight beam engines at the Abbey Mills pumping station, for the London County Council :—

Alley & MacLellan	£23,220 0 0
Bertrams, Ltd.	14,451 0 0
Klein Engineering Co., Ltd.	13,500 0 0
John Fraser & Son.....	13,455 0 0
Woodhouse & Mitchell, Ltd.	12,603 0 0
Mather & Platt, Ltd.	12,500 0 0
Isaac Storey & Sons, Ltd.	12,050 0 0
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East Perry Road Engineering Works Co., Ltd.	11,844 0 0
Cole, Marchant, & Morley, Ltd.	11,733 0 0
Couper, Schwarz, & Co.	11,145 0 0
Amos & Smith.....	10,260 0 0
Easton & Co., Ltd.	10,120 8 0
Clayton, Goodfellow, & Co., Ltd.	9,850 0 0
Sir Hiram Maxim Electrical and Engineering Co., Ltd.	9,499 11 6
Grant Ritchie & Co.	8,850 0 0
D. Stewart & Co. (1902) Ltd.	8,447 10 0
John Cochrane.....	8,400 0 0
Mirlees Watson Co., Ltd.	8,050 0 0
Ashton, Frost, & Co., Ltd.	7,995 0 0

MARGATE.—For the supply of flints and broken granite, for the Town Council. Mr. E. A. Borg, Borough Surveyor, Town Hall, Margate :—

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T. Tobin, Margate.....	£0 6 0 per cubic yard.
<i>Granite.</i>	
J. Runnalls, Penzance	0 12 0 per ton.

NANTWICH.—For additions, &c., to workhouse, for the Guardians. Mr. C. E. Davenport, architect, Hospital-street, Nantwich. Quantities by architect :—
 J. E. Williams..... £220 0 0
 J. F. Heywood..... 210 0 0
 Cox & Vaughan .. 199 10 0

PENZANCE.—For the erection of a lavatory, Princess-street markets and Promenade lavatory, for the Corporation. Mr. F. Latham, C.E., Public-buildings, Penzance :—
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 D. D. Hall, Gateshead-on-Tyne..... £1,432 13

SOUTHAMPTON. For the supply of granite chippings, macadam, &c., for the Corporation. Mr. J. A. Crowther, Borough Engineer, Municipal Offices, Southampton :—

Sandell	1 1/2-in. granite chippings, 8s. per ton.
Brothers,	1 1/2-in. do. 7s. 6d. per ton.
Southampton* 1 1/2-in.	do. 10s. per ton.

TUTBURY.—For the construction of sewerage and sewage disposal works at Tutbury, for the Tutbury Rural District Council. Messrs. Willcox & Raikes, engineers, Birmingham :—
 Lowe & Sons, Burton-on-Trent*..... £5,171 19

WITNEY (Oxon).—For works of water supply, including the providing and laying of about 7,000 yards of 9-in., 6-in., 4-in., and 3-in. cast-iron mains, with the requisite valves, hydrants, &c.; also the construction of water tower and tank, and the supplying and fixing of pumping machinery, oil engines, &c. Mr. George Winslip, F.C.S., consulting engineer :—

F.G.S., consulting engineer.....			
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Bartlett Bros.	7,866	W. Manders.....	6,763
J. Peattie	7,750	S. Wood	6,680
Johnson & Langley ..	7,391	D. Young	6,639
H. Shardlow	7,268	Gill & West	6,543
Dixon & Fish	7,074	Porter	6,279
J. H. Vickers	6,991	P. W. Simons	6,242
H. Roberts	6,950	Rowell & Sons, Chip-	
A. G. Osenton	6,879	ping Norton*	5,962

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VOL. LXXXIII.—No. 3119.

NOVEMBER 15, 1902.

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Abbey Dore Church, Herefordshire	Drawn by Mr. Roland W. Paul.
Westhope Manor, Shropshire	Mr. E. Guy Dawber, A.R.I.B.A., Architect.
Chancel Screen, St. John Baptist, Potter's Bar	Drawn by Mr. Roland W. Paul.
Additions to House in Hertfordshire	Mr. Roland W. Paul, F.S.A., Architect.

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HAPPISBURGH: FROM INLAND

The Church of Happisburgh.



N the edge of the coast of Norfolk, about half way between Winter-ton and Cromer, stands the church of Happisburgh, dedicated in honour of the Blessed Virgin. The considerable height of its tower makes it a well-known feature, for it stands on a slight elevation of this low-lying coast, called Happisburgh Hill, which the guide-books usually exaggerate into a "lofty eminence." Apart from the size and dignity of the church, its history is of some little importance and interest. The Conqueror granted the town of Happisburgh to Roger Bigot, and Bigot bestowed it in marriage with his daughter Maud on William de Albi, ancestor of the Earls of Arundel and Sussex. When William, at the beginning of the twelfth century, founded the priory of Wymondham, which was then a cell of St. Alban's, he bestowed the whole town and church on that religious house. On the occasion of the burial of his wife, Maud, at Happisburgh, William de Albi renewed his grant of the manor after a solemn fashion, confirming the gift by offering on the high altar of the parish church, through the hands of the Bishop of Norwich, a silver cross that served as a shrine for relics of the true Cross, of our Lord's manger-crib, and of the Virgin's sepulchre, together with his gold

ring, and a beautifully-wrought silver cup to be reserved for the Eucharist. The proceedings are set forth in detail in the register of St. Alban's in the Cottonian collection, where it is stated that there were two exceptions to the gift of the whole manor, namely, the land of Anscot the Chamberlain and one little house (*mansiuncula*) called Eccles. The occasion of the interment of Maud de Albi must have been a grand day for Happisburgh; and it may reasonably be inferred that the Early Norman church then standing was a building of some considerable size and dignity to be selected for this purpose. The burial was attended not only by Ebrard, Bishop of Norwich, but by the priors of Wymondham, Norwich, Thetford, and Castlere, and by a host of other clerks and laymen.

There are various references to Happisburgh in Walsingham's chronicles of St. Albans. Ralph de Nuers, the fourth prior of Wymondham, by his hot temper is said to have been the cause, *circa* 1160, of the violent quarrel that broke out between William, Earl of Arundel, the descendant of the founder, and Robert, Abbot of St. Alban. Eventually the Earl opposed with violence the attempt of the Abbot to visit the church of Happisburgh, driving him from its very doors, with the result that the Earl was cited before the Archbishop of Canterbury and was in danger of excommunication. A compromise was, however, at last brought about through the intervention of the Earl of Essex and other lay mediators. A composition of 1228 arranged that the vicars of

Happisburgh should be episcopally instituted on the presentation of the prior of Wymondham, without any interference from St. Albans. A few years later there was another quarrel in which Happisburgh was concerned, namely, a dispute between the Prior of Wymondham and the Archdeacon of Norfolk. The former forbade the Archdeacon visiting the church of Happisburgh or holding his courts on the manor. The strife was referred to Rome, and settled in the year 1249 in favour of the Archdeacon.

The church and manor of Happisburgh was by far the most valuable endowment held by the priory of Wymondham in the thirteenth and fourteenth centuries. In 1291, the annual value of the rectory of Happisburgh, appropriated to the monks, was the then large sum of 35*l.* 6*s.* 8*d.*; an amount that was only surpassed by ten other churches in the great county of Norfolk, and those pertaining to important places such as Yarmouth, East Dereham, North Walsham, or Diss. Their lands and manorial rights at Happisburgh afforded the monks, according to the same return, a further income of 59*l.* 12*s.* 11*d.* The stipend of the Vicar of Happisburgh, which was originally arranged at a pittance of five marks yearly, was altered before the thirteenth century closed for payment in kind and fees. To him was assigned by the priory the tithes of flax and hemp, of calves, poultry, geese, pigs, general merchandise, and gardens, as well as all oblations, and mortuary and testamentary fees. But there was clearly more than one priest at this

great church; for various charters and rolls of the fourteenth century refer to chaplains of Happisburgh, though how they were supported cannot now be definitely ascertained. Judging, however, by analogy, these extra parochial clergy were in all probability supported by the voluntary contributions of the various guilds. It is known from pre-Reformation Norfolk wills that there were four guilds in connexion with the parish church of Happisburgh, namely those of St. Mary, the Holy Trinity, St. John Baptist, and St. Anne. There were also lights kept burning before the Rood, and before the images of St. Nicholas, the patron saint of sailors, St. Mary, St. Margaret, and St. Erasmus.

The present church of Happisburgh is a fine lofty building, consisting of chancel, clearstory nave with aisles, south porch, and a high western tower. It is surpassed in beauty of design and in finish, in this county of fine churches, by Worstead, Cromer, Salle, Causton, and possibly by two or three others, but certainly may be reckoned among the ten or twelve best churches of fifteenth-century date, when there was such an extensive ecclesiastical rebuilding throughout the whole of East Anglia. There is no tradition as to the date of the rebuilding, but a special circumstance in the history of the great house of Wymondham offers a probable clue. Stephen London, an ambitious man, who became Prior of Wymondham in 1446, secured its freedom as a cell of St. Albans in 1448, and its conversion into an independent abbey. The promotion of London was signalised with much pomp and ceremony; it was a part of his policy to exalt Wymondham in every way, and what more likely than that he should see to the rebuilding of their most important church of Happisburgh, in the new and popular style, as soon as Wymondham secured the right to the unhindered use of her own funds, and to an entire independence of superior control. At all events, the style of the work, when compared with other Norfolk examples, seems to be nearer the middle than the end of the fifteenth century.

Notwithstanding the great scheme of rebuilding carried out at that period, the fabric has some trace of earlier work. The chancel has now no windows on the north side. The upper part of the wall shows, from the exterior, two blocked-up square-headed clearstory windows. Below them have been two large openings that are now somewhat difficult to define. There are traces of the foundations of a late building of some size against this wall at the east end of the north aisle. It is stated that some remains of Norman work were found here at a restoration about twenty years ago; if so, it is possible that this is the site of the burial of Maud de Albini in the twelfth century, and that the chapel was afterwards altered, and used perhaps as a commodious vestry. The three-light east window of the chancel is a modern imitation of fifteenth-century work. The two south windows, with quatrefoils in the heads, and the crocketed hood of the piscina niche on that side are *circa* 1360. The Decorated style was late in dying out in Norfolk, and there are not a few instances in which quatrefoil work in the upper tracery of a window can be shown to be fairly advanced in the fifteenth century and used synchronologically with downright Perpendicular

work; but in this case there is no doubt of the tracery being earlier. The outer wall on the south side of the chancel shows traces of a former chapel separated from the chancel by an arcade of two arches. Probably these windows belonged originally to the chapel.

There is one trace in the nave of an earlier fabric than the present well-designed building. At the east end of the north aisle, close to the small doorway that gave access to the rood-loft stairway, part of the capital of a respond of a fourteenth-century arcade is exposed. It is about 3 ft. below the capital of its successor of the next century. The corbelled chancel arch seems also to be of fourteenth century date.

The nave is separated from the aisles by arcades of five lofty arches on each side, supported by octagon piers and responds. The aisles are lighted throughout by large pointed windows of the same date, and there are also five good clearstory windows on each side. There is a small square-headed three-light window above the chancel arch. The octagon font at the west end of the nave is a handsome example of the fifteenth century, and obviously coeval with the rebuilding of the tower and body of the church. It stands on a flight of three octagonal steps, the space below the uppermost one being panelled with quatrefoils. The bowl bears the Evangelistic symbols, alternating with angels playing musical instruments. The octagon base is supported by alternate "woodwoses" and lions under canopies. The woodwose, usually corrupted into "woodhouse" or "wodehouse," was a wild man of the woods, and is usually represented with a natural growth of long shaggy hair all over the body. The woodwose was a distinctive feature of later mediæval pageants and masques in England. The figure was also used as an heraldic supporter in the bearings of several families of distinction. The use of these strange figures as supporters of font bases is met with in many fourteenth-century churches throughout East Anglia, usually in association with lions. Possibly they were first used in such a position owing to their heraldic connexion with the family of the donor of the font, and were afterwards put in the same place, without the like reason, as a conventional ornament of some school of font carvers.

In the south wall of the south aisle, between the two most eastern windows, is a large squared recess, about 3 ft. wide by 6 ft. high. It has had three richly ornamented crocketed canopies, now much mutilated, but still bearing traces of bright colouring and gilding. This must have been designed for some particular group of imagery, or for a group of three associated saints connected with the chapel or altar at the end of this aisle. Possibly this was the site of the altar associated with the Guild of the Holy Trinity.

There is a fairly good fifteenth-century rood-screen remaining, but none of the rood-loft. Mr. J. S. Cotman made an outline etching of this screen in 1811, but gives none of the base, which was probably then obscured by pews. There are three arches in the screen each side of the central opening, and each is divided into two openings with cinquefoil heads. At an extensive restoration in the "eighties," the lower panels of the screen were needlessly divided into two by strips of perpendicular moulding that were not part

of the original design. These panels were in the first instance painted with winged angels—very possibly representing the different grades of the heavenly hierarchy—and the result is that traces of half an angel and one wing appear in each of the subdivided panels with semi-comic effect. The spandrels of the panelling are well carved, and differ in each case. Small dragons, eagles, and human faces may be noticed, as well as foliage. The tracery of the upper part is good and richly developed, though rather toilsomely "improved" at the restoration with lighter wood. Within the screen are plain returned stalls with poppyheads of the same date. Under the tower is a panelled chest inscribed "1708, W. H. Midelton Churchwar."

Among the Harleian MSS. of the British Museum are the heraldic church notes of Norfolk taken by Robert Kemp in the year 1575. With regard to this church he wrote:—

"Hapessboroughe Church in the chauncell window.

Clifton.—Bendy of x pieces argent et goulis
Goulis a playue crosse argent.

Erpringham.—Vert a schochion and an orle of merles argent.

Felbrige.—Or a lyon saliaunt goulis
Azur 3 Crownes or spered argent.

Aslache.—Argent a Chevron inter iij Katherine wheels sable.

Ujforde.—Sable a crosse engr' or.

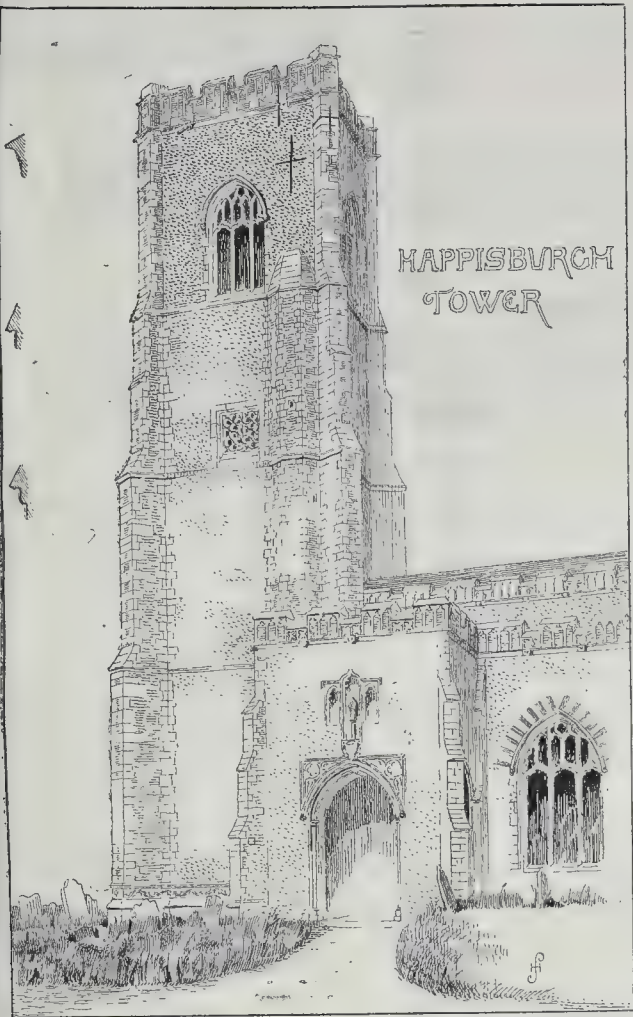
Fastolfe.—Or et azur Cartelle or Quarterlie."

All this heraldic display has long ago disappeared. There are no old monuments left in the church, but it is said that various inscribed stones were covered up after restoration. Against the north wall of the north aisle is a large mural brass to James Slater, for thirty-six years Vicar of Happisburgh with Walcot; he died in 1895.

The handsome south porch has a well-designed image-niche over the entrance, between two single lights communicating with the parvise or room above. In the niche, on a pedestal, is a fairly good figure of the Blessed Virgin and Holy Child; it is said to be the original, and, strange to say, has escaped mutilation. Within the porch, on the right hand of the inner doorway, is the large recess for the holy water stoup. The parvise is gained by a stairway from the church, but it is quite clear of all fittings or remains; it never had a fireplace. On the opposite side of the church to the porch is a large disused north doorway.

The fine lofty tower, which used to have pinnacles at the angles, now stands about 110 ft. high. It is divided into four stages. The base mouldings of the wall-plate are handsomely worked in flowing tracery and in small panelled arcades of flints and freestone. The third stage has those large square openings so characteristic of Norfolk towers, termed "sound holes," filled with tracery. The highest stage has four pointed three-light windows of some size; unfortunately, the window to the west has lost its tracery, which gives a rather forlorn look to the church as it is approached by the main road from that side. The west doorway of the tower has ten shields in the deep moulding round it, as well as two in the spandrels, but they are all uncharged.

A former adjunct to this church, in an unusual place, remains to be noted. At the west end of the south aisle there has been a building of some size, having an internal measurement of about 21 ft. by 13 ft., the



end of the aisle and the side of the tower forming two of the outer walls. The building had a gabled roof. In the west wall of the aisle, about the centre of the east end of this adjunct, is a niche some 4 ft. by 18 in. with trefoil head. The small holes drilled in the sides of the stonework of this niche, and the two larger ones at the base show that it was originally protected by an iron grille, and had a small platform or shelf in front, which was probably intended for votive offerings. At any rate, an image or figure stood here, either of exceptional beauty and delicacy, such as one of alabaster, or else one that was specially venerated and had some cult of its own. There was no direct communication with the church from this building, which is an exceptional feature in its construction, for any kind of chapel or adjunct at the west end is most unusual. Possibly a thorough search among pre-Reformation wills might throw some light on the image that was here so carefully protected.

Quite ninety per cent. of the Norfolk

churches, owing to the lack of stone and the cost of transit in bringing it from a distance, are constructed of flint or pebbles set in concrete, and merely faced with stone at the quoins and angles and round the windows and doorways. This sparsity of moulded stone often prevents the tracing of buildings of an older date among the component parts of rebuilt structures, as can often be done in the stone districts of England; but a careful examination of the interior of Happisburgh tower brought to light at least two examples of early Norman moulding pertaining to the church as known to William de Albini, court butler to Henry I. Several other stones appear to have been tooled with the Norman diagonal axing.

When the Valor Ecclesiasticus was taken in 1535, the value of Happisburgh to Wymondham Abbey was less than it had been at the end of the thirteenth century. The rectory was only returned as worth 16*l.* per annum; the manor and lands, with pasturage for 700 sheep, was valued at 49*l.* 13*s.* 8*d.* a year; and there was also an average gain

of 6*s.* 8*d.* to the abbey from wreckage on the coast; and of 3*l.* 6*s.* 8*d.* in manorial court fees and fines.

Such a fine church as Happisburgh was doubtless well equipped with costly furniture and fittings, the gifts of the Abbey of Wymondham, of the larger families of the district, and more especially of the parochial guilds. At the beginning of Edward VI.'s reign, his Council profited largely not only by seizing chantry, collegiate, and hospital lands, but by taking no small amount of the goods and valuables from the churches. In 1551 the Privy Council coolly "decreed that forasmuche as the Kinge's Majestie had neede presently of a masse of mooney, therefore Commissions shulde be addressed in to all shires of Englande to take into the Kinge's handes suche church plate as remaineth to be employed so unto his Highness use." On September 2, 1552, Sir William Fayrmer, Sir John Robsant, and Sir Christopher Heydon, together with Osbert Momford, Robert Barney, and John Callybute, esquires, visited Happisburgh as Royal Commissioners, when the following indented inventory was drawn up between them and John Callowe and Robert Elwyn, the parish churchwardens.

"In primis ij chales with ij pattens. Whereof the one ys doble gilt and the other parcell gilt, the doble gilt weying xij ounces and iij quarters en ye ouncwe lijs. iij*l.*d., and the parcell gilt x ouncwes, every ouncwe lijs. iij*l.*d. iij*l.*li. x*s.* x*d.*

Item one payre of sencers of sylver parcell gilt, weying xxiiij ouncwes, every ouncwe lijs. iij*l.*d. iij*l.*li. vii*s.*

Item iij copes, wherof one of blew velvet, another of rede velvet, another of blake satten, vallowed att. xlijs. iij*d.*

Item iij vestmentes, wherof one of blake velvet, another of whyt damaske, the thyrd of grene satten, vallowed att. xs.

Item j crosse of copper, vallowed att. v*d.*

Item ij handbells, weying by estymacion xvii*l.* ijs.

Item iij stole belles, the best bell weying by estymacion v*l.*c., the second bell xs., the third bell xii*l.*c. xxii*l.* xs.

Item ij clappers valued att. ijs.

Whereof assygned to be occupied and used in the mynistracion of Devyn Serveyce the lest chales and the lest bell."

It is not likely, judging from the weight, that either of these chalices could be the great cup (evidently from the description of secular origin) given to the church by William de Albini in the twelfth century. Of the miserable remnant of church goods left to Happisburgh by Edward VI., the paten pertaining to "the best chales" is still in use, and is one of the eleven mediæval patens extant in England that bears an inscription. The gilt is sworn off, but it is otherwise in good preservation. The paten, which is 4½ in. in diameter, has the Vernicle in the centre (formerly enamelled), with a slightly forked beard and cruciform nimbus. The legend, in black letter punched on the rim is:—*Accipite ex hoc est eni corpus meum quod p vobis tradetur.* The hallmarks give the London date letter for 1504-5.

On the south-east of the churchyard is a small house called the Rectory, or the Old

Rectory. The grange of the monks of Wymondham, with their tithe barns and other manorial buildings, was in a different part of the parish. This "rectory" is somewhat of a puzzle. It is stated by old inhabi-

tants that it used to be called the Church House, and yet it does not appear to have ever belonged to the church. Can this building possibly be the successor of the little mansion, even then called "Eccles" or

church (that may have been the site of the first pre-Norman house of prayer), which William de Albi specially excepted from his great gift to the monks in the twelfth century?



NOTES.

Trade Unions
and Workmen.

THE case of "Read v. The Friendly Society of Operative Stonemasons" is one of great importance and interest both to employers and workmen. Although the facts at first sight seem somewhat complex and the law rather subtle, the real point is perfectly plain and simple. The gist of the whole matter is that Trade Unions, whether representing masters or men, may not act so as to cause a third person to break his contract with one with whom the Trade Union has any concern. In the case in question, the plaintiff was apprenticed to Messrs. Wigg & Wright, builders, of Ipswich. Rule 6 of the Trade Union for the Ipswich District was to the effect that in no case should an apprentice be more than sixteen years of age, whereas the young man in question was considerably over this age. We need not consider the wording and meaning of this rule, upon which the Trade Union and the masters held different opinions. In the result, however, the Trade Union obliged the builders to dismiss the apprentice, who thereupon brought the action in question. The County Court Judge, before whom the case was first tried, held that there was no right of action against the Trade Union, because they had acted in a *bona-fide* manner and without malice. The Court of Appeal and the Court of King's Bench came, however, to a different conclusion, on the short ground that the Trade Union had conspired to enforce action, by threats of a character which they had the means of carrying into effect. "Belief," said the Master of the Rolls, "however honest, that in what they did they were acting in the best interest of the Society of Masons, could be no excuse for conspiring to deprive the plaintiff of the advantages of his contract." In other words, where there is a contract between two persons it is not legal for a union to bring pressure upon one of them to depart from it. That is to say, the Trade Union for its own ends has induced a person to commit an actionable wrong. The distinction between what is right and what is wrong under such circumstances may be illustrated by another example. If the plaintiff had been an ordinary workman and the Trade Union had persuaded him to leave his employers, giving them due notice, this

would have been a perfectly legal action on their part, because no contract would have been broken. In all cases in which Trade Unions bring pressure to bear upon masters by causing workmen to leave their employment, they are doing a legal act so long as the workmen depart from their engagement under proper terms. Of course, this decision will be regarded with dissatisfaction by Trade Unions; but the truth is that at the present moment the law may be said to be safeguarding the interests of masters and non-union men, just as a few years ago it was building up a code of case law for the protection of Trade Unions.

THE Highways Committee of the London County Council have acted wisely in postponing indefinitely the consideration of the suggestion for a proposed bridge over the Strand. The difficulty is just what we expected it would be—the junction of the proposed road with Waterloo Bridge. As the roadway could not be in a line with the roadway of Waterloo Bridge, it ought to have been evident from the first that the junction with the bridge would be a very awkward problem, difficult to arrange as regards convenience to traffic, and impossible to arrange without spoiling the bridge. We do not think anything more will be heard of the scheme.

THE case of *Humphrey v. Young* (*Times*, November 7) again raised the point on which we commented in the case of *Woodford Urban District Council v. Stark* (*the Builder*, March 29, 1902). A summons had been taken out by the Sanitary Authority against the respondent for refusing to make certain alterations in the drains of a pair of semi-detached houses. The houses had one continuous roof and were divided by a party wall which did not go up through the roof, and was separately let and separately assessed, but the drain or sewer served both houses. The Justices found as a fact that the houses were two separate buildings, and, in consequence, that the drain was a sewer and vested in the Local Authorities and the respondent was not liable. The Divisional Court refused to dis-

turb this finding of fact, and held that each case must stand on its own merits. The importance of the decision lies in the fact that the case of *Hedley v. Webb* (1901, 2 Ch., 126), in which Justice Cozens-Hardy held a pair of semi-detached houses one building within the meaning of Section 4 of the Public Health Act, 1875 (the Section in question here), has been considered by some a binding authority on the question. In that case, however, Justice Cozens-Hardy also said it must be a question of fact in each case, and householders will be wise to remember this, as on a question of fact it is useless to attempt to review the decision of the Court of first instance. Seeing the diverse decisions that have been given on this simple question of fact, and the interest Sanitary Authorities have in taking proceedings, it is a matter of regret that the private householder should, before he embarks on litigation, have no certain guide as to what in fact constitutes "one building only, or premises within the same curtilage," within the meaning of the Act.

AN interesting example of masonry bridge construction is to be found in the Max Joseph Bridge, now approaching completion in Munich. This structure is essentially a three-hinged arch crossing the river in a single span of 210 ft., rising 19 ft. 6 in. from the springing to the crown, which is 3 ft. 9 in. in thickness. The roadway and footpaths, having a combined width of 59 ft., are carried by auxiliary arches, the piers of which are supported by the main arch. Including the approaches, the bridge has a total length of 298 ft. 6 in. The masonry is of limestone, with the exception of the granite bearing-stones for the steel hinges. The main structure is practically finished, but some architectural features remain to be executed, including columns with bronze bas-reliefs, which have been designed by Professor Fischer, of Stuttgart.

ONE of the tunnels for the Weston aqueduct of the Metropolitan Waterworks, Boston, appears to have developed quite unexpected conditions during construction. It was anticipated as the result of soundings that the

tunnel in question would be through solid rock, although work was commenced where the upper part of the excavation was in clay. The theory was that the rock formation would be struck at a higher level, but as things turned out the whole cross-section was not brought into rock until the tunnel had been driven for about 915 ft. Timbering was employed from the first, but owing to the belief stated above, it was of inadequate strength. The result was that the timbers began to crush and sag, and collapse was only averted by the addition of stouter supports. In one place along the first 915 ft. of tunneling the rock dropped just below the elevation of the invert, and in two places it rose slightly above the crown of the arch. The rock penetrated is a seamy, broken granite, and the clay is so hard as to require blasting, but so intersected with sand as to be unsafe without substantial support. Trouble also arose in consequence of a sand pocket, which yielded so much water that nearly a week was occupied in driving through a length of 6 ft. The circumstances stated above serve to show the risks and uncertainties of tunnelling work, but it is difficult to understand why, in this case, anything should have been left to chance. We hear that mishaps in tunnelling are too often attributable to misplaced optimism on the part of some person in charge of operations.

Dynamo Design.
ON Tuesday last Mr. H. A. Mavor read a paper on the design of direct-current dynamos and motors to the Glasgow local section of the Institution of Electrical Engineers. The paper, from the nature of the subject chosen, was necessarily of a very technical character, and the author's attempt to popularise it by putting most of the formula into appendices, so that "the text be not unduly defaced," is not to be commended. In our opinion, to put a lengthy mathematical formula into words is a useless proceeding, as it demands quite as much knowledge on the part of the reader, and takes up far more space. Mr. Mavor points out that the ratio between the iron and copper in the armature of a motor is not a fixed quantity, but depends on the nature of the work it has to do. If, for example, it is run from the supply mains on a very variable load, the iron losses should be kept low, as they are practically constant at all loads; but if the load is constant, then the ratio of copper to iron should be designed so that the combined losses are a minimum. As slotted armatures are now almost universal, and as consumers demand machines in which it is not necessary to change the position of the brushes with the load, motor design has become a very complicated problem; but Mr. Mavor's diagrams seem to show that there are several simple laws governing it. He states that in large dynamos the power generated varies directly as the speed of rotation, and that the total lost power "radiated from the armature varies as the square root of the speed.

Chadderton Free Library Competition.
An architect who had applied for the conditions for the competition for Chadderton Free Library, sends us the following extract from them:—
"The payment to the successful architect will be a sum equal to 5 per cent. for plans, details, and superintendence, and 2½ per cent. for quantities

and measured bills on the total cost of the whole work.

The architect must state at the time of competing what amount will be allowed from this sum towards the salary of the clerk of works, whom the Council will appoint."

This is a new and most unheard-of proposal; and we may add that this is one of the cases in which competitors are asked to deposit a guinea before they can obtain a copy of the conditions of the competition; which makes it still worse. He parts with his guinea to obtain a copy, and then finds that it contains this improper stipulation, to which he cannot and ought not to accede, and his guinea is gone without redress. Perhaps a public notice of the matter may save some other readers from wasting their guineas.

Petworth Church, Sussex.

It is stated that an application will shortly be made to the Chancellor of the Diocese of Chichester for a faculty in respect of the fabric of the parish church of St. Mary, Petworth, Lord Leconfield having undertaken to bear the expense of reinstating the nave and of carrying out various improvements of the interior. The church, as erected in the latter part of the fifteenth century, was for the most part rebuilt, under Sir Charles Barry's superintendence, at a cost of 16,000*l.*, defrayed by the Earl of Egremont, ancestor of the present Baron Leconfield. The church comprises a nave, chancel, north and south aisles, with an old chapel dedicated to St. Thomas at the end of the north aisle, in which were buried several members of the house of Percy, Earls of Northumberland, to which family the manor formerly belonged. The monument to their memory was sculptured, in 1837, by Carew. At the east end of the south aisle stands the tower, of which the spire rises to 180 ft. Petworth was brought in marriage to Charles, sixth Duke of Somerset, by Elizabeth, only surviving child and heir of Joceline (Percy), eleventh and last Earl of Northumberland. Their daughter Katharine married Sir William Wyndham, Bart., father of the first Earl of Egremont. The chapel at Petworth House (which Charles, Duke of Somerset, reconstructed) formed part of the old mansion occupied by the Percys.

A New Hotel in Piccadilly.

ALL the equipment and other effects of the Bath Hotel and the hotel and restaurant known as Walsingham House, will shortly be sold at auction. Since the relinquishment of a scheme promoted by an American syndicate to take the site for a large hotel, the directors of Carlton Hotel, Ltd., have agreed to pay 250,000*l.* for the lease of Walsingham House and the freehold of the Bath Hotel, with a view to the building of a residential hotel on the site. They estimate that the total outlay will amount to from 500,000*l.* to 600,000*l.*, whilst an opportunity would be afforded for the widening of Piccadilly on the south side, at the upper end of Arlington-street. The Bath Hotel, in which, at No. 155, Piccadilly, are the original White Horse Cellars, was so named, it seems, after William Pulteney, Earl of Bath, who lived in an adjacent house on the west side of Arlington-street, and, according to one account, had as his next-door neighbour Sir Robert Walpole, who, in 1742, removed to No. 5 on the opposite side. On the site of Nos. 23-24 in that street, and of Nos. 150-4, Piccadilly, was erected, in

1886-7, Walsingham House, after plans and designs by Mr. W. O. Milne, the ground landlord being Lord Walsingham. In pulling down No. 23, Arlington-street, was found a wall-painting executed in distemper, representing, in life-size, Hercules and Omphale in the grotto on Mount Tmolus, with a landscape in the background. The drawing-room of the adjoining house, which, as others maintain, was the early home of Horace Walpole, formed the scene of the second picture of Hogarth's "Marriage à la Mode," engraved in 1745. Sir Robert Walpole's first house in the street was rebuilt for him in 1729 by William Kent.

The Modern Gallery.

At the Modern Gallery in Bond-street is a collection of works in water-colour and pencil by a young artist, Mr. A. Romilly Fedden, which show unquestionable talent and originality, though there is a want of definite aim in them; the artist seems to be still in search of a style. His small colour sketches of town scenes and people seem prompted by the example of Mr. Melville of the Old Water-colour Society, whose figures are all made up of dots of strong colour; Mr. Fedden has caught the trick very well, but it is only a second-hand effect. His larger work of somewhat the same class, but with the figures more defined, "Sunlight and Shadow" (60), is however quite admirable, and not so imitative. Then he shows us a separate class of moonlight and night effects, treated with a technique quite different and rather a mannerism; some of these, however, are very effective—"Quimperlé, Moonlight" (30) especially. "A Breton Idyll" (65) is also a fine work, but here again we come upon reminiscences of Mauve. Mr. Fedden has a way of his own in the use of pencil, and his small pencil sketches of figures and heads are excellent. In short, for a young man's exhibition this is a collection full of interest and promise; only we recommend him to get to a definite aim in his art and keep to it.

The English Art Club.

THE Exhibition of the New English Art Club at the Dudley Gallery contains some very clever unfinished pictures, one or two good finished ones, and a good many things that do not deserve the name of pictures at all. Mr. Brabazon invites us to regard some shapeless blots of colour as "Philæ," and Mr. Wilson Steer offers us some brown smudges to do duty as "A Glade." In some of the subjects which introduce architecture prominently the buildings are all crooked (see Nos. 15, 108, &c.)—that we suppose is a note in "New Art"; but Mr. George Thomson's two architectural interiors from Windlestone (29 and 36) are good pieces of work, definite but not too hard, and Miss Hogarth's "Uffizi Palace" (42) is good as a slight sketch. There are no figure subjects that present beauty—beauty is a worn-out pleasure, and a good number of them are hideously ugly; but among the finished paintings Mr. E. A. John's "Merikil" (111), a half-length of a woman, is a remarkably fine piece of colour, if only the face, and the way of painting it, were not so unattractive. Mr. Strang's group of three men under the title "The Statuette" (103) is also a powerful work, though it cannot be called more than a broad sketch. Among the landscapes there are two

beautiful small works by Mr. Mark Fisher (54, 67), a refreshing contrast to many other things in the gallery. Miss Fanner's large landscape, "Richmond Hill" (86) is a little disappointing; the artist seems to have succumbed a little to the influence of her surroundings, and has lost some of the brightness and movement which characterised her former exhibits. In Mr. Wilson Steer's "Upland Landscape" (59) the tree in the foreground stands out with great power. Mr. Lindner's "Evening Glow" (2) and "The Haybarge, Holland" (43) are bright and sunny (a rare quality in the landscapes in this exhibition), and Mr. Francis James's two flower studies (7 and 20) are fine in colour and freedom of design; but why call the second one "a study in orange"? It is surely a very scarlet "orange." Among others that pleased us are Mr. Muirhead's small landscape study, "The Shepherd" (62), and his "Woodland Landscape" (71), which has some of the quality of the best school of French landscape painting; Mr. Henry's "The Millpond" (107); Mr. Russell's "Richmond Castle, Yorkshire" (116), a fine bold sketch for a landscape, worth finishing; and Mr. Yates's picturesque bit of old buildings "At Dunmow, Essex" (133).

At Mr. Van Wisseburgh's Gallery in Brook-street there is a collection of etchings and pencil and wash drawings by Herr M. Bauer. The etchings are the best portion of the collection; they are of rather large scale and mostly represent Oriental buildings with rather confused groups of figures. There is a fine bold style of execution and composition about them; "The Terrace" is perhaps the best, and is a very effective work. The style of the drawings we do not sympathise with; they are rather untidy and scabbily large pencil drawings of architectural subjects (chiefly), with monochrome washes on them—a method of execution which does not make the best of architectural subjects; "Amiens Cathedral" for instance, is certainly not a success. There is a decided power, however, about the view of "The Kremlin"; and "Coronation Festival at Moscow," where a confused torrent of people, not very much defined, seems to be pouring down a broad exterior staircase, is striking and original in composition.

AMONG the birthday honours is a knighthood for an eminent architect and one for an eminent contractor—Dr. Rowand Anderson, of Edinburgh, and Mr. J. Mowlem Burt. Contractors on a large scale have long been accustomed to be knighted, and even created baronets, but the recognition of architects as persons who may have some claim to official honours is almost a novelty. Better late than never. In this case the bestowal of the honour on a Scottish architect was evidently intended as a recognition of Scotland; an Irish and an English architect having been recently knighted, the remaining sister kingdom had a claim to be remembered.

SANITARY OFFICERS.—The Local Government Board has sanctioned the appointment of the following Sanitary Inspectors: Mr. W. A. Perry in Camberwell, Messrs. R. J. Davis and J. A. H. Cooper in Lewisham, Miss E. Stewart in Southwark, Mr. T. D. Young in the City of London.

MAGAZINES AND REVIEWS.

The frontispiece to the *Art Journal* takes the rather unexpected form of an etching by Mr. Axel Haig which is nearly all landscape effect, and the building quite subordinate and only half-shown; it is a view of Balmoral, and is a fine work. Mr. Edward Dillon writes an article on the very interesting subject of "Turner's last Swiss Drawings," with some comparative illustrations of the same subjects treated in two different sketches. The subject is to be continued. An article by Mr. I. Langridge is devoted to the consideration and illustration of Mr. Frederic Shield's paintings in the little chapel off the Bayswater-road, familiar to many who have passed along the road, but which there seems to be some strange difficulty in getting access to, although it is understood that it was built as a kind of open refuge for weary souls. At all events we have never succeeded in finding it open. Mr. Hercules Read, the Keeper of British and Medieval Antiquities in the British Museum, contributes a profusely illustrated article on "The Waddesdon Bequest" to the British Museum, by Baron Ferdinand Rothschild, a remarkable collection of Renaissance works of art and jewellery, which seems still little known to the general public. The *Christmas Art Annual*, published in connexion with the *Art Journal*, is devoted to the life and works of Sir W. B. Richmond, the literary portion by Miss Helen Lascelles. The numerous illustrations give a remarkable idea of the versatility of power of this artist, including as they do portraits, landscapes, and architectural studies, as well as the figure pictures mostly of antique Greek subjects with which his name is most generally connected.

We presume this month's issue of the *Magazine of Art* represents the promised expansion of this excellent publication in regard to matter and manner, more especially in illustrations. It is certainly an admirable number. The new element in it consists to a considerable extent in the increased use of coloured illustrations. Thus, the frontispiece is a powerful and effective chromo-lithograph reproduction of one of Mr. Byam Shaw's pictures from Ecclesiastes—that of the rich man "whose wealth will not suffer him to sleep." There is an article on this set of productions by Mr. Shaw, which we think have been a little over-rated, though there are some powerful things among them, and we are glad to find here the explanation of the one entitled "For God shall bring every work into judgment," which is certainly not apparent on the face of the picture, nor do we even now see that there is any necessary connexion between the subject as described here, and the text. Mr. Val Prinsep commences a very clever contribution, which we are glad to see is to be continued, entitled "New Art and Old Masters—Then and Now: a Vision," in which he imagines in a dream the old masters visiting modern galleries and talking with the modern artists. This fancy is made the medium for a good deal of good criticism, and the personifying of some of the ancient artists is very dramatically done. One can quite fancy Cellini's first remark on seeing Leighton's bronze of "The Sluggard"—"Mother of God! This is a fine casting! My Perseus was not more successful"; and he is rebuked by Michelangelo for being "ever too prone to admire mechanical skill." The whole article is a good idea and, so far, very well carried out. The editor contributes a discriminating article on Mr. C. Dana Gibson, "apostle of American beauty and humour." Architecture is recognised in an article on Mr. Colclutt's building, Lloyd's Registry. Among the coloured illustrations are four jewellery designs by the French artist René Lalique, who is certainly an original artist, but with a little too much of the trail of the "article de Paris" over his work; and there is a separate coloured plate, or rather a red monochrome one, from one of Romney's numerous Lady Hamiltons. Altogether a most spirited and interesting number. We must say, however, that we do not altogether like the new cover, with its grey sculpture and architectural design on a black ground; in a decorative sense it is rather heavy in appearance.

The *Art Workers' Quarterly* goes on admirably; the present number is a very good one. The most important article is one by the Rev. Percy Dearmer on "The Altar and its Furniture." Among other things, Mr. Dearmer observes that the height of the altar being decided by practical reasons (the best height is about

3 ft. 3 in.), the dorsal ("dossal" it used to be called) should not be of such a height as to dwarf the altar and rob it of its importance, but that the altar may be emphasised by length (10 ft. or 12 ft. being common in old instances; and by enclosing it on three sides, an anchor as a method of which a modern example is given in an illustration from St. Mary's, Primrose Hill. All this is in favour, it may be observed, of giving to the so-called altar the appearance it ought to have as being properly speaking the "Communion table," as it is called in the Prayer Book. The persistent use of the word "altar" by modern ecclesiologists is of course useless to protest against. A large proportion of the illustrations in this number are made up from the prize designs of this year's National Art Competition, and a very good show they make. The text accompanying this consists largely of reprint of the examiners' reports; one of the interpolated comments is however very much to the point, viz.: that too many of the students are occupying themselves in surface-pattern designing which they are trying to dispose of to manufacturers; that many of these, however good as design in the abstract, are not what manufacturers want and are not technically suitable; and that students would be better occupied in giving at least part of their efforts to learning a craft thoroughly; "they will be more competent as designers if armed with a substantial knowledge of the possibilities of the material with which they are dealing." This is excellent advice.

It is difficult to select anything for special notice amid the curiously mixed pages of the *Artist*, in which, after a modern fashion, illustrations and writing are jumbled together in a manner which seems to have more reference to the attractive appearance of the page than to an attempt to follow out any subject fully. Among the portions that we can specify are the illustrations of bookbindings by Miss Maudie Nathan. These are all in a good style and show forms of design specially suitable for leather and tooling. An article on the work of Mr. Norman Ault, an artist whose name we do not recollect, shows us as accompaniments a considerable number of exceedingly good black and white drawings.

The *Architectural Record* for October (which arrived too late for notice last month) contains a good survey of contemporary French sculpture, by M. Paul Vitry, an official of the Louvre Museum, who writes in a broad critical spirit, puts Rodin (thank goodness!) in his proper place, and appreciates fully the grandeur of M. Bartholomée's great work the "Monument aux Morts," in which, as he truly says, "the profoundest thought and the most touching sentiment to be met with in the whole range of modern art are expressed with such grandeur and such harmony." M. Vitry, while doing justice to the brilliant talent displayed in much of the recent French sculpture, regrets the breaking away from the best traditions of breadth and repose in sculpture, in favour of an increased vitality and movement which are alien from the true spirit of the art, and tend to widen the breach between it and architecture. In short, this is an eminently well-considered and wise article. Another article is devoted to a criticism of the "flat-iron" building in New York, now well-known by illustrations; the article forming No. 2 of "Architectural Appreciations." We have nothing to find fault with in the criticism, except to ask, was such a building worth a long article at all? An English architect, Mr. G. A. T. Middleton, contributes an article on "English Farmsteads," the illustrations to which ought to interest American architects, being something so different from what they can find in their own country. But we hope there will be no attempt to imitate them; they will not bear transplanting. Mr. Edwards Gale, we presume an American, gives an article on the Erechtheion, with no new "views," but a good summary of its history and architectural character, with illustrations from photographs.

The November issue of the *Architectural Record* contains an account and an illustration of what is called "An Innovation in Architecture." This is in connexion with the New York Public Library, not yet commenced, but on the site of which one bay of the architectural design (a classical design with an engaged order) has now been erected full size, for imitation of the material to be ultimately used in order to enable the architect to judge of the effect of the details. This certainly is an

ation, and one which we fear it would be difficult to have carried out generally, on account of the expense; but it is a splendid in itself, and we cannot but admire the ingenuity of the architect who took such a line in studying the effect of his design in perspective. Professor Goodyear contributes a paper on the subject to which he seems to have devoted his life—the effort to prove that deviations from the perpendicular and the angular found in ancient buildings were intentional, and not due either to bad foundation or careless setting out. In this paper he has got photographs of various buildings in Italy which are leaning slightly out of the perpendicular, and wishes to prove that they were all built thus deliberately and for reasons of effect. The leaning out of the piers in St. Mark's façade is now no longer regarded as due to settlement, but to structural considerations. If Professor Goodyear included English medieval buildings in his survey, we suppose he would tell us of the leaning over of Peterborough front and the deliberate intent of the builders. We would be sorry to appear to speak with any respect of so able a man, but it does seem to us that amounts to a kind of architectural y.

The *Architektonische Rundschau* it is shining, amid the frequent eccentricities of German architecture, to find in Herr Mann's Public Baths building in the Waldstrasse in Berlin a really fine, solid, and unified piece of work. This is a massive front of which two-thirds of the height consists of bold rusticated masonry and rounded windows, terminated by a modillion cornice, immediately below which is a long row of small square mezzanine windows. Above this the wall surface changes to smooth work (or perhaps cement with stone joints) with very boldly treated pedimented rusticated windows inserted in it, the whole ended by widely-projecting eaves on wooden brackets. It is about as bold and effective a piece of street architecture as could be seen. A noteworthy family funeral vault (*Grabmal*) at Paderborn, designed by Professor Haupt of that town, though questionable in detail, is impressive in general design. The leading article in number is occupied with "Deutsche Ornamente: Neue Formen," and fearful stuff it is. It is a succession of fireworks going off.

The *Berliner Architektur-Welt* has a considerable variety of interest in its illustrations. The exterior and interior of the Villa Löwenstein, by MM. Hauser and Vogt, of Berlin, illustrates a modern German city residence of the most dignified class; a school building by Paul Hesse shows a sensible and severe front of suitable character, and there is a good study about the police building in Berlin (at a suburb of Berlin), by Herr Timmann, a brick building with plain dressings and a rusticated stone front; it has the merit of looking like a police-service office. The number contains also some sculpture illustrations, showing both good sculptural style and originality of idea, and some more or less interesting examples of decorative work, of which the best is a "Fensterlaibung," a word which our German dictionary is innocent of; "Fenster-laden" we know, but what is "Fensterlaibung?" It is a fine bold piece of design, in any case. Along with the *Architektur-Welt* is issued the second special number (*Verheft*) under the title *Berliner Kunst*. Here, unhappily, we are in the full swing of the "New Art" again, and can find little to sympathise with; the only thing among the illustrations is a commission design for a bridge over the Rhine at Cologne; this is a quiet and sensible design, of good character; we cannot say so much for the two separate designs for bridge piers (not the same bridge); they are pretentious and ending after effect.

The *Antiquary* contains the first part of a long and important article by the Rev. James Barron on the "Limes Britannicus," an attempt to identify with finality the thirteen divisions of the *Notitia*, and to trace out the course of the *Limes*. The "Ramblings of an Antiquary" (II), conducted by Mr. George Bailey, leads us instance to the ruined manor-house of Warkenton, Derbyshire, of which we have a historical sketch, three coats of arms, and a drawing of a pretty Elizabethan pavilion which is still standing, and which it is suggested was a place from which ladies might view the sports on the green before it.

The sketch is on a small scale, but shows a building which is interesting and unusual.

The *Quarterly Review* contains articles of considerable and varied interest, but none of them on subjects which it comes within our province to comment on.

Harper contains an article on "Surrey Downs," by Mr. Arthur Colton, which includes some remarks in regard to John Evelyn and his house, or what is left of it. The author fully appreciates Leith Hill and its wonderful view, though thinking (and we agree with him) that the boasted sight of "twelve counties" is not much to the purpose. Mr. Walter Hough, of the United States National Museum, contributes a short article on "Ancient Peoples of the Petrified Forest of Arizona." In the same number we meet the rather startling heading—"Puis de Chavannes, Cartographer." Who would have dreamed that this decorative artist of the solemn and severe style, whose pictures are without a trace of humour, was capable of making caricatures of a rather coarse and vulgar description? To do him justice, he attached no importance to them, and in sending them to a friend, M. Philippe Gille, he said, "it is my way of amusing myself"; adding "tear them up, burn them; they are yours." M. Gille preserved them, and some of them are here reproduced. He would have done better to burn them; they add nothing to Puis de Chavannes; they are not even humorous.

Under "The Field of Art" *Scribner* gives a short account of American artistic pottery, of which there seem to be now several varieties connected with as many names, firms, and localities. As far as one can judge from the small photographs given, America is getting quite a pottery art of its own; as indeed we should have expected, though not much of it has been heard of in England as yet.

The *Pall Mall Magazine* contains a very interesting article by M. Bernard Secretan on "The New Pacific Cable," describing and illustrating the methods of laying out, picking up for faults, localising faults &c. "Boston, Ancient and Modern," with numerous small illustrations of the architecture of the city, is the subject of an article by the competent hand of Mr. Montgomery Schuyler. Architecture is also represented in another article in the same issue, by Mr. Hugh Philpott, on "Some Points of Interest in the New Westminster Cathedral." It is an article both enthusiastic in tone and well judged in its critical expressions.

Macmillan contains a kind of "rhapsody" on the Cathedral of St. Magnus at Kirkwall, worth reading for the picturesque manner in which it is written, and the vivid way in which the character and the peculiar glamour of the ancient cathedral and its stormy surroundings are conveyed to the reader's mind.

The *Essex Review* deals this quarter more with subjects of history than of archaeology. There is however an article on the ancient silver hoard discovered at Colchester in July last, when the workmen engaged in excavations on the site of the London and County Bank in High-street discovered a leaden casket containing over 12,000 early English silver pieces. None are later than Henry III., a good many are a century earlier. Illustrations of two dozen of them are given. Speculation as to the original owners of this money, and the cause of its being secreted, has been indulged, but can only be very imaginative. The writer of the article in the *Essex Review*, however, has hit upon one possible explanation of the mystery:—

"It was a custom of King Edward I., and one he commenced in the very first year of his reign, to impose large levies upon the nation, and it appears from the Borough Records that a fifteenth was exacted from Colchester in that year, and again a further contribution three years later. The rolls actually contain most detailed particulars as to the manner in which these levies were computed, and it is particularly significant that throughout the assessments of the burgesses' chattels, ready money was conspicuous by its absence. Almost every entry relates entirely to goods, and one only of all those quoted in 'The History and Antiquities of Colchester,' mentions cash. The entry is as follows, and may be taken as typical of the others, except that the rest are innocent of any cash balance:—

'William the Miller had the day aforesaid in ready money one mark of silver. In his cupboard a silver buckle, pr. 6d.; one ring, pr. 1s.; in his granary one qr. wheat, pr. 4d. &c., &c.'

Now surely the apparent impecuniousness of the burgesses, in spite of their pretty abundant possessions in kind, is a remarkably suspicious circumstance, and it is by no means unreasonable to

imagine that possibly they were shrewd enough to conceal their coin so as to avoid the objectionable impost."

It seems rather hard that according to law, these coins should go to the Treasury, instead of remaining in a local museum; we share the hope, at all events, that after the reasonable demands of the British Museum have been satisfied, the remainder of the find may be returned to Colchester. The "Notes and Queries" include a curious little bit of information which has been communicated to the *Review* from two different contributors (both accounts are printed), about the oak screen in Thorpe-le-Soken Church, along which runs an inscription "This loft is the bachelers' made by ales," with some words of blessing (apparently) at the end. The explanation is that the screen was made with funds raised by the "bachelers" at a "church ale," a "carousal" which was the precursor of the no less iniquitous modern church-bazaar.

The *Revue Générale* contains an article on "L'application de la Loi Italienne sur la Réparation des Accidents du Travail." This is the Italian law of March 17, 1898, the result of about twenty years' inquiry and deliberation. The article, by M. Georges Eeckhout, we have not space to summarise here; but it will be found of interest by those who are specially studying the subject of compensation to workmen.

Knowledge contains a remarkable communication by Mr. B. W. Lane on "The Canals of Mars," which goes to show, experimentally, that this appearance may be produced by optical illusion, and has been produced thus in the case of Mars. We must refer the reader to the paper for the arguments and experiments. The editor of *Knowledge* seems to consider that the point deserves serious consideration. We are tempted to ask, on the basis of the experiments given, why then have not similar illusory "canals" been seen in the course of telescopic observation of the moon?

The *Church Builder* contains illustrations and descriptions of two fine recent churches, Christ Church, Lower Sydenham, of which Mr. Fellowes Prynn is the architect; and Stoke Damarel Church, designed by Mr. Caröe.

DISCOVERY OF REMAINS OF BERMONDSEY ABBEY.

In the course of recent excavations for the erection of working-class dwellings by the South-Eastern Railway Co., upon land belonging to the London County Council, have been dug up what are considered to be fragments of the foundations and lower courses of the chancel of the abbey church. Further excavation has brought to light pieces of, apparently, a large Perpendicular window and doorway, also of a hood-moulding and an arch of the Early English type, and similar fragments. Timbs, in his "Curiosities of London," cites a drawing in the Upcott Collection showing the monastery as rebuilt early in the reign of Edward III., and the cloisters and refectory in 1380. Katharine of Valois found sanctuary there after the death of her husband, Henry V., and there also died Elizabeth Woodville, widow of Edward IV. For the site itself we may direct attention to a ground-plot plan that was engraved and published by Robert Wilkinson on January 1, 1822, and is described as being from an original drawing taken in 1679—that is to say, nearly 140 years after Sir Thomas Pope had pulled down the church, together with most of the conventual buildings. On that plan "the ground-plot of the old abbey church" is hatched-in upon the sites of some buildings along the north side of Long-walk, on the north side of "the Base Court-yard" (afterwards Bermondsey-square), and parallel with the later Abbey-street. One of those buildings, which is detached, is lettered as "The Rev. W. Whitaker's Meeting House (he was an Ejected Minister, 1662)." The meeting-house is plotted in the south-eastern portion of the nave of the church, which measures, to the scale, 170 ft. in length, the chancel included, by 60 ft. in width at the west end. At the west end of Grange-walk is the site of the East Gatehouse opening into the Base Court yard, and to the south of it are "the Coney-grew" and "the Stable yard." Between Long-walk and the East Gatehouse stands "the Bakehouse," between which and Long-walk are plotted "where the Mansion House stood," and "the Gallery of the Mansion House," as on the east

side of the later square. That was the house, known as Bermondsey House, which Sir Thomas Pope built for himself out of the materials of the church, and which, with its gardens, orchards, pasture lands, ponds, and so on, covered about 20 acres. Of Pope's house there is an interesting water-colour drawing, made by T. H. Shepherd sixty years ago, in the Crace Collection, which shows the old stones in the walling. At the north-west angle of the square stood the North Gate, or Great Gatehouse, and just beyond it the West Gate, where is now Bermondsey New-road. In the Crace Collection is the original drawing of the former, by C. I. M. Whichello, of which Wilkinson published an engraving in September, 1820; on the northern side of the gatehouse he depicts the graveyard of St. Mary Magdalen Church. The gatehouse and some adjoining portions of the conventual buildings remained until 1806, when Abbey-street and most of the square were laid out. The Abbey of the Holy Saviour was originally a priory of Benedictine monks, brought in 1082 from Cluny, whom Aylwin Child endowed with some rents in the City of London. At the instance of Richard II., Pope Boniface in 1399 erected the priory into an abbey, which at one time was amongst the richest and most important in the kingdom. On July 8, 1541, the abbey site was granted to Sir Robert Southwell, Master of the Rolls, who on August 30 of that same year conveyed it in fee to Sir Thomas Pope, Treasurer of the Court of Augmentations, and his wife. Pope, it is true, pulled down the church, but he had saved St. Albans from destruction, and he devoted part of his gains to the building and endowment of Trinity College, Oxford. The late Dr. Rendle, of Southwark, says that Pope caused the Rood of Grace to be removed from the church to the common in Horselydown at the end of the present Crucifix-lane. It was destroyed by the populace, together with the Rood of Grace, from Boxley in Kent, after a sermon preached at Paul's Cross by the Bishop of Rochester on St. Matthew's Day, February 25, of that year.

THE ARCHITECTURAL ASSOCIATION.

AN ordinary fortnightly meeting of this Association was held on Friday, last week, in the Meeting Room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, Mr. H. T. Hare, President, in the chair.

The minutes having been read and confirmed, and some nominations having been read, the following gentlemen were elected members of the Association:—Messrs. P. Luker, M. C. M. Leggett, T. A. Jaques, E. M. Ellis, B. E. Atkinson, jun., R. W. White, A. E. Brooker, H. Hutchinson, F. B. H. Carrell, W. Jones, H. T. Tovey, H. A. Aitken, J. S. Cable, F. C. Mears, J. H. Reynolds, J. Ewing, F. J. Matthews, E. L. Hampshire, E. F. C. Buckley, H. A. Fairhead, J. C. Bull, J. D. Winder, A. E. Richardson, V. Hooper, and S. L. C. Gilks.

Mr. W. Flockhart was, on the motion of the Chairman, also elected, by acclamation.

Mr. R. S. Balfour, hon. secretary, announced the following donation to the library:—*Journal and Supplement of the Sanitary Institute for November, 1902*, presented by Mr. Francis Hooper. A vote of thanks having been accorded to the donor,

It was announced that on November 26 a meeting of the Discussion Section will be held, when Mr. G. P. Bankhart will read a paper on "Decorative Plaster Work."

Proposed New Premises.

The Chairman then gave formal notice of a special general meeting to be held on Monday, November 24, at 7.30 p.m., to consider proposals which have been made by the Royal Architectural Museum and Westminster School of Art.* It would be in the minds of all of them that the question of new premises for the Association had been under consideration for a great number of years, and that for many years it had been referred to in the annual address of their President. It would also be in their minds that their immediate past-President, Mr. W. H. Selth-Smith, made a very determined effort to collect a sufficient fund to enable the Association to acquire or erect new premises. That fund had not yet up to the present time progressed so far as to justify them in the immediate hope of being able to

build. However, on October 27 last, a communication was sent to the Association from the Royal Architectural Museum in Tufton-street, suggesting that their premises might possibly be handed over to the Association for their use. The suggestion had received a very large amount of anxious consideration by the Committee, and the result was that the following resolution had been passed:—

"Resolved, That the Committee of the Architectural Association, having considered the communication of October 27, 1902, made by the Special Committee of the Council of the Royal Architectural Museum and Westminster School of Art, unanimously and heartily resolves to accept the conditions suggested in this communication by the Council in transferring their premises to the Architectural Association, subject to confirmation by the body of members in general meeting."

That gave shortly the objects of the proposed meeting. A circular was being issued to members, calling the general meeting. The Council and subscribers of the Museum propose to transfer their premises in Tufton-street as they stand, together with the valuable collection of casts, to the Architectural Association upon certain conditions. The Association would be required to maintain the use of the Museum free to the public as hitherto; but in the administration the Association would have sole discretion. The original cost of the building was over 4,000l., the new studios cost 3,000l., and the collection of casts is estimated to be worth many thousands of pounds. The Association would be required to pay the contingent liabilities at the time of transfer, roughly estimated at 700l., and in some way retain the name of the Royal Architectural Museum if His Majesty the King is willing to continue his patronage. The lease of the premises expires in 1916, and the lease of the land on which the new studios stand in 1976. The annual rent of the former is 80l. and the latter 60l. Should the members of the Association endorse the Committee's resolution, immediate steps will be taken to complete the transfer, and to give notice at Christmas to terminate the lease of 56, Great Marlborough-street, at Midsummer next, as another opportunity would not occur for seven years. The transfer being effected, steps would at once be taken to adapt the premises which are considered ample for the Association's present and prospective educational requirements. The Committee has given most careful consideration to the matter, and were strongly of opinion that the opportunity of acquiring these premises should not be lost. The Committee hoped that there would be a large attendance of members at the meeting, and that in the meantime careful consideration would be given to the project.

Roof Coverings.

Mr. F. C. Eden then read the following paper:—

I have to ask your pardon to-night for two things; firstly, for what I am going to leave out, and secondly, for what I am going to leave in. I am obliged to omit much of what I might otherwise have said—as I once heard a preacher lament after an hour of violent exertion—because each of the materials with which we have to deal would supply matter for a paper to itself; and, on the other hand, some of the suggestions which I offer with great diffidence may be at variance not only with the well-thumbed rules of the text-books, but with the practice of those who know much more about these things than I do.

It has often been a surprise to me to notice in how many modern buildings of something more than a pretence to architecture, the roof seems to have been left almost to chance. And yet the roof exerts an influence which, though often unperceived, affects the mind so powerfully because, far more than any peculiarities of detail, it impresses the building with the indefinable stamp of character and of style. Surely it is lost labour to be, like Wren, "as nice as the pedants," about mouldings, without, as he did, devoting equal care to the covering of the roof. Just as the most beautiful stone which nature has to offer may be spoilt by stupid and mechanical tooling, or still more

* For instance: "The Welsh slates... split finer and to a more uniform thickness, and are bluer in colour than the others; those from Westmoreland are rougher, thicker, and consequently inferior, and of a dull greenish tint."—Seddon, *The Builder's Handbook*.

"In good slating, the vertical joints of the alternate courses should range in straight lines from ridge to eaves, and the tails of the slates should be in perfectly straight horizontal lines."—*The Building Construction*, "Kivington's," 1901 Ed. 20p.

so by polishing, as in the case of granite the form of a roof may be as elegant as possible, but if the covering material be ungraciously made or mechanically applied, the must be ugly. Architectural beauty is, in but skin deep.

Goethe's maxim, "Take care of the bear for the useful can take care of itself," conveys that good sense which usually lurks at the bottom of a paradox; and is especially applicable to that most utilitarian part of building, the roof. Beautiful materials make good roofs; and ugly materials, without exception so far as I know, prove in the long run to be bad materials.

In reply to the question, What makes a beautiful, or the reverse? I suppose the answer must more commonly given would be colour. This is only partly true, really important quality, in my judgment, texture. A roof may be poor and neutral colour, as are many of the old Cornish roofs. Delabole slate (though, indeed, if she fine surface sympathetic Nature usually takes of the colouring), but with good texture, simplest roof becomes interesting and pleasurable.

The true reason why Westmoreland slate makes a better roof than Welsh is not because they are green and the others blue, but because they cannot be split so thin or be so mechanically dressed. There is a thin green slate the market which makes as ugly a roof as emanated from Portmadoc.

A feeling for texture is every whit as important to the architect as an eye for colour. In the case of every material with which he has to deal he must make a choice between those true and false methods of working, on which texture of surface much depends. In masonry he has to choose between mechanical or sham tooling, or dragged on the one hand, and the traditional tool peculiar to each different kind of stone on the other; in brickwork, between the thick trowel with narrow joints (specified four courses the foot), and the thin brick with wide joints in structural timbers between the marking the circular saw, and those of the adze carved work between the tale of the trowel and the trail of the glasspaper; plaster, between the artificial, screeded surface with sharp arrises, and the natural, trowelled face with angles soft and rounded in lead between milled and cast; in window glass between the slight convexity of crown so valuable in external effect for its brilliancy and changefulness—and the tiny mottling sheet, or the flatness and blackness of plate in metalwork between the marks of hammer, and the neatness begotten of scratch-brush and the file. In every case has to choose between texture and the absence or pretence of it; between a monotonous surface and an interesting one. Let us, then, see how this choice may be exercised in the matter of roofing.

In theory, I suppose, all are agreed as to the rightness of using local materials. It is practice that the shoe pinches, since cheapness of transit has put so many and great temptations from Bangor and Brosely in our way. But, state though the exhortation be, material that, however monumental buildings in large towns be roofed, in the country, and in dealing with cottages, other small buildings, it is of the utmost importance to the landscape that the natural material of the country-side should be used rather than material imported from a distance.

One of the greatest charms of old towns and villages lies in the unity of the roofs—all one material and all of one pitch. Here slate from Westmoreland do not jostle tiles from Brosely; here are no domes of the South, or the steep roofs of the North; here are steep roofs seen side by side with flat roofs, in fact, here are none of those incongruities which are popularly supposed to produce picturesque. This is simply the local material asserting itself, together with that feeling of unity in the roofs of a district which builders of old always exhibited.

Owing to the large expanse of a simple material which most roofs in this country show—often in far larger unbroken surfaces than the walls of the buildings they cover—material with which they are covered has greater æsthetic importance, especially in distant views, than the material of the walls. The smaller the building the truer this is felt to till in a cottage the roof becomes the feature on which the beauty of the whole depends.

* See page 444 this week.

us then suppose, not to be too ambitious, collage is being built in a tile district, might prefer (for reasons which will be given) than on boards or battens; bedding not in mortar, which either drops out or the wet like a sponge, but in hay, moss, dried marsh-grass, or whatever may be available material and traditional usage of strict. The problem—almost an insoluble one—is how to admit plenty of air between the tiles while excluding fine, powdery snow. Mr. R. Nevill, "who, in taking of roofs, has ever seen the horrid mess to be made in the hay in a few years becomes reduced, and ever think of adopting so useless and vicious a method." Felt, he goes on to add, is better, and after some years becomes better than useless. A draughty cock-loft is a dry roof. But if the aspect be much exposed, the under-side of the tiles can be bedded, this method being, perhaps, less objection than bedding in mortar. Fifty years is a suitable pitch. What builders call square pitch, or pitch of 45 deg., hardly ever right, whatever the roofs be covered with, the roof be of the collared rafter form, the rafters might be of larger scantling than the 4 in. by 2 in., but spaced further apart, 4 in. to 6 in. to 2 ft. from centre to centre, intervals need not be equal. The timbers large enough to be framed instead of nailed together, a stronger roof is obtained, and the slight sag of the laths between the rafters produces that ribbed appearance which we admire in roofs that have kept out the rain for generations, and which is the result, not so much of age, as of this method of construction. Another advantage incident to the use of laths is that, owing to their elasticity, it is impossible to get a straight line to the courses. The examination of many examples makes it clear that effects of this kind were studied, and not accidental. In the fifteenth-century house of Ockwells Manor—a house evidently planned with much thought and skill—it was found that the purlins were placed at such a distance that the rafters did not touch them by 1 in. until they were loaded, and when loaded they sprang back to the right again. By this simple means the position of the principals is marked on the outside of the roof by a gentle undulation, not an unbecoming method of construction, and one which serves to give delicate relief to the roof without destroying their breadth and dignity, relief which we seek in vain with gables, dormers, bands of glazed tiles and so on, whereas it is just this soft play of line and shade upon an otherwise unbroken surface which gives so much quiet charm and character to old-world roofs.

Coming to the tiles themselves, what are the characteristics of a good plain tile? What are the requirements of the tile-maker? "A good tile," says Mr. J. P. Allen, "should be hard, burnt, well shaped, non-absorbent, of good grain, and with a glazed or vitrified face to prevent water from penetrating." ("Practical Building Construction," p. 209.) The section on tiles by Professor J. Adams in the work called "Specimen," contains this specification clause:— "over the roofs with first quality hard-burnt, dark, Broseley tiles of approved manufacture, with nibs, but not nail holes, laid to a gauge, and each tile bedded in lime and mortar" (p. 177). Well, I think it safer to let Nature on one's side rather than attempt to defy her. All she can do with "pressed" Broseley tiles of approved manufacture, is to bed them with any thin, flat, vitrified tiles, is to make them, crack them, blacken them, and finally blow them off the roof. But a rough, dark, sanded tile, she will not only water-proof, if that be needed, but will paint it with most delicate grey, or the brightest orange, or any other colour, and it will be as durable as possibly, owing to its flatness, uniformity, unsympathetic surface, produce a roof of any character—a roof such as an artist would care to paint. A good tile will be of moderate size. Some old ones are as narrow as 4 in.; 6 in. is a usual width, I think 5 in. to 5½ in. looks better. With a flat-made tile there is no difficulty, if the rafter is given in time, in procuring them of a specified width, the mould, from which thousands of tiles are made, costing about 6d. The length is usually about 10½ in., the thickness is the really important dimension, and nothing under a full ½ in. could be used; ¾ in. is better.

Next as to shape. The set of a tile, or curve in the direction of its length, is given by placing it when partially dried on a shaped bed of sand; but the buckling, or curve across its width, is the result of hard burning. A buckled tile means a well-burnt tile, and should be by no means rejected. Buckled tiles are especially useful for wall tiling, and when the sun strikes obliquely across them the effect is charming.

Texture of the surface of each individual tile is produced by plentiful sanding, and by not scraping out the mould too often in the effort to get a neat tile, as near as possible to a machine-made one. The nail holes are better punched by hand, and not by any mechanical process, as is sometimes done, even in hand-made tiles. The slight inequality in the level of the holes causes the tile to hang unevenly—a little matter, but an important one, as when each course looks as though laid to a steel straightedge the effect is unpleasant. The colour of a tile depends on the amount of iron in the sand, and on its being burnt with a clean, fierce flame such as wood gives. With wood the temperature can be more easily varied than when coal is used, and it is possible to obtain a greater intensity of heat towards the end of the burning, so as to bring about that incipient vitrification of the middle layer of the tile without affecting its surface, which makes it impervious to moisture.

Needless to say, tiles should not be "selected for uniformity of colour," as some specifications require. It is only by slight varieties of colouring in the separate tiles that the colour of the roof as a whole becomes beautiful.

In a good roof there are many little practical dodges to defeat the weather which all help to give interest and variety to its surface. For instance, where the tiles abut against vertical surfaces, as chimneys, gable copings, party walls, and the like, they are given a slight upward tilt sideways to throw the water away from a naturally weak place. This was the case in all the old roofs at Gray's Inn until they were relaid in recent years, when they were all smoothed out with admirable skill, so that the rain has every inducement to soak into the mortar fillets.

A similar practice is that of laying a tile flat against the verges against the end rafter. This gives a side tilt, which prevents rainwater trickling down the gable face. This specially-made tile, known as "tile and a half," should be avoided, as the effect of a very broad tile in every other course is unpleasant. A good tiler can work the verges perfectly well without it by a little cutting.

For ridges nothing is better than the plain half-round. It has a sanded face, like the common tiles, and is thicker—say, about 1 in.—and is bedded in hair mortar. A thickish projecting fillet of white mortar over each joint has an agreeable effect. I have not noticed it in this country, but it is the usual practice in the North of France. Special end ridge tiles do not look so well as a bottle end or pebble in mortar in an ordinary ridge tile.

For the valleys it is not always necessary to use valley tiles or lead. A pleasant effect is produced by sweeping the tiles round. This involves a certain amount of cutting, and some packing on the back of the valley rafters, and, unless you are fortunate enough to have an unusually skilled and old-fashioned tiler, an enormous amount of personal supervision. But I think the result is worth the trouble.

It is pleasant to think of a roof of tiles or slates as a kind of coarse drapery or tarpaulin, which roughly takes the shape of the framework over which it is thrown, softening all harshness of outline with the gentle undulations into which it naturally falls. The great enemy to be overcome in roof design is hardness. In the typical modern roof each plane looks as if cut out in one piece from some stiff and flat material, like the cardboard roofs of a badly-made model, and makes hard mathematical angles at its intersection with the adjoining planes. For all their fantastical extravagance the roofs of the Low Countries teach us this lesson—that slates, if small enough, can be made to cover any form you please: domes, bulbs, spheres, to say nothing of hips and valleys, like the scales of a fish; so that a complicated roof can be designed without a single mitred or mechanical angle.

It may or may not be true that you can always tell an Adam house by the eaves, but any how, they are not a bad test of a well-designed house; for the most emphatic point

in a small building is the eaves. They occur at the wall-head, to which the eye naturally travels, just where there is the most marked change of plane and of material, accompanied by a strong line of shadow. So it is easy to see that by unskillful treatment of this part the effect of an otherwise good roof may be completely marred. When the sprocket-pieces or rafter ends show, their management demands great care. Nothing can be worse than the effect of a row of narrow sprockets laid on edge, all of exactly the same scantling, and all spaced at exactly the same interval—possibly all varnished into the bargain. A better way is to lay the sprockets flat, whatever you do with the rafters, to space them unequally, and to vary their sizes. In small houses, where the eaves have much projection, the soffits can be boarded, lathed and plastered, or treated as a cove. With slight overhang, a cornice of wood or stone may be comfortably tucked under the projecting tiles or slates.

All eaves' gutters are something of a disfigurement. Substitute for the pleasing irregularities of the natural eaves' line, a line just as hard as cast iron can make it; in other words, fix a half-round gutter, and not only eaves, but to a great extent, elevation also will be spoiled. Where it is necessary to collect the rain water, or where walls are thin, it is better to use wooden spouting. It may be square or V-shaped in section, or hollowed out of the solid, but it must be kept small, or the effect is clumsy. The downpipes in this case will be of wood, with tapering heads, and will stand clear of the wall, to which they are attached by long holdfasts.

When a parapet or cornice gutter is out of the question, nothing looks so satisfactory as dripping eaves. It is the rule where thatch is used, and with the majority of old roofs, though it must be acknowledged that with gables the result would probably not justify a reversion to methods that are suitable only to good building. At the same time, it is not likely that dripping eaves have ever done as much damage in three centuries as neglected guttering and downpipes, choked with their own rust, and discharging the collected water of successive seasons into the walls, have done in a single generation.

Of slate roofs, I think those are prettiest where the slates are very small and thick, and the graduation not too obvious. Old Cornish roofs are of this type: they sometimes have two or three courses of very large slates at the eaves.

What are known as stone slates, such as occur in Oxfordshire and Gloucestershire, make, perhaps, the most beautiful roof of any. Of the heavy Horsham slates, as used upon Sussex houses, Mr. Dawber writes—"The slates are very large at the eaves and diminish in the usual manner to the ridge; but they lack the finish and texture of the small Cotswold stone slates, and are more nearly allied to the heavy roofs of Lancashire and Yorkshire. We notice that directly these slates are used the pitch of the roof is flattened, for these old builders, so sound in their practical knowledge, at once recognised the impossibility of covering with heavy stone slates, steeply sloping sides where all the drag and strain would be on the pegs and laths, and to this can doubtless be attributed the reason of our constantly finding these roofs cemented and stopped with mortar, for their flat pitch has the disadvantage of not always keeping the wet out without extraneous aid."—"Old Cottages," p. 21.

In Gloucestershire, I believe, the roofs are galletted as well as torched—that is to say, after the slates are laid they are gone over carefully on the undersides, and small slips of slate are inserted in the larger crevices which arise from the unevenness of the slates, before the torching is proceeded with.

When the roof is of steep pitch and shows conspicuously against the sky, lead is not suitable, except to monumental and lofty buildings, in which the proportion of visible roof to wall surface is not large. A cottage roof, with eaves 10 ft. or less from the ground, would not be a pleasing object if covered with lead. When the roof is flatish and but little seen, or entirely hidden by parapets, as in many late village churches, lead is especially suitable to those small and highly decorated roofs, such as often surmounted octagonal turrets of the Tudor period. One or two such roofs of tabernacle work covered with lead still survive at Hampton Court. These were doubtless originally brightly illuminated and gilded. On Barnard's Inn hall

is a good louvre in turret form covered with lead. One of the most interesting examples of this kind of work that I know of is the old belfry at Calais, which is well worth missing a train to see.

As with other kinds of roof, so with lead, there are several devices in the laying invented for purely practical reasons, but which lend aesthetic effect and interest. For instance, in many old churches, including Exeter Cathedral, the sheets are not laid parallel to the gable copings, but strike into them at an angle. Then, too, the boarding under the lead in medieval roofs was not close laid, but with gaps of about 2 in. between each board. The motive of both these devices was, by increasing the friction, to keep the lead from creeping; and each gives some interest to an otherwise mechanical surface. The boarding in old roofs is almost invariably oak; with modern imperfectly seasoned wood chemical action is set up and the lead perishes; but if the boarding be thin, say 3 in., and water-seasoned, I believe it is safe to use oak; however, no doubt desilvered lead is more easily acted upon by acidulated vapours than the lead which was used before 1840, when the desilvering process came into use. In modern roofs the rolls are often too big, owing to the use of a wooden core. A welt is better, except in flats, where there is likely to be much walking about, and the wooden roll is a necessity.

There is no practical reason why the sheets should all be of equal width, and a very good aesthetic reason why they should not be. I do not say that they should vary to the extent noticeable in old roofs where there has been much patching, but just enough to destroy the mathematical accuracy which leases the eye.

In old English roofs there is no ridge roll, but the sheets are lapped over several feet at the top; and I believe the ornamental ridge was rare. There is the well-known exception at Exeter, where the ridge of the cathedral has a simple cresting of fleurs-de-lis. Old prints of Holyrood show a beautiful ridge of crowned roses and thistles; but here, no doubt, French influence was at work.

On church roofs one may often see the dates at which repairs were executed accompanied by the churchwarden's initials. These are cast in the sheet, and some of them, as at Minster in Thanet, are elaborate and interesting. There is some suggestion for ornamentation in this. A simple powdering of symbolic or heraldic device, gilt, might be worth attempting. The old *dicke* on King's College Chapel, Aberdeen, is decorated after this fashion, with monograms, lily-pots, thistles, and crowns. The roof of the cathedral at Troyes is said to have been diapered with golden flames. But it is easy to overdo these things, and I think some of the elaborately tinned and painted French roofs of which one reads, must have been rather overdone.

Gilding is as a rule safe enough. In the East domes are often gilt all over. In Western surroundings the effect might be unpleasant, but parcel gilding, as on the dome of the Invalides, is most valuable. I should like to see the ribs on the dome of St. Paul's so treated. The effect would not be in the least barbaric, but refined, owing to the delicate effects of the curvature of converging ribs which would be brought into relief by the gold.

The lead used should be cast, not milled. "It is almost useless," says Mr. Lethaby, "trying to put interesting workmanship into dull and poor materials. It must be allowed that modern sheet lead has a poor, mean, crushed mill-board look, and its wretched colour puts it quite out of court as anything but a mere makeshift. Cast lead, on the contrary, has a beautiful surface, it is cast with the greatest ease, with the most simple of appliances, and does not blacken by exposure to the air as milled lead does. . . . In gutters and flats cast lead should be used, if for practical reasons alone. . . . It is said that milled lead was introduced into England about 1670. The plumbers of the time opposed its use and said it could not be durable. The Milling Company replied by offering to keep milled lead of 7-lbs. a foot in repair for forty years for an insurance of 4 per cent. That, to me, seems saying very little for the material; it would have said little in the Middle Ages at least. Then the forty years' view of things had not been invented" ("Journal of the Society of Arts," xlv. 456).

The greater number of lead roofed buildings have parapets or cornice gutters, but in many

old churches there is no gutter, but the lead hangs easily over the eaves like a frounce, which gives a curiously forlorn look, not without charm. It is just this gentle dressing of the lead which is so appropriate. Modern plumbers like to dress lead far too hard, especially where, as over cornices, they have a fillet to dress it to. The result is that the drip is spoilt and the water runs back over the members of the cornice and down the wall.

Thatchers must be a stubborn race, for they have preserved the traditions of their craft in spite of modern improvements; and, though the best materials are not now available, reeds being no longer grown for the purpose, and wheat straw being too much broken by threshing machinery, their work seems to be as well done as ever. Neatness, which is the bane of slate and tile roofs, is most appropriate to thatch. The more it resembles well-combed fur, and the less it suggests a heap of sodden refuse the better.

The characteristic beauty of thatch is the grace and ease with which it undulates over hips and dormers, and projections of every kind, combined with the curious sense of snugness which it conveys. No eaves gutters are used, and no flashings are necessary against stacks or gable copings. If the walls are plastered a coating of tar about 1 ft. 6 in. high along the base is a sufficient protection against damp.

The thatchers' trade is slowly dying out. Between the years 1851 and 1891 their numbers declined from 6,000 to 3,000; and it is to be anticipated that they will not be able much longer to resist the inroads of improvement and the superior attractions of corrugated iron.

Mr. H. D. Searles-Wood, in proposing a vote of thanks to Mr. Eden for his paper, said he was too great a Philistine to agree with all Mr. Eden had said. He had, unfortunately, rather too much personal experience of what some of Mr. Eden's suggestions resulted in. He happened to have a reversionary interest in some charming property in Kent, where could be found the features dealt with by Mr. Eden: oak timbers, hand-made tiles, &c. The cottages were most picturesque, but their picturesque-ness was all they were worth, for they could not be occupied, but they were often sketched or painted. Consequently, he was rather out of sympathy with Mr. Eden's point of view. Some of the points referred to were interesting, but he would leave some one more in sympathy with Mr. Eden to discuss them.

Mr. M. B. Adams seconded the vote of thanks. He said he was somewhat in sympathy with Mr. Eden's opinions, but he realised with Mr. Searles-Wood that there were more practical difficulties to be dealt with. That a building should not look mechanical was evidently one of the first points an architect should attend to, but they had to do many things in the ordinary practice of everyday life which they would not do if they were masters of the situation, and the suggestions Mr. Eden had made were not altogether practical. One of the greatest and most annoying difficulties that an architect had to deal with was the local by-laws, which on every hand imposed restrictions which were extremely irritating. If an architect attempted to build a house or cottage without, for instance, any eaves-gutter, the district council would not pass the plans. The other day when he was building a small workshop in his garden for his boy—it was an unpretentious building, and he did not intend to have any eaves-gutter at all—he was asked what he was going to do with the water. He was compelled to construct the building in fireproof material, and so he designed it to be built in iron, to be covered in slate (which he thought was an extremely useful material). He knew the local board could not object to this construction, but they sent his plans back and asked him what he was going to do with the water. He got over the difficulty by saying he was going to collect it in a tub. As an instance of the obstructiveness of the by-laws he might mention the following facts: he built a house a year or two ago in a country district of Surrey where the Local Authority insisted upon him taking the waste of one sink with a 4 in. pipe about 200 ft. right round the house in order to comply with the by-laws which stated that nothing like a catch-pipe must be within 60 ft. of a building. Many of the matters suggested in Mr. Eden's paper they would not, in ordinary practice, be able to do. An architect must be practical above all things, and although he was not prepared to say that most of the sug-

gestions made by Mr. Eden were not practical, he must say, after some years' experience, that they would be extremely difficult to put into effect.

Mr. Henry Lovegrove, in supporting the vote of thanks, said he quite agreed as to the difficulties to be faced in regard to the local by-laws, and he could only hope that architects would do all they could to come under the simple London Building Act. He disagreed almost all Mr. Eden's conclusions, and appeared to him that architects did not desire merely to make buildings picturesque, or afford instruction for young artists. No one admired more than he did picturesque cottages, with pretty roofs and so on, but architects had to satisfy their clients in other things as well. As to what Mr. Eden said about sprockets of varying thickness of different spacing eaves, could any one imagine what a client, or district council, or any one else would say to things being done that way? A roof should be picturesque, but the sometimes feared, judging from the style of architecture now so prevalent, that the roof would soon be more or less hidden altogether. At a certain period of the last century, roofs, as they knew were hidden behind an enormous parapet, gave a great character to a building, especially a small one. The Kent and Surrey cottages were extremely picturesque, because they show, comparatively, a large mass of roof, covered with hand-made tiles adorned in nature, giving an effect which could rarely be obtained by slate roofs. He was sorry the paper had not dealt more with the practical details of roof covering, because the roof in every country was of great importance. It must strike any one who visited Holland how extremely careful the people were with their roofs, and how they tried in every way to make good roofs. Some of the old Dutch farm buildings with their projecting eaves were very picturesque; sometimes, for the sake of protection from heavy rains, hay and eddicks were covered with a movable roof drawn up and down by pulleys. Swiss roofs had large projecting eaves and verges, and for the same reason. As to slates, he agreed with what Mr. Eden had said. Some slates seemed almost like newspaper, so thin were they. At a recently-erected London County Council Fire Brigade station some very thick Westmoreland slates were used by the Works Department, but he was afraid that on some of the frail buildings that were erected, it would not be possible to use these slates, for they were very heavy, though they were the best kind of slate to use. Slates, generally, did not change colour—ordinary Bangor slates did not—hard-pan tiles did, and generally looked very picturesque. He liked broseley tiles, and was getting to like dark purple brindled Broseley, but they were a little brittle. He had observed that in modern buildings roofed with tiles there had been a great many subsequent repairs to the roof, and it seemed to him that tile roofs did not last so long as slate roofs. There were a great many so-called patent tiles about, of which he disliked the Broomhall, which seemed to destroy the scale of a building and did not last—in fact they were not durable, and could be scraped with a knife. He was rather sorry that in the twentieth century they should be discussing thatched roofs. They made warm roofs but they harboured a lot of things which ought not to be there. Besides, there was great danger from fire from thatched roofed buildings when built close together. Nor was a thatched roof a good roof for protection from the weather, for there were no flashings in such a roof. He had noticed that the practice was being done away with of providing a very ornate ridge, and he believed that a plain ridge was a good deal better. The ornaments broke off sometimes, and produced a peculiar and not pleasing effect. The plain ridge was more pleasing, with a figure at the end, if they wished. A dropping eaves would look very well if we had no rain, but as we have rain he liked to see an eaves gutter. He did not admire the sunk gutter which was once used in conjunction with the dropping eaves. He thought milled lead was a useful material, cast lead being but little used. No much had been said about zinc, which was a material much used and much abused. It was not of much use unless laid on good boarding and felt. In some districts in Gloucestershire, for instance, the roofs and walls of the buildings seemed to be too much

e same colour. The 45 deg. pitch gave extremely ugly roof, and he thought that in climate we should never go below it; ct, a steeper roof was much better for ling-houses and public buildings.

Mr. H. Wymouth said they ought to look at Mr. Eden for the literary merit of his work and the general interest he had sustained in the paper. He thought they should specially observe the point of view from which Mr. Eden looked at this subject of roofs, i.e., the personal interest an architect must take in tiles and slates and all the minutiae of the subject. There was a great difference between the infinite pains in the erection of a building by Mr. Eden's method and selecting materials by sitting in an office with a specification on your side. He did not think Mr. Eden referred to the old system of doing this merely for philosophical reasons, or with a desire to put in a plea for doing the work in the cheapest way possible. It had been said we have to build cheaply, but that did not apply to all buildings; but effective building could be produced on the lines laid down by Mr. Eden. If we knew how to do money and time, and in recalling to us methods of our forefathers, Mr. Eden had good things to say, and in the sincere way in which he had treated the subject he had, perhaps more of them think that the present rather slap-dash way of specifying a roof was not the best, and that they had better take a little more pains and more personal interest in their work—in the laying and using of tiles, for instance—the same interest, in fact, they took in preparing their drawings for clients to see. The paper fitted in very well with the last paper read before the Discussion Section—a paper by Mr. Cautley on the minutiae of farm buildings as erected in the Corn counties, and the two papers made one of that there were young and able men who were not ashamed to go back to the old ways of doing things. It did not follow that in those old times they were degenerating—it might be that those old ways were better than modern ones. He agreed with Mr. Eden that as far as possible they should use the materials of the quality where they built. Materials had to be transported sometimes, but in the main they were suited to the neighbourhood into which they were introduced. In Westmoreland one used slate for roofing and in Kent tile; when things were reversed there was a certain inharmoniousness about the result. Mr. Eden might have said a little more as to grouping of roofs and the way they run together. As to that, it was not, as some knew, durable, but country folks who would under it winter and summer had many good words to say for it.

Mr. Lewis Ambley said he agreed with what Mr. Seymour had said, *i.e.*, that a paper of this kind was just what was useful in lagging back old methods of covering roofs, compared with which the modern methods were inferior in results as to appearance. The sand-baked Broseley tiles were certainly satisfactory compared with sand-faced, and glazed tiles were an abomination. As to es, Mr. Eden had said it was a question of colour and texture—perhaps it was more of texture. He (the speaker) was very much in favour of regarding colour as of as much importance as texture. He did not think those blue-grey slates ever looked well, particularly when they were used in connexion with "crimson" brick walls, as was often done. As to the green slates, they were not only inferior in texture, but also objectionable, but their colour was good. They were green at first, and then (he said some buildings in mind which had been new years) they got a mottled appearance of dried peas—anything but green; grey or blue, perhaps. Even when green Westmoreland slates were specified, it was not always difficult to get the colour ordered. He had had difficulty in getting the Buttermere slates to the sample selected; the bulk supplied were often of a darker and greyer shade, much of the green tint being lost. Mr. Eden had not referred to copper as a roofing material. Copper, particularly in towns, was an excellent roof covering, though it was very expensive, and the wonderful green colour that it was in the case of the beautiful, Ingham slates was a disadvantage. In the case of copper was a bluish tint which did not harmonize with foliage; but for use in towns it was an excellent material if expense did not to be greatly considered.

The Chairman, in putting the vote of thanks to the meeting, said Mr. Eden's interesting paper had given rise to great diversity of opinion, and there appeared to be a little confusion in the minds of some of the speakers, who had not quite realised what Mr. Eden had in mind. Apparently Mr. Eden had been thinking of roof coverings to cottages and country houses and buildings of that kind rather than of buildings in towns, and a great many people would sympathise with Mr. Eden's feeling that a building, to look really well after the lapse of time, should be susceptible to the influence of the weather, and should show that a certain amount of time had passed over it, and had toned down its irregularities and crudenesses of colour. No doubt to ensure that they must have materials which were more or less soft and absorbent. The Rivingtons and other authorities said that bricks should be hard and non-absorbent—apparently the ideal to look for was cast-iron. It was, in his opinion, most unfortunate that all the text books and all the authorities which were consulted by the young men were prepared from that point of view. Speaking from his own experience, when he was a student he read Rivingtons most religiously, and used to believe that materials ought always to be hard. He also used to think, on the same authority, that a wall should be built of solid stone and not backed with brick, and he had to unlearn many things like that; and there must be similar cases of young men who learnt such injurious stuff. He thought there was great need of a text book which should be a really reliable authority, and which should guide students in the right way. It was absolutely false to say that a hard material was necessarily more durable than a soft one. He knew cases where the hardest pressed red bricks flaked after a few years, while the London there were cases of soft rubbers which had been built 200 or 300 years ago which were as good as new. As to the uses of tiles, Mr. Eden had not told them what he considered to be the best means of treating a roof where there were rooms in it, close up to the rafters. Mr. Eden had told them that chopped hay and that sort of thing was pernicious, and had said that felt was not much better, but he did not say what he considered to be the best way of treating the roof in that case. A method he (the Chairman) had

adopted and found fairly successful was to pick mortar underneath the tiles about 1 in. thick, with an ordinary plasterer's lath between each tile, so that made a fairly good roof, but it was open to objection, for he had noticed that in some cases the frost had got hold of some of the tiles and split them, because they were too tightly held in position, but as far as he knew, sort. Turning valleys, instead of lead valleys, or purpose-made valleys, was an excellent method skill to do it properly. The appearance was good, for the angular line in the roof was lost and a soft effect of one surface flowing into another was produced which was very pleasing. It was done in nearly all cases of stone-slatted roofs, and the stone slates of Northamptonshire still carried out in that way in a good many cases. As to wood gutters and down pipes, he did not agree with Mr. Eden, for he did not think a cast-iron gutter supported wrought-iron brackets was offensive, but it would go down with care. In a great many cases one saw that treatment on a roof with an enormous fascia projecting below the gutter, and, of course, that was objectionable; but when carefully done the iron gutter was not bad. He thought it would be undesirable to omit gutters entirely. As to the weight of stone slates, and the weight of very thick tiles necessitating an increase in the size of the rafters, he thought that was a point very much exaggerated. Supposing they were to have a rafter 6 by 2 instead of 5 by 2 in a house of ordinary size, they would add the extra cost was very little. The weight of timber was one of the smallest costs in the erection of a building, and it ought not to be allowed to influence them. In considering what was the best form of roof covering. As to thatched roofs, they were not durable, but at the same time it was incorrect to say that the thatched roof was disappearing altogether, and that in course of time it would be a method of the past. A great many people were content to have a thatched roof, knowing it must be renewed in a few years, for the sake of its picturesqueness, and that being so, he believed the thatched roof would continue

Stone slates on cottages had been objected to in the discussion because they resulted in such a sameness of colour. That was true, but why should it not be so? Nothing was more charming than the Northamptonshire grey cottages with grey roofs against the green trees and grass.

The vote of thanks having been agreed to, Mr. Eden briefly replied. He said he did not expect, nor did he wish, that everything he said should be agreed to without discussion; but he thought there was a point of view worth putting whether it was accepted or not. He was aware that there were difficulties to contend with as to cost, but still more in the matter of by-laws, but it was as well, as facts are corrupting, to resist them by persisting in any ideals they might have.

The meeting then terminated. The next ordinary meeting will be held on November 21, when papers by Mr. C. C. Brewer and Dr. Jane Walker will be read on "Sanatoria for Consumptives." The meeting to consider the question of the acquisition of the Architectural Museum premises will be held on November 24.

EGYPT EXPLORATION FUND.

SIR JOHN EVANS, K.C.B. (President), took the chair on Friday last week at the sixteenth ordinary general meeting of the Egypt Exploration Fund, held at the Rooms of the Society of Antiquaries, Burlington House.

Lord Belhaven of Stenton proposed the re-election of the retiring members of Committee, with the exception of the Rev. H. G. Tomkins. Mr. H. H. Statham seconded the motion, and it was agreed to.

Mr. Herbert A. Grueber (Hon. Treasurer) submitted the financial report, which stated that the general balance-sheet showed that the assets of the Fund, the Archæological Survey, and the Græco-Roman branch amounted on July 31 to 5,196l. rs.

Sir W. Charley proposed, and the Rev. F. C. Warton seconded, the adoption of the financial statement, which was agreed to.

statement, which was signed by the President of the Society, referred first to the loss sustained by the Society in the deaths of Mrs. F. Llewellyn Griffith, Dr. John Gladstone, F.R.S., Mr. A. Haworth, and General C. G. Loring. As to their work and publications, the excavations carried on for the Fund by Professor Flinders Petrie were mainly amongst the Royal Tombs, and partly within the Temenos of Osiris, at or near Abydos. The account of a portion of the work done is held back for publication next year. One of the results of last year's work had been to add another name to the list of kings who reigned before the first dynasty. The king represented the last slave-King, Zeser, Narmer, and Smes, among the objects found were flints in the shape of flakes, axes, scrapers, knives, and other forms were numerous. Among the flints from the Royal tombs is one chipped apparently to represent the cow-head of Hathor. A figure of a crocodile was also found. The flints from the Temenos are arranged in accordance with the depth (specified in inches) at which they were found below the surface. The number of stone vases that were found was large, but they were for the most part broken. Pottery also was abundant. In bronze were various tools of no particular merit, but some engraved hypoccephali are of the work of the great artists of the Old Kingdom. The collections of beads and amulets from different parts of the foundation deposits, the tables of offerings, the sculptures, stela, and other objects form valuable additions to the museums to which they had been allotted. Of publications shortly to appear were a fourth and revised edition of "Piithom and the Route of the Exodus," by M. Naville; and an account of the work carried out by Mr. McIver and Mr. Mace during the season before last, entitled "El Amrah and Abydos." For the Archaeological Survey Mr. Davies had again carried on a campaign single-handed in Upper Egypt. Tell-el-Amarna was the site chosen for Mr. Davies singled out for his admirable *fac-simile* work the magnificent mast tomb in the group, known as No. 4. (A large part of this had already been well copied by the artists of Lepsius' Expedition and others, but the copies made by Mr. Davies will for the first time give connexion to its scenes and supply important omissions. A short visit was paid at the beginning of the season to Thebes. A magnanimous

of that capital, Aba, in the time of the twenty-sixth dynasty, reproduced for his own tomb many scenes from that of his namesake, Aba, at Deir-el-Gebrāwi. All that remained of them were traced by Mr. Davies. The publications of the Survey had been increased by one memoir, the first volume of Deir-el-Gebrāwi, devoted to the tomb of Aba and the small tombs of the southern group. Some scenes from the tomb of the Theban Aba had been added for the sake of comparison. The second volume of Deir-el-Gebrāwi will present the remainder of the tombs, give identifications of the fishes depicted in the scenes on the Boulenger, and comprise a chapter on the Coptic graffiti by Mr. Crum. Dealing next with the publications of the Græco-Roman branch, the President said the large volume of Tebtunis Papyri had just been issued. The papyri, almost without exception, were obtained from the wrappings of mummified crocodiles disinterred at Umm-el-Barāgāt in the south of the Fayūm. As to the future work, the cholera was now greatly diminishing in virulence, and Professor Flinders Petrie and Messrs. Grenfell and Hunt felt justified in almost at once returning to Egypt to renew researches. The Temenos of Osiris and possibly other sites at or near Abydos will be the scene of Professor Petrie's operations. The programme of the Archaeological Survey for the coming season is to combine work at Tell-el-Amarna with visits to one or more of the small sites on the east bank of the river, where the copyist is much needed. The researches of the Græco-Roman branch will in the main be conducted at Hibeh—a promising site for papyri, which was partially explored last season. Messrs. Grenfell and Hunt would probably leave this country early in December. They had been hard at work on the Oxyrhynchus Papyri, Vol. III., and it was hoped that it would be ready for publication about July next.

Professor Flinders Petrie said he need hardly trouble them with any details of the work of last year, as the volume "Abydos I." had been in their hands since July. The work of building up the early history of the dynasties had continuously gone forward; and few perhaps realised that what was now quoted as a matter of course in the order of the kings was entirely brought to light only two years ago in "Royal Tombs." When that was published the envious remarked that we should doubtless have to change our minds because the results were so quickly laid down. But scarcely a single conclusion has been modified in the two succeeding years which have built up so much more. And the only argumentative objections that have been raised entirely fall to the ground when accurately studied. The main result of last winter's work was the reading page by page the successive levels of the early town of Abydos, identifying the earlier levels of it with the last four stages of the prehistoric sequence dates, and the later levels with the reigns of the earliest kings. Thus an exact continuity has been determined between the end of the prehistoric age of unwritten record, and the beginning of the 7000 years of written record of Egyptian history. This is entirely the result of archaeology; not a word or a sign of writing helped this discovery; and a scholar who only understood the written record would have seen nothing in the site but a meaningless cartload of flints and broken potsherds, as meaningless to him as a papyrus roll is to an Arab digger. The knowledge of the past has gone through four stages: the gold-hunting, the art-hunting, the inscription-hunting, and now the archaeology-hunting. Each stage has been despised as foolishness by those who preceded it, and each in its turn has shown that there is a wider interest and a greater importance in the remains of past civilisations. In the coming year we look forward to a very definite course of work. There is the great site of the oldest temple of Abydos, on which we have only yet cleared down to the eighteenth dynasty level. The two or three yards of accumulations which lie below that must consist of the older remains of the temples, which were rebuilt by the earlier kings. Re-used blocks of the sixth, eleventh, and twelfth dynasties show that a series of temples have left their mark; and the temple of the first dynasty kings is the goal which we seek below all these. The site is under water level till late in the spring; and it will be needful to do the costly work of removing all the upper layers in order to dry the soil below, and to be

able to work, perhaps under the water, to finish it. But the most important early site in Egypt is worth some trouble and cost to save all we can of history which will never be known except from this ground. Another great work is that of clearing out the two immense tombs of the twelfth dynasty kings, which were found last year. One of these he had gone through, and seen two vast sarcophagi of red granite, and hundreds of square yards of polished quartzite lining the passages, which show the lavish care of the work. They next hope to bring some fine objects to light from the deep mass of chips and rubbish which half fills the passages and chambers some 600 ft. long. There is also the excavation of the large fort of the Old Kingdom, within which burials of later ages have been found; but as it has never been really cleared out, there is much to be done in it. And besides this, the great cemetery of Abydos has been by no means exhausted yet. Now, all this work is a very large amount to cover, far beyond the scope of one person. The ideal of the Fund has hitherto been that of individual explorers, sometimes with assistance, examining a single building. This has perforce had extensions, but the unit of work has been the type. He hoped that this year will see a different ideal established, that of a group of workers, each devoted to a separate ground, and all co-ordinated in methods and results by one organiser. The Committee had agreed to the principle of extending the work by joining more workers together, and we go out this year a much larger party of united workers than they had ever had before.

That year they started with entirely new helpers. Mr. Hugh Stannus has offered for this year his skill in architecture and drawing, which will help to clear the history of the Osiris temple. Mr. Carrelly, Mr. R. Winsley, and Mr. Ayrton are all new to the subject, and with different capacities and in various ways, and he hoped, would take charge of parts of the works. Miss Hansard has volunteered to stay and give some help with artistic drawing, and Miss Eckenstein will attend to the camp work on the collections. His own business would be organising, arranging, and interpreting the work, drawing, and preparing for publication. On collateral work, apart from the fund, Miss Murray and his wife would be copying a great inscribed tomb.

In conclusion, Professor Petrie said:—"We start, therefore, on what will, I hope, be a new type of working for the future, and shall have a staff which will render the fund less dependent than before on the health of any one worker. It is the duty of this society to rescue what we can in Egypt before it is entirely wrecked by the dealer, the ignorant amateur, and speculator, and the commercial destroyer; none of whom leave a shred of information; and a duty which has its scope in the present generation particularly, as at the present rate of wreckage there will be but little left behind for future lives to explore. Now is the time."

The Chairman proposed a vote of thanks to the Society of Antiquaries for the use of their room, and this was agreed to.

On the motion of Mr. Cotton, seconded by Judge Baylis, a cordial vote of thanks was passed to the Chairman, and the meeting terminated.

PROPOSED NEW PREMISES FOR THE ARCHITECTURAL ASSOCIATION.

AN "extraordinary general meeting" of the members of the Royal Architectural Museum, Westminster, was held in the Museum at Tufton-street on Friday last week (Sir William Emerson, President, in the chair) to confirm the action of the Council of the Museum at a meeting held on October 24 last. On that occasion the Council unanimously passed the following resolution:—

"Resolved: That the Council of the Royal Architectural Museum and Westminster School of Art, at a meeting called for the purpose, having received a Report from their Hon. Secretary, Mr. Maurice B. Adams, upon the proposed transfer of the premises in Tufton-street and the interest of the Museum Association to the Architectural Association, and the consequent winding up voluntarily of the Museum Association; having also received from their Hon. Solicitors a Report that the Museum Association have the legal power to transfer their premises and interest, are of opinion that it is expedient, and in the best interests of the Architectural Museum, that such a transfer should be carried out upon satisfactory terms being arranged between the parties, such terms containing inter alia that after the Museum Association have appro-

riated all the funds at their disposal towards carrying out the agreement to be entered into, the Architectural Association shall provide such further funds as may be necessary to complete the business, but inasmuch as the Council are not at present sufficiently acquainted with their position, financial and otherwise, to enable them to come to a conclusion, and to inform the Architectural Association what funds it would be necessary for that Association to provide to carry the transfer into effect, a Special Committee be appointed to investigate the whole business connected with the proposed transfer, with authority to consult with the Hon. Treasurer and Solicitors and the Professional Auditor, and prepare a report and financial statement, to be laid before the Council at an early date. The Special Committee to be authorised to incur any necessary expenses in connexion with the investigation."

Mr. Maurice B. Adams, the Hon. Secretary of the Royal Architectural Museum, in a circular calling the meeting held on the 11th inst., stated that "the Council and friends of the Royal Architectural Museum, while gratefully recognising the good work and financial success of this Institution as a whole, have in a long while past realised that the precise purposes for which the unique collection housed in the galleries at Tufton-street was brought together have not been fulfilled to anything like the extent originally intended. This was due to circumstances quite beyond our control, and although we have during the past few years been enabled to erect new studios at a cost of over 3,000l., and more recently to roof and repair the original buildings at a cost of 700l., assisted by a temporary loan by the Technical Education Board of the London County Council, the work of maintaining the museum for future use has remained the main portion of our achievement, apart from the admirable and successful work accomplished by the Westminster School of Art. Successful as its art classes have been, the collection which distinguishes the Architectural Museum afforded little special assistance to the students attending the school, seeing that their studies were chiefly devoted to drawing from the life and kindred subjects. The Council, with a view of greatly developing the more technical use of the contents of the museum, and thereby carrying out the intentions of its founders, has, with the approval of the Ecclesiastical Commissioners, agreed to the intended handing over of the leases and museum to the London Architectural Association, as advocated in my Report already referred to."

That body for many years has been endeavouring to obtain more commodious premises for the training of architects, and a late strenuous effort has been made to raise funds for this purpose. Up to the present, however, the amount of money obtained is quite inadequate. Sites are increasingly difficult to obtain, and are becoming yearly greatly enhanced in value. In the meantime the work of the classes is undoubtedly very seriously hampered for want of room, and the Day School has been conducted under the most confined limitations, with consequent disadvantages both to the pupils and teachers. The need of an improved and systematic scheme of education for architects, conceived on wider lines and based on University methods, has become a matter of urgency to enable the forthcoming generation of architects to hold their own with other professions both at home and abroad. Consequently the Council has thus determined, with the approval of the members of this Museum Association, to hand over the premises as they stand, in accordance with my Report (on terms to be arranged as indicated by the above resolution), to the London Architectural Association, who will continue the use of the museum free for ever to the public, and retain in some way the name of the Royal Architectural Museum, subject to the Royal favour of his most gracious Majesty King Edward VII., our Patron. In matters of administration the conduct of the museum will be left to the Architectural Association, its maintenance being provided for by that Society."

On October 27 a resolution was passed at a meeting of the Special Committee of the Museum Council (consisting of Messrs. M. B. Adams, Sydney W. Lee, and W. Pain), instructing Mr. Adams to approach Mr. Selby-Smith, acting for the Architectural Association, with the view of ascertaining if the terms suggested by them would be accepted by the Association. The proposed terms are as follows:—

"The Architectural Association to pay to the

nell of the Museum any sum which may be necessary to relieve the said Council from all available funds in carrying the transfer to the Association into effect. This liability is roughly estimated at 700l., including the winding-up of the Museum Association and the assignment of the assets.

To retain the services of Mr. Francis Ford, the architect, for at least twelve months from March 25, 1903, at his present salary; and afterwards, should he not require his services, to pay him 2l. 2s. per week for the remainder of his life.

To pay to Mr. Holgate, assistant master since the year 1884, upon completion of the transfer of the Museum, a sum of 500l.

To undertake, with the consent of the King, that the name of the Royal Architectural Museum shall be retained.

To undertake to keep the museum open to the public, as has been the case hitherto.

The transfer to take effect on March 25 next, and including all the fixtures, fittings, and furniture on the premises, and being the property of the Council of the Museum.

The following communication was received by the Special Committee early this month from Mr. H. T. Hare, President, and Messrs. Balfour and Maule, the Hon. Secretaries, of the Architectural Association:—

"The Architectural Association, 56, Great Marlborough-street, London, W.

November 3, 1902.

ROYAL ARCHITECTURAL MUSEUM.

DEAR SIR:—The Report of the Sub-Committee of the Museum Council, held on October 27, 1902, together with the approximate estimate of receipts and expenditure of the Royal Architectural Museum and School of Art, from January 1, 1902, to March 25, 1903, were laid before the Committee of the Architectural Association at its meeting held on Thursday last; and we have the pleasure to forward you herewith a copy of the resolution which was unanimously passed by the Committee:—

"That the Committee of the Architectural Association, having considered the communication of October 27, 1902, made by the Special Committee of the Royal Architectural Museum and Westminster School of Art, and having unanimously and heartily accepted the conditions suggested in this communication by the Council in transferring their premises to the Architectural Association, subject to confirmation by the body of members in general meeting."

We have called a special Committee meeting for Friday next, November 7, and Mr. Seth-Smith has kindly promised to convey to us verbally the result of the extraordinary general meeting of the Royal Architectural Museum, in order that due notice of our special general meeting may be given to our ordinary meeting to be held on the same evening at 7.30 p.m.

A Report will be issued to our members immediately after Friday next.

We are, dear Sir, yours faithfully,

HENRY T. HARE, President.
R. S. BALFOUR, } Hon.
HUGH P. G. MAULE, } Secretaries.
Maurice B. Adams, Esq."

It is stated that the money value of the casts and objects of art in the museum, exclusive of the historic furniture and fittings, and furniture in use in the buildings, has been estimated to be between 20,000l. and 25,000l. Mr. William Pain estimates the value of the unexpired terms of the two leases subject to the ground rent, at 6,500l. The amount expended last year in providing new roof covering to the old buildings, and sundry substantial repairs to same, was 735l.

In the course of the meeting the following letter from the Bishop of Ely was read:—

"The Palace, Ely,
October 31, 1902.

DEAR MR. ADAMS:—I cannot attend the meeting on November 7, but I am very glad to hear of this proposed transfer of the museum, and all belonging to it, to the Architectural Association, as I think the result will be the most effectual carrying out of the wishes and purposes of its founders.—Yours truly,
ALWYN ELY.

I have read with much satisfaction your Report.

The President of the Royal Institute of British Architects, Mr. Aston Webb, A.R.A., proposed that the meeting should confirm the action of the Council in adopting the scheme put forward by Mr. Maurice B. Adams, as recorded in their resolution passed on October 24.

Mr. J. P. Seddon, F.R.I.B.A., Vice-President, seconded the motion, and, as one of the oldest members, could only express his appreciation of the gift, and the extended use that it would make possible for the benefit of architects.

Sir William Emerson pointed out that the museum was started about fifty years ago for

the purpose of improving the study of architecture, and the building contained a unique collection of choice details of some of the best periods of architectural work. For many years the Council had great difficulty in keeping it on its legs, and they had to thank the School of Art for the assistance rendered in making the museum prosperous. The real object of the institution had, however, never been lost sight of, and grateful as they were to the School of Art, they were obliged to think more particularly of the interests for which the museum came into existence. An opportunity had now occurred for putting the museum on a firm basis, and by placing it in the hands of those who could make a greater use of its contents an enormous advantage would be given to the Architectural Association, the leading educational body of the profession, whose classes were so prosperous that their present quarters no longer afforded the necessary accommodation, so that the Council agreed with the Report that no better use could be made of the museum than by handing it over in the way suggested. The building was exactly adapted to the purpose. The casts were worth between 20,000l. and 25,000l. There must be no misapprehension as to the financial position of the museum, for it had no monetary difficulties; indeed, they had built the new studios and spent 735l. last year on a new roof and repairs. For a long time they had been able to utilise about 1000l. a year on work of this kind. They were informed that there were no legal difficulties in the way of the proposed transfer.

Mr. W. H. Seth-Smith, on behalf of the Architectural Association, thanked the Council for their splendid gift.

The resolution put from the chair was unanimously adopted, and Sir Wm. Emerson proposed a hearty vote of thanks to Mr. Maurice B. Adams for his twenty-six years of service as Hon. Secretary, and for the way in which he had worked and brought about this movement.

The President of the Institute, Mr. Aston Webb, A.R.A., said that in no measured terms he desired to second this vote, which, he thought, should take a more permanent and concrete form, seeing that no one had done so much for the museum as their Hon. Secretary—often when it seemed a thankless task; and he suggested that the Council should form itself into a committee to carry out this suggestion. He wished also to express, on behalf of Mr. Foster Hayward, his concurrence in such a project, and to unite also in thanking Mr. J. P. Seddon for his years of help and his lectures, for his "Casket of Jewels," descriptive of the museum and its contents. Mr. Adams and Mr. Seddon replied, and the meeting terminated.

THE SURVEYORS' INSTITUTION: PRESIDENT'S ADDRESS.

THE opening meeting of Session 1902-1903 of the Surveyors' Institution was held on Monday at No. 12, Great George-street, Westminster, when Mr. Arthur Vernon, President, delivered an opening address. In the course of his remarks he referred to the flourishing state of the Institution. There were on the roll of members at the present time 3,424, of whom 1,433, omitting students and ordinary Associates, had qualified by examination. As to finance, they had accumulated invested funds to the extent of about 10,000l., irrespective of the library capital, about 2,000l. of prize endowment investments, the produce of generous gifts and bequests by members. They were assembled in their own home, which was free of debt, although burdened with a considerable annual ground rent and heavy maintenance expenses, and were in receipt of an income sufficient to meet the annual outlay. The objects for which the Institution exists were well expressed in the Charter and by-laws, and he thought it might be fairly claimed that the Institution had not been unsuccessful in its effort to give effect to these. Those who founded the Institution were animated by an unselfish desire to raise the standard of the profession, alike in the interests of surveyors and of the public whom they serve. They were content to forego present and personal advantages for the sake of the general good, and so long as that spirit animated the counsels of the Institution it would continue to thrive. But the future was with the young men, and to them he appealed with confidence to rise above

narrow and sectional consideration, and to work together in a laudable spirit of emulation to promote the general welfare. Some of the most successful surveyors had laid it down that the head of an office should be able to do personally any of the work required in his office, and to do it as well as any of those he employs. If every young surveyor would do his utmost to attain success, he must practise perseverance combined with patience, never handing over a plan or document as finished without first reviewing its completeness or accuracy, and remembering that the average of thought and excellence above the average were just those things which command approval and secure ultimate success.

It was surely a great mistake to divide life into the terms of pleasure and work, and to write or talk as if one meant delight and the other weariness. Success and fame would be more readily obtained if they made their profession their pleasure, and regarded intervals of cessation as necessary rest or recreation. "We sometimes hear complaints from young men that they have no business to succeed to, no professional friend to start them up the ladder of life, or no private means to purchase advancement. Properly used, either or all of these things are great advantages, but those of our young men who start too well provided with money or influence would do wisely to consider themselves handicapped in many ways for the race of life, and to beware lest others who have to first struggle for a bare living do not in the long run outstrip them. Many a young man has leaned so heavily on a small private income or on inherited connexions that he has gone backward instead of forward in his chosen career.

There are at least four things absolutely necessary to every thoroughly equipped surveyor. First, knowledge of his art, the technical matters and the basis of the law, science and practice of his profession. This can be acquired at any public school, coupled with the teaching of an agricultural college or other suitable training place. Next, the study of the application of such knowledge to practical work. This is usually obtained in office apprenticeship and practice, or on a landed estate with farming facilities, or, better still, by both together. Then, the cultivation of a sound judgment combined with tact and good manners in dealing with the multifarious problems that present themselves to the surveyor, and in his relations with the many varieties of his fellow-men; and, lastly (what may be called the personal factor), the strictest honesty and rectitude of conduct combined with a fastidious regard to professional etiquette as understood by the most scrupulous of his brethren and the best traditions of the profession.

Examinations can fairly test the first and the second, but no certificates can guarantee, or examinations prove, the possession of my third requirement—a sound and sober judgment, the acquisition of which must be of slow growth, and which depends on many qualifications, both moral and intellectual. Of the fourth and last-mentioned, the surveyor's clients, the public, and his fellow-practitioners are the judges, and they soon detect the presence or absence of those qualities which I have ventured to call the personal factor. It may be an advantage to be considered clever, smart, or brilliant, but it is far better to be reputed straight, honourable, and trustworthy.

Young surveyors are too apt to rely on academic honours or examination successes as ends, whereas they are simply means for higher results. Every one in our profession should be trained and intellectually equipped to the highest level of excellence. But teachers, examiners, and employers should endeavour to make it clear that these successes are merely the equipment for life's work. Only as such training and tests give confidence, knowledge to discern and judge, and ability to grapple with the thousand common problems of practical professional life, do they serve the real and highest purpose. The tendency of over-trained or over-confident scholars is to look backward instead of forward, to rely too much on precedents, and to lean rather on theory than on the practical application of principles.

Every surveyor in good practice is continually approached by parents and guardians as to the prospects which the profession offers for young men, and it is a common remark that the boy is generally a clever, good fellow, but is averse to office life and wants outdoor

work. There is, of course, a great deal of employment which a busy surveyor finds to do out-of-doors, but it must be remembered that no one can do much practical work until he has been through a good deal of drudgery in the office. The successful surveyor must in almost all the branches of our profession be able to stand the hard, concentrated work of the office, as well as use his brains in outdoor work, of whatever kind this may be.

As in the other great professions, the openings for successful practice are limited. 'All the marts are thronged with suitors, all the markets overflow,' but while the weakest in every profession may go to the wall, steadiness and even moderate ability can still secure in England as large a measure of success and as genial surroundings as can be easily found in any other country of the world. Lasting success will almost invariably be found to be the result not merely of influence, good luck, or accident, but of knowledge, earnest labour, and persistent application.

There is one condition which often militates against a young man's progress. It is not confined to our profession, but is common to all vocations. It is the haste to grow rich, and the wish to make money too rapidly, and to expect payment for services on too liberal a scale. This haste to grow rich defeats itself in nine cases out of ten. It is the man loving his work for its own sake, who obtains a reasonable share of employment, who is content with moderate fees, and lives within his income, who is most likely to become eminent.

The Surveyors' Institution have been often asked to adopt a scale of fees for professional work, but the experience of the wiser and more far-seeing members of our craft has invariably shown that this is undesirable. It is, moreover, a practical impossibility. The scale of fees varies largely throughout the country. The value of much of the delicate and difficult work entrusted to surveyors must depend mainly upon individual experience and reputation, and even if it were possible to promulgate a scale, surveyors could not enforce it in any court of law. On the other hand, local authorities have adopted scales for much of the work involved in their various districts, and these are largely made use of, while custom as to charges, which varies greatly in different districts, has still the force of law, and is largely applied.

The valuers' profession, or, as our Royal Charter puts it, 'the art of determining the value of all descriptions of landed and house property, and of the various interests therein,' is one of enormous importance and 'constantly increasing complexity.'

It is sometimes said that valuers earn unduly large commissions for such work, and members of other callings (who should know better) occasionally assert that this part of a surveyor's profession is simple and easy, and sometimes, indeed, assume that it is the result of mere rule of thumb. It seems to me that every valuation of property may involve at least four problems, each one of which requires, for accurate solution, the careful exercise of skill by a well-trained and experienced mind. To ascertain the present market value of any property it may be necessary—

(1) To determine its exact net yield or rental value calculated at the rate of interest which such a property might be expected to return according to its character, after deducting all proper outgoings; (2) To consider in many cases the proper cost of the land, buildings, or other items of value, after eliminating all waste, unnecessary expense, or unproductive elements; (3) By a process of comparison to estimate, wherever possible, its proper value as established by the market price realised for similar properties; and (4) To ascertain all the various present or contingent interests in the property, all existing or potential drawbacks, or any possible elements of appreciation or depreciation in the future, together with any other unusual or special circumstances affecting its value.

A prudent valuer will omit none of these points from his purview, and it hardly needs repeating that skill, care, and experience can alone settle all or either of these problems. Most valuations of importance contain novel points, but a careful consideration of the above conditions should enable every valuer to be capable of reasonable pro. of accuracy.

Subsequently the President said:—'All things considered, I am clearly of opinion that the landed interests of the county are in a

better rather than a worse condition as compared with five or ten years ago. In the sixties 'Mr. Greenlads,' as landed property was often called, was considered by many a more desirable security than Consols. Land has suffered a fall in value varying from 30 to 60 per cent., but in recent years we have seen in that choicest of all gilt-edged securities a fall of about 20 per cent. Who shall say that land may not, in years to come, enjoy something like a repetition of the boom of the past. The land of the country considered as a commodity is continually increasing, while the population is strictly limited in quantity, and trade is expanding by leaps and bounds. Our cities are choked with traffic, and overcrowded with shops and factories, which need light, fresh air, and cheap and healthy labour, and show a disposition to transplant themselves into the fair fields and bright air of the countryside.

Again, country residences, from the clerk's cottage home to the stately mansion of the rich, are increasing and multiplying in the parts within easy reach of the cities. Small farms for residential purposes are in increasing demand at present prices, and sporting estates of moderate size are saleable everywhere. The wealth of the community is seeking investment, even at low rates of interest, and by the intelligent investor a portion at least of his capital and savings can advantageously be devoted to the purchase of land at present prices which risks a hundredfold less than if invested in most foreign securities or in the 'wild-cat' companies which are weekly launched by flattering promoters. For myself, I believe in land. I believe in its future. It can be purchased as an investment at one-half or one-third the price which was greedily paid for it a quarter of a century ago, and while the house property of the Metropolis will always tempt a large section of investors, it would surely be a wise policy for even the capitalist who seeks the larger return which bricks and mortar in the cities afford, to acquire some share of the landed property now available.

In dealing with the Housing question, the President said: 'The latest project of legislation with this object is embodied in the recommendation of a hybrid Committee which has just issued its report. The Committee was appointed to consider the standing orders relating to houses occupied by persons of the labouring class, and clauses usually inserted in private and local bills and in provisions of confirmation bills, and in pursuance thereof and to report whether any amendments should be made in such standing orders and clauses.'

Thirteen witnesses were examined, among whom was only one surveyor, our Vice-President, Mr. H. T. Steward. In the result the Committee resolved to submit two model clauses and three corresponding standing orders for approval by the legislature in substitution for existing ones, and recommended that they be embodied in a public General Act.

The displacement of large numbers of the labouring classes by the appropriation of areas for public works and undertakings, without due provision for rehousing them before they are actually displaced is an admitted grievance, and it is generally felt that the new houses erected for them have hitherto been too frequently of such a character as to attract the better class of artisans rather than the people for whom they are specially provided. There is no doubt also that new buildings have often been erected at too great a distance from the old houses. Some municipalities have—in a spirit of over-ambitious enterprise—expended large sums in the provision of labourers' tenements, which have failed in their special purpose, and involved a serious annual burden on the rates. These are all matters which admit of remedy, but I confess that I shrink with some alarm from the proposal that the Secretary of State should have the power of fixing the rentals, and am surprised to learn that he already exercises this function without legislative sanction. The principle is a dangerous one, and its introduction is unnecessary if the authorities take care—in the words of the fifth paragraph of the report—that the 'new houses to be provided shall be suitable for persons of the labouring classes, and not too ambitious in character and design.'

There are many topics on which, if time and space permitted, one would desire to touch. On every hand we see signs of changes and rapid evolution which will be of the greatest

interest to surveyors in the immediate future. Our cities, and especially the metropolis, have multiplied in population until the traffic has become unmanageable. Facilities for the conveyance of goods must be multiplied. Pedestrians must be provided with easy and safe access, and both comprehensive schemes, as those of our distinguished Association Council, Sir J. Wolfe Barry, must be taken hand, or the congestion of London's centre will become unendurable.

We look forward with some assurance to early reorganisation of the docks and Port of London that they may be worthy of the city of the world. We await the proper utilisation of the great deserted silent highway of the Thames. There is already a rush of schemes for piercing London with tubes and for providing tramways to radiate everywhere, and it may be that by the gradual completion of well-devised and comprehensive schemes London may become the place of convenience and of beauty which it deserves while the countryside may share its prosperity and afford within easy reach delightful and healthy homes for the toiling millions of the cities.

On the motion of Mr. A. Buck, seconded by Mr. Howard Chaffield Clarke, a hearty vote of thanks was accorded to the President for his address.

The President, in the course of a brief report, said a very attractive subject for discussion was that of Municipal Socialism, and how it was economically sound for municipalities to compete with those who supported them. No one would wish to discourage municipalities supplying what was essential to the health and comfort of a community, but he hesitated to agree that they should enter into fields where there were people supplying what was wanted with equal advantage to the public.

It was announced that the next ordinary meeting would be held on November 24, when a discussion would take place on the paper read by Mr. Hooper last April on 'Compensation for Fruit-planting.' On November 1 a meeting will also be held to consider whether the members of the Institution are not being taxed beyond the value of their receipts.

ARCHITECTURAL SOCIETIES.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—The opening general meeting of the Leeds and Yorkshire Architectural Society was held on the 6th inst. at the Queen's Hotel, Leeds. Mr. Butler Wilson, the President of the Society, occupied the chair, and, in his Presidential address, referred to some of the considerations which he ventured to think had affected, and would still further affect, not only their interests as architects, but also the interests of their clients. Dealing with some of the ever-increasing difficulties which beset the path of the most enthusiastic, he spoke of the hindrances which interfered with the realisation of perfect planning. Architects often had to deal with a site which bristled with obstacles and restrictions, and in such a case it would be a fatal mistake to endeavour to place there a preconceived arrangement only suitable for some totally different situation. Rather should they endeavour to turn obstacles into advantages. Though they might have the desire to make themselves thoroughly acquainted with the needs of their client, these endeavours were often met by ill-considered indifference—an indifference which often expressed itself in some such words as 'get the building finished, and we will adapt it to our requirements.' But that was entirely unsatisfactory. Architects must be determined to fulfil requirements in a far more complete way than their clients had ever imagined. Another difficulty was that of adapting the acknowledged forms of architecture to the ever-increasing advantage of modern constructive inventions. The fight between material and imagination did not decrease with the advance of time, and there was no doubt that many accepted forms were, under certain modern conditions, far from applicable to functions which this age demanded. To grapple with those demands, and at the same time preserve the essential qualities of their art, was the task which lay before them. This could best be done, not by ignoring or rejecting inventions and appliances which, on the grounds of their practical utility, had come to stay, but by a frank acknowledgment and acceptance of their value, and a determination

make those inventions their servants rather than their masters. They must be ready to progress in that respect, and to seize upon all that was best in modern constructional methods, or there was no law born of past experience which might not be instantly repealed owing to the appearance of new conditions and materials. Architecture as a fine art was to live, it must adapt itself to present needs. Iron and steel had almost ousted carpentry from buildings of any size, and the arrival of the flanged beam and iron joist marked a great era. Steel, combining as it did the virtues of cast and wrought iron, could be utilised for supporting enormous loads. The idea that constructive metal work needed concealing from view was rapidly dying out. They were now able to build a partition $2\frac{1}{2}$ in. in thickness, which local authorities recognised as a 9-in. brick wall for fire-proof purposes. Architects were, indeed, feeling the steady invasion of the technical constructor. Technical construction was advancing, and they must not allow the constructive specialist to gain an ascendancy. There was an invasion which, if it was allowed to continue, would end in disaster; an invasion of the domain of their art by a commercial element, coming forward and successfully turning numbers of their brethren to relinquish their hold upon the aesthetic side of architecture. The busy practitioner was tempted by the readiness of the trade to relieve him of the arduous work of design. The tempting words, "designs furnished free," were constantly meeting his eye; and the offers were made by the terra-cotta manufacturer, the cabinet-maker, the mosaic worker, the glass-stainer, and the ornamental plasterer. He counselled that on no account should architects accept such offers; any such acceptance would disgrace their profession. They could design for themselves. Having spoken of the approaching invasion of their art, and the difficulties which beset the enthusiast, he pointed out the means by which the invasion might best be resisted, and the difficulties be overcome. Last July the Council decided to take steps to found a school of architecture, to afford facilities to Associates for the study of architecture. In casting about, the Leeds Institute was approached, and the response was most encouraging. The Committee of the Institute signified their willingness to cooperate with the Society to the extent of accepting various proposals. A room was to be set apart for the sole use of the students of the school; the master was to be nominated by the Council of the Society; a representative of the Council was to have a seat on the Committee of the Institute; members of the Council were to be received as visitors to the classes, and prizes and studentships offered by the Society were to be competed for by associate students. By those arrangements they had at least achieved that which was the nearest approximation to the spirit of the decision of last July; and it was extremely gratifying that, when the new buildings in Cookridge-street were completed, there would exist in the city of Leeds a school of architecture which should justify its title.—Mr. Wood moved a vote of thanks to the President for his address. This was seconded by Mr. E. H. Hepper, representing the Leeds Institute, who stated that there were already eighteen students in the new architectural class connected with the Institute. He thought that the tendency of the times was all towards specialism in architecture, as in other professions. Mr. G. F. Bowman and Mr. G. B. Hulmer supported, and the motion was adopted. In responding, the President referred to the Crafts Evenings they had arranged, from which he thought valuable practical information might be obtained. Prizes were distributed to the successful students in the competitions for measured designs, sketches, &c.

ROYAL INSTITUTE OF THE ARCHITECTS OF IRELAND.—The Council met in their rooms in Lincoln-place, Dublin, on the 3rd inst. In the absence of the President, Mr. J. Rawson Carroll occupied the chair. A deputation, consisting of Mr. James Beckett, Mr. Bolton, and Mr. Jolley, representing the Master Builders' Association, attended, and submitted to the Council several questions affecting the building trade. The matter was fully discussed, and the Council expressing themselves in sympathy with the views put forward by the deputation, these gentlemen withdrew. A letter was read from the hon. secretaries of the Ulster Society of Architects in reference to the proposed alteration in the by-laws of the

Society. The proposed alteration was approved by the Council. The Secretary of the Architectural Association of Ireland wrote announcing that the Institute Prize had been awarded to Mr. J. Knox Vinycomb.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The opening meeting of the forty-fifth session of the Edinburgh Architectural Association was held in the Association's Rooms, 117, George-street, Edinburgh, on the 4th inst. Mr. A. Hunter Crawford, the President, in the chair. It was resolved that a communication should be sent to the Town Clerk, suggesting that the architectural profession should have an opportunity of submitting designs in competition for the proposed Usher Hall. The chairman intimated that the Association had become affiliated with the Royal Institute of British Architects. Mr. Crawford, in the course of his presidential address, said that in one branch of activity their Association was wanting—they had no work classes or studio. Since the School of Applied Art was begun their work classes had been discontinued, and it was felt that so long as that School provided good teaching under the immediate control of architects, that anything their Association could do would be a hindrance rather than a help. They were unanimous in acknowledging the excellence of the architectural education supplied by the School of Applied Art, especially in draughtsmanship and knowledge of style, and architects had seen the results in their own assistants; and the marked success of its students (out of all proportion to their numbers) were known to them all. Could they rely on this school being continued on the same lines as hitherto, with a prospect of its development to include all the teaching necessary for the full education of their students, they could wish for nothing better; but this was improbable, everything pointing to the early closing of the school, or, at any rate, its removal from the direct control of architects engaged in the daily practice of their profession. So soon as the school lost touch with practising architects, they might look for a falling off in results. There might be more passing of examinations, more academic teaching, but the results, so far as providing the students with ability to design and knowledge to construct, would be found to be meagre in the extreme. He asked the architects present what weight they gave to South Kensington certificates of honours in building construction when engaging an assistant? Was it not almost invariably found that knowledge acquired to pass these examinations was of little use when the student was brought face to face with a single piece of real building construction? Book learning was only an infinitesimal part of the education of an architect. It was absolutely essential, geniuses excepted, that the education should be given, or, at least, directly controlled by architects in the active practice of their profession. In his experience in this country he had not seen great results from the professional or University teaching of architecture, while everything pointed to the good that was done by teaching it in a school where practically the whole of the teaching was given by architects in active practice. In any reports he had seen regarding proposed changes in art education in Edinburgh, no one had taken up a strong position in this matter, which he believed to be the most important in the whole question. It was the principle which was adopted at the inauguration of the School of Applied Art.—On the motion of Mr. Thomas Ross, of Messrs. Macgibbon & Ross, seconded by Mr. Daniel Macfie, Mr. Crawford was cordially thanked for his address, and the proceedings terminated.

QUEEN VICTORIA MEMORIAL ON THE EMBANKMENT.—A memorial tablet is to be placed on the railings of the gardens of the Middle Temple, facing the Embankment, to commemorate the fact that the late Queen passed by that spot on her last visit to the City. Incidentally, the tablet will mark the City's boundary in that direction. The memorial, which has been designed by the City Surveyor, Mr. Andrew Murray, consists of Portland stone, with two panels, the lower one containing an inscription, and the upper one, which is of marble, having in the centre a marble medallion portrait of Queen Victoria, surrounded by a wreath of laurel. The carving of the work embodies the Royal arms, the arms of the City, and the roses of York and Lancaster. The memorial will measure 9 ft. 3 in. in height from the pavement level, and will be 4 ft. 3 in. in width. The contractors are Messrs. Dayman & Son, of Vauxhall Bridge-road.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The first meeting of the session was held at 32, Sackville-street on the 5th inst., the hon. treasurer, Dr. W. de Gray Birch, in the chair. The Rev. H. J. Dukinfield Astley exhibited a silver token, the size of a threepenny-piece, which was picked up at East Rudham, Norfolk, recently. The token bears upon the obverse, Richard Crouke, 1658, with heraldic lion and a bag or pouch, probably of the Merchant Taylors' Company, in the centre; reverse, "At Seven Oakes, Kent," and the letters "R.C.A." in the centre. Mr. Astley also exhibited a photograph of the old porch of Braizworth Church, near Eye, in Suffolk, having curious and unusual Norman details. Mr. Patrick was of opinion, from careful examination of the photograph, that although the details of the ornamentation were of semi-Norman character, they did not at all form part of the original design of the porch, which was the result of a rebuilding at some period when architectural fragments from other places had been worked in. Mr. Robins exhibited, through Mr. Astley, the photograph of a Roman sepulchral cinerary urn, which was discovered in a broken condition in a labourer's cottage at Brentwood, in Essex. The urn is of Yellow Siena marble, and of very beautiful workmanship. It has been carefully repaired, and is now in excellent condition. For several centuries the urn is thought to have been preserved at Myddleton Hall, Sheffield, near Brentwood. The urn bears the Imperial wreath and an inscription partly obliterated, which reads:—

DIS • MANIBVS • QVINT • FABII • FELIC • CONS.

An interesting paper on Oatlands, in Weybridge, was read by Mr. S. W. Kershaw. The Manor of Oatlands is first mentioned in the reign of Henry VIII., who often came here from Hampton Court for the pleasures of the chase. He built the mansion, to which many later additions were made. The mansion was conveyed to the King by indenture dated 1538—in consideration of a grant from him of the site and demesne lands of Tunbridge in Kent, and of others in Surrey. The name was anciently spelt Otelands, Otlend, Othland, and Otwelland, and the owners had long held the manor lands of Byfleet and Weybridge by leases from the Crown. A drawing by Antonio Van Wyngaerd (1559) shows the mansion as constructed of brick, and in general appearance somewhat resembling one of the Cambridge colleges. Oatlands was a Royal abode from the time of Henry VIII. to the Commonwealth, when it was nearly all destroyed. In the reign of Elizabeth, Oatlands was a favourite resort, probably from its comparative nearness to Nonsuch, and many State papers are dated from both these noted places.

ENGINEERING SOCIETIES.

INSTITUTION OF JUNIOR ENGINEERS.—The Institution commences its twenty-second Session on Friday, the 21st, when the new President, Colonel E. Raban, R.E., will deliver his opening address, on the important subject of "The Preparation of Engineering Projects." Among the other papers promised for the Session are: "The Planimeter, explained Simply, without Mathematics," by Mr. W. J. Tennant; "Practical Notes on the Use and Maintenance of Electric Motors for Factory Purposes," by Mr. W. T. George; and "The Effect of Design on Methods of Construction, from a Contractor's Point of View," by Mr. R. W. Newman.

BOOKS RECEIVED.

SCIENTIFIC PROTECTION: A Guide to the Proper Application of Lightning Conductors. By Alfred Hands. (J. W. Gray & Son.)

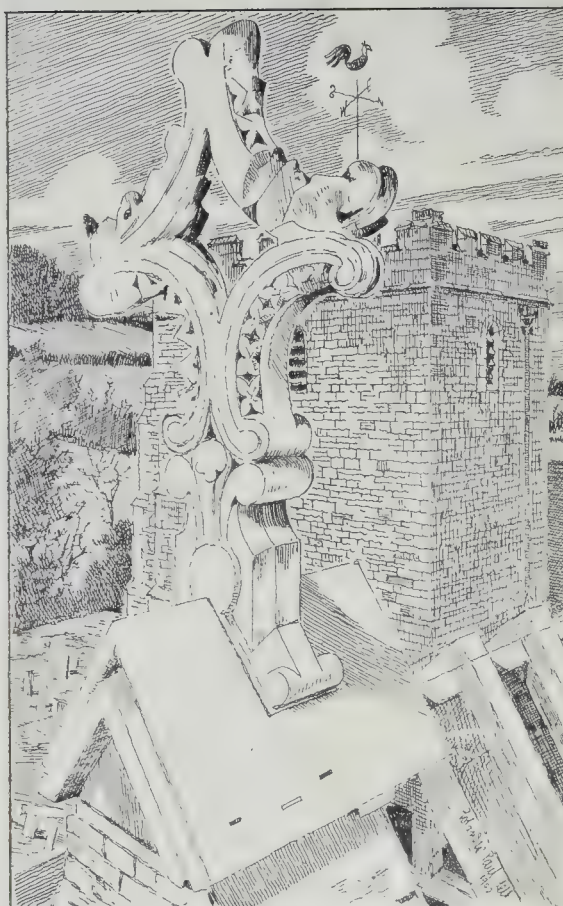
CHRISTMAS: ITS ORIGIN AND ASSOCIATIONS. By W. F. Dawson. (Elliot Stock.)

DIE ROMANISCHE UND GOTISCHE BANKUNST DER KIRCHENBAU. Erstes Heft. Van Max Haack (Arnold Bergstrasser, Stuttgart.)

LETTERING IN ORNAMENT.—By Lewis F. Day (B. T. Eastford.)

NEWLANDS' READY RECKONER FOR ROOFING. By R. W. Newlands. (Hazell, Watson, & Viney.)

CONGREGATIONAL CHURCH, DARNALL.—The memorial stone was laid on the 30th ult. of the new Darnall Congregational church and classrooms. The church will have seating accommodation for 550 persons, and there are to be eight classrooms below, which will accommodate 300 scholars. The architects are Messrs. Moulds & Porritt, of Manchester and London.



Abbey Dore Church: Cross on East Gable.

Illustrations.

LIVERPOOL CATHEDRAL COMPETITION.

IN this study for a modern cathedral the idea was to adhere in a great measure to the traditional cruciform plan, and at the same time to provide a large area from which the congregation could have an uninterrupted view of the preacher.

This seemed to be best attained by adopting the experiment of a large dome with diagonal flanking towers, under which considerably more seating space is gained.

Although not strictly designed to fit such a narrow site, it was thought that a central and dominating feature was desirable for a building of such importance, and especially so in Liverpool, which is somewhat lacking in line as seen from the river.

F. WALLACE.

ABBEY DORE CHURCH, HEREFORD.

The illustrations show, in two cases, the result of the removal of the accumulated soil round the exterior. Outside the north door of the presbytery steps were found, and a wall that extended to the chapter-house, and formed probably one side of a passage from the church to the infirmary and abbot's house. On the doorway itself is still some good thirteenth-century ironwork (illustrated in the *Builder*, April 8, 1893). On the west side of the church the bases of the two columns of the nave arcade still standing have been uncovered, and

also the jambs of the doorway that formed the communication between the nave and the cloister.

The drawings of the interior show part of the south transept (with a curious fresco of "Time" on the west wall), and a view across the east end of the presbytery, showing the effigy popularly known as that of the founder, Roger de Ewias, and the sanctuary rails and altar slab erected by Lord Scudamore in 1634 on "three pillars of stone."

The repairs are being carried out by Messrs. Collins & Godfrey, of Tewkesbury, under the direction of the architect, Mr. Roland W. Paul, F.S.A., of London.

An account of some of the recent discoveries will be found in the *Builder*, April 19, of this year, and the architect's Report.

The illustration of the gable cross is from a sketch recently made from the scaffolding: it is a curious instance of seventeenth-century work, with imitation of earlier detail.

WESTHOPE MANOR, SHROPSHIRE.

This house, now nearing completion, is situated some five miles from Craven Arms.

It is built of brick, and rough cast, and local stone quarried on the estate, with red tile roof, &c. The terraces, forecourt, garden, walling, and steps are also being formed.

The builders are Messrs. Broad & Co., of Great Malvern, and the architect is Mr. E. Guy Dawber, of London. The illustrations are reproduced from the two drawings in this year's R. A. Exhibition.

SCREEN, POTTERS BAR CHURCH.

The screen formed part of a rearrangement of the fittings of the chancel, carried out last year, which included also a new dossal behind the altar. The woodwork was carried out by Messrs. H. & E. Lea, of London, and the decoration of the screen and dossal cornice by Messrs. Flashman & Sons, of Barnet, from the designs and details supplied by the architect, Mr. Roland W. Paul, F.S.A., of London. Messrs. A. Stalman & Co., of London, supplied the dossal.

The drawing was exhibited in this year's Academy.

ADDITIONS TO A HOUSE IN HERTFORDSHIRE.

The drawing, exhibited in last year's Academy, shows a scheme for the enlargement of an old house, part of which has already been completed. The builders were Messrs. Gimson, of Royston, Herts, and the architect, Mr. Roland W. Paul, F.S.A., of London.

ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

The second meeting for this session of the Discussion Section of the Architectural Association was held at 56, Great Marlborough-street, W., on Wednesday, the 5th inst., when a paper on "The Buildings about a Farm" was read before a well-attended meeting by Mr. H. Munro Cautley.

Mr. Geo. H. Smith was in the chair, and, having signed the minutes of the preceding meeting, reminded the members of the privilege of question time. Many important questions having been asked and replied to, the Chairman called on Mr. Cautley for the paper of the evening, the subject matter of which was treated by the author in a highly interesting and instructive manner, and the many practical hints with regard to details showed a close acquaintance with practical farming in the Eastern counties. Mr. Cautley strongly advocated the use of local materials and simplicity of construction in the fittings and buildings about a farm, so that repairs could be readily carried out by the estate carpenter. Having taken the members carefully over the necessary buildings for a farmstead, and emphasising the value of Dutch barns in these days when thatchers were scarce, Mr. Cautley concluded by inviting discussion and promising to reply to any questions.

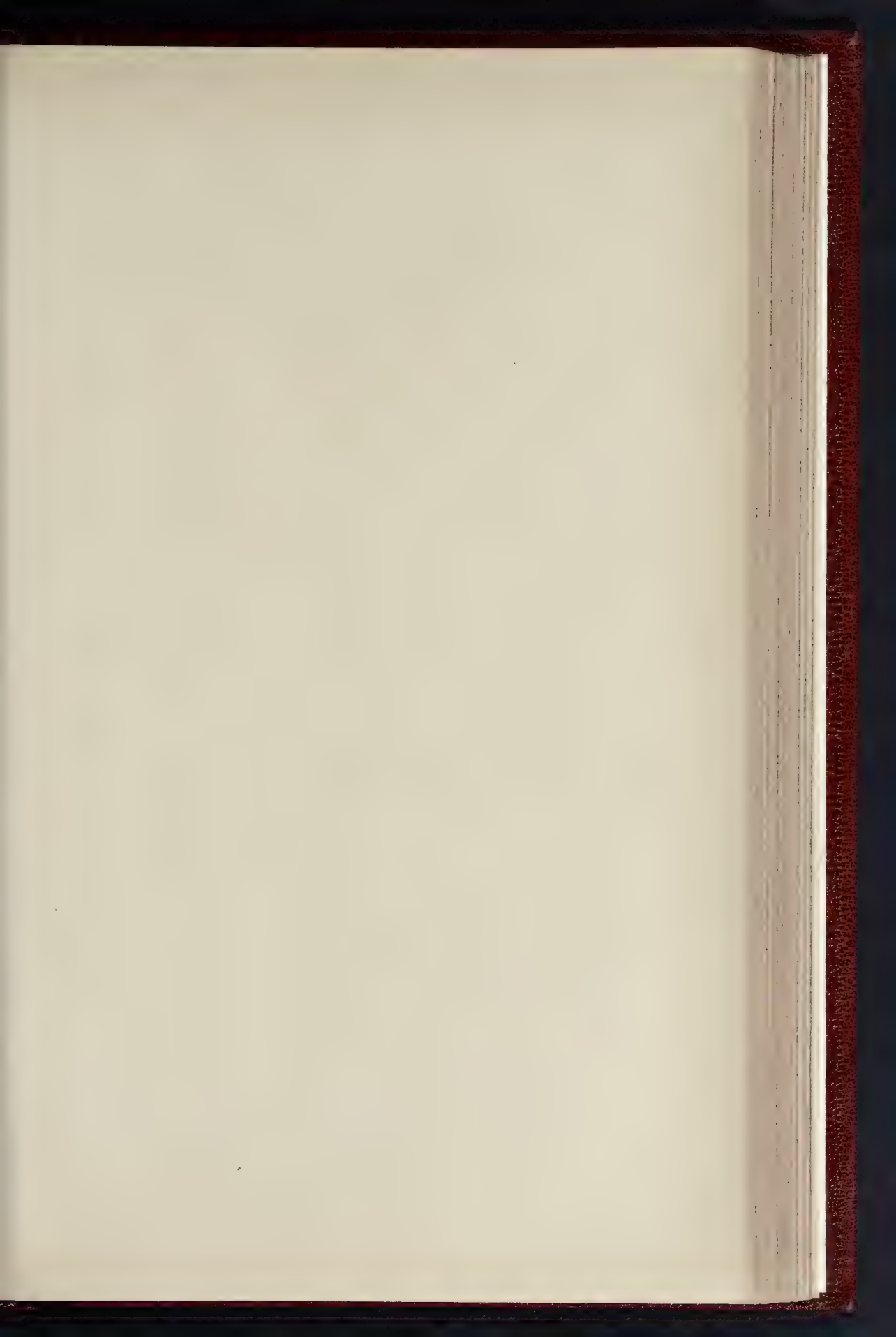
The discussion was opened by Mr. C. H. Brodie, who proposed a hearty vote of thanks to Mr. Cautley for having come all the way from Ipswich that day to give the Section such an excellent paper. He said the author had given them much valuable information which was not to be found within the covers of text-books, and showed an intimate acquaintance with the subject of farm buildings.

The vote of thanks was supported, and the discussion briskly carried on by the following gentlemen:—Messrs. P. J. Turner, Horsemann, Louis Ambler, R. H. Weymouth, Ernest Radford, Arnold Tayler, F. Lishman, H. Gregory Collins, and the Chairman. The discussion was most interesting and well maintained, and was summed up most ably by one of the Honorary Secretaries of the Association, Mr. H. P. G. Maule, who attended as Special Visitor of the evening. He said he had listened with great pleasure to Mr. Cautley's remarks on a subject which seemed to be neglected by architects. He was in complete agreement with the author concerning the use of local materials, and thought a most satisfactory architectural effect could be obtained, and was always most pleasing, when proper attention was paid to local customs and a skilful employment of materials ready to hand. He also strongly advocated the building of good cottages for the farm hands, the provision of which would go a long way towards helping to keep the workers on the soil. He had much pleasure in supporting the vote of thanks.

The Chairman having put the vote to the meeting, it was carried with acclamation.

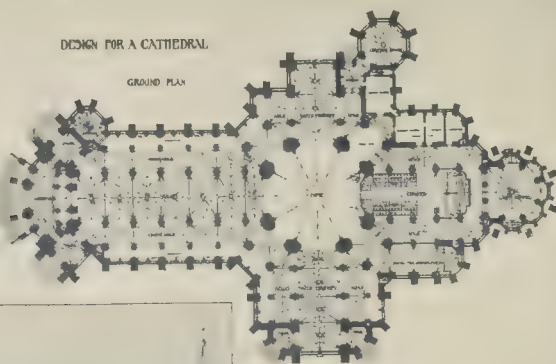
Mr. Cautley, in replying, said the preparation of the paper had given him much pleasure, and thanked the members for the kind way they had listened to him; and, having briefly replied to the various questions, the meeting terminated.

The next meeting will be held at 56, Great Marlborough-street, W., on Wednesday,



DESIGN FOR A CATHEDRAL.

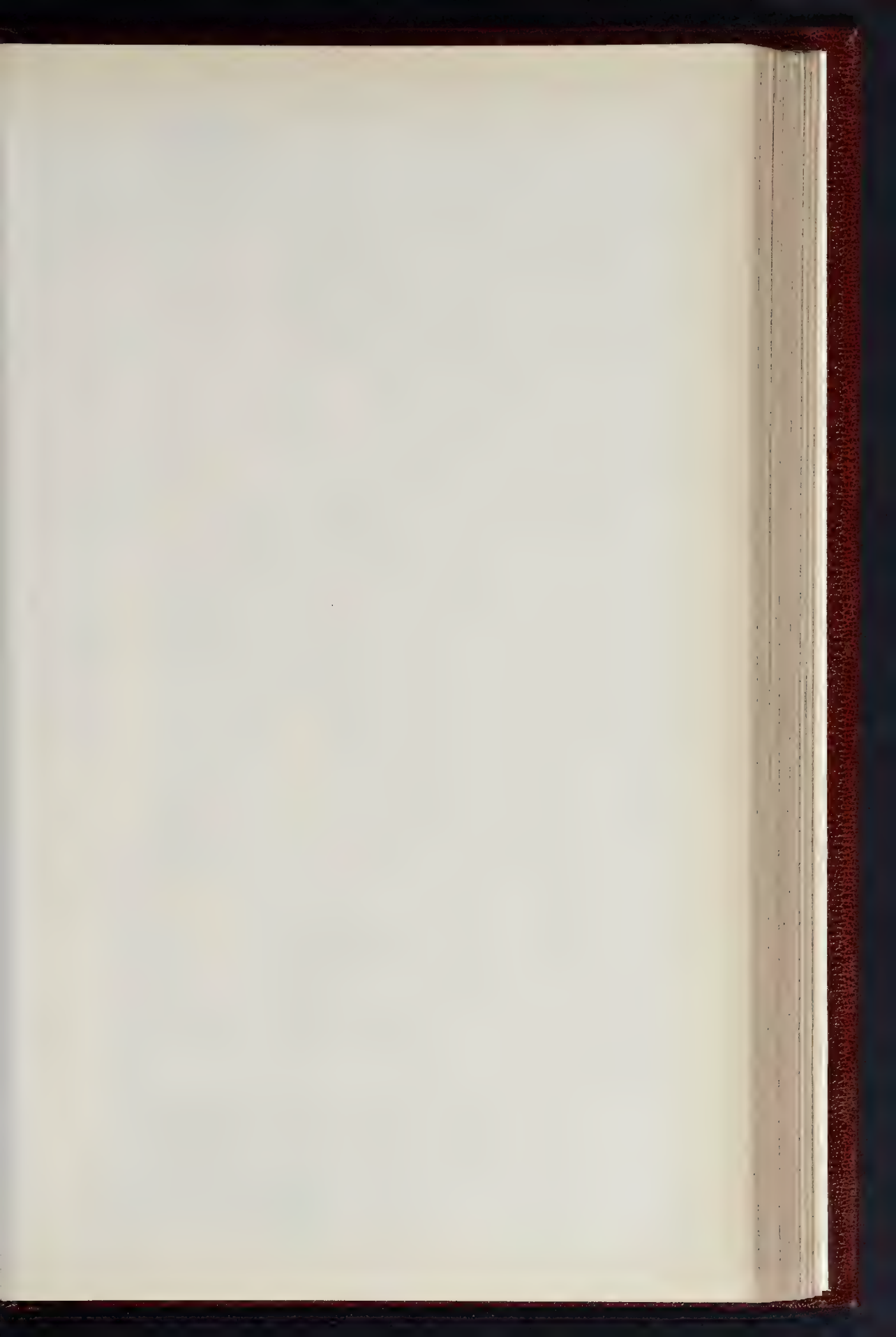
GROUND PLAN



Frank Watley.
Arch't. 1842.



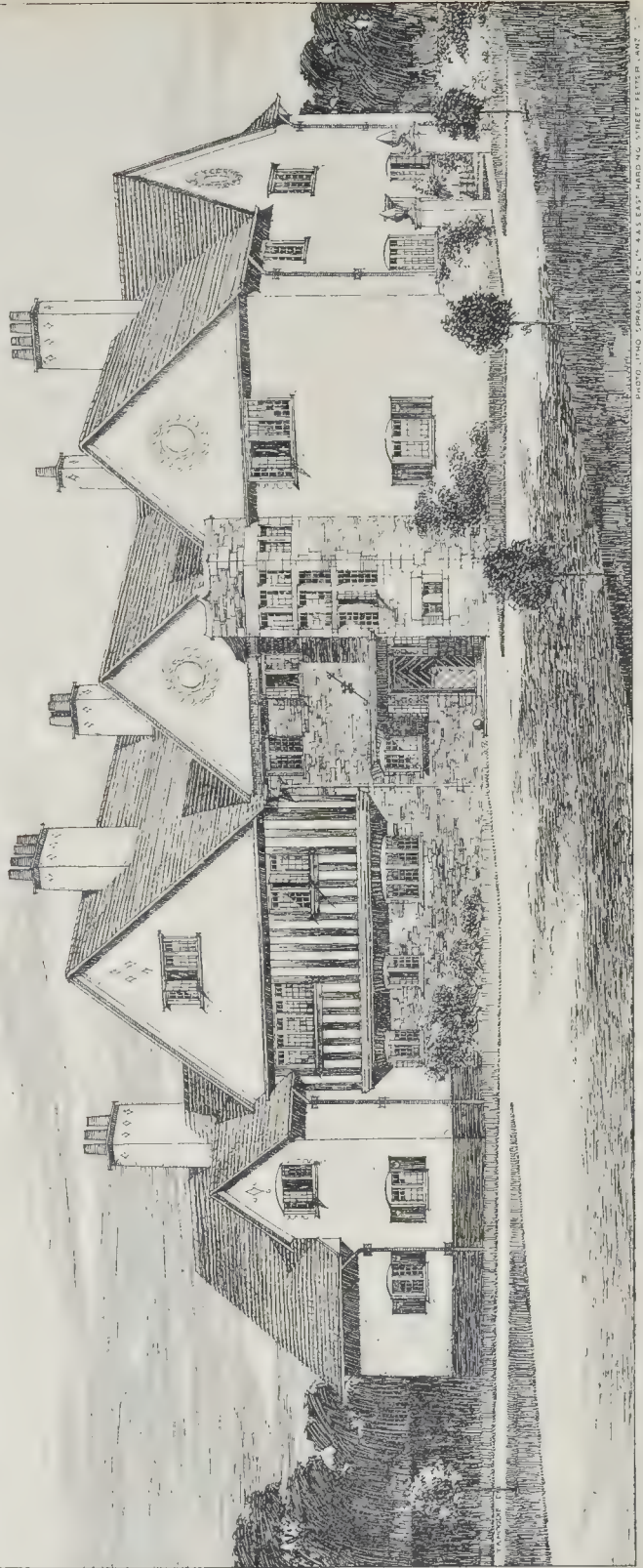
INK PHOTO SPRAGUE & CO. LTD. 4 & 5 EAST HARDING STREET FETTER LANE E.C.



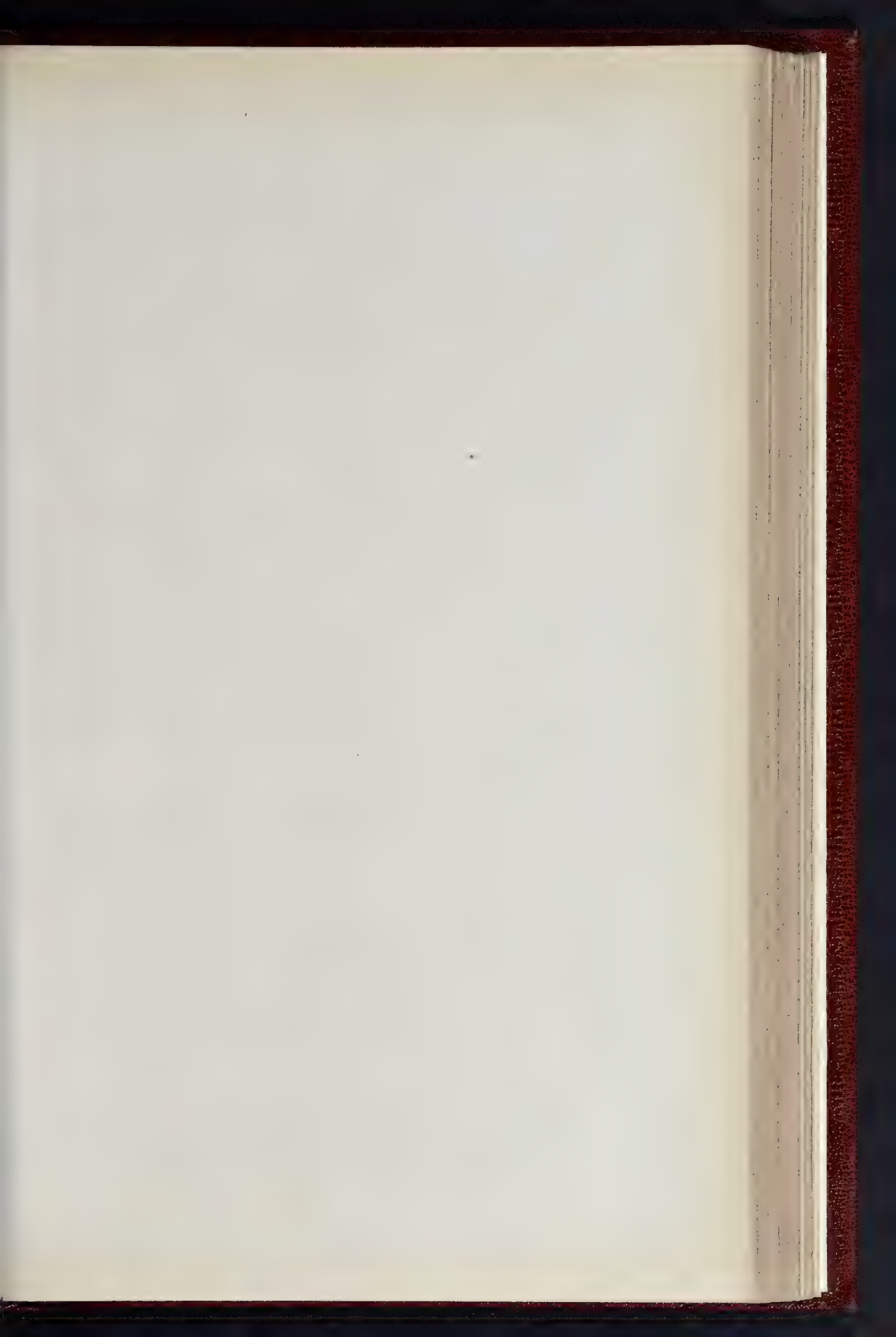
THE BUILDER, NOVEMBER 15, 1902

**WESTHOLME MANOR, SHROPSHIRE,
FOR LEONARD DYER, ESQ.
BY G. G. POWELL, ARCHT.**

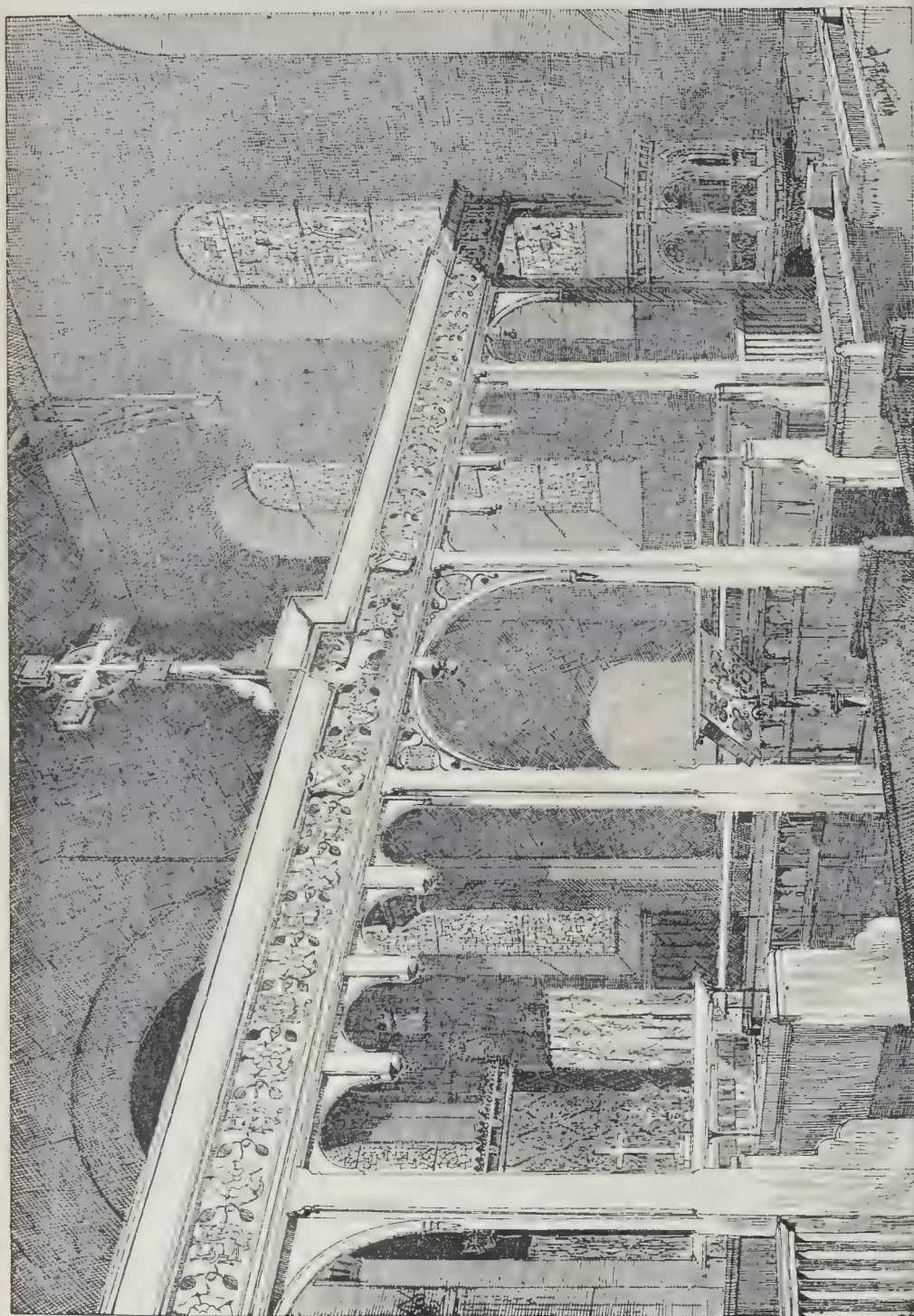
THE FURNACE, 1894.



PHOTOGRAPH BY SPENCER & CO. 483, REGENT STREET, LONDON, W.



THE BUILDER, NOVEMBER 15, 1902





ADDITIONS TO HOUSE IN HERTFORDSHIRE - MR ROLAND W PAUL, ARCHITECT

PHOTOGRAPHED BY J. H. P. & CO. LONDON. PRINTED BY J. H. P. & CO. LONDON.

WESTHOPE MAJOR SHOPS HIRE.

FOR LEOPARD'S DYER, F.S.O.,

E. GW. DAWBER, ARCHITECT.

THE GARDEN FRONT.

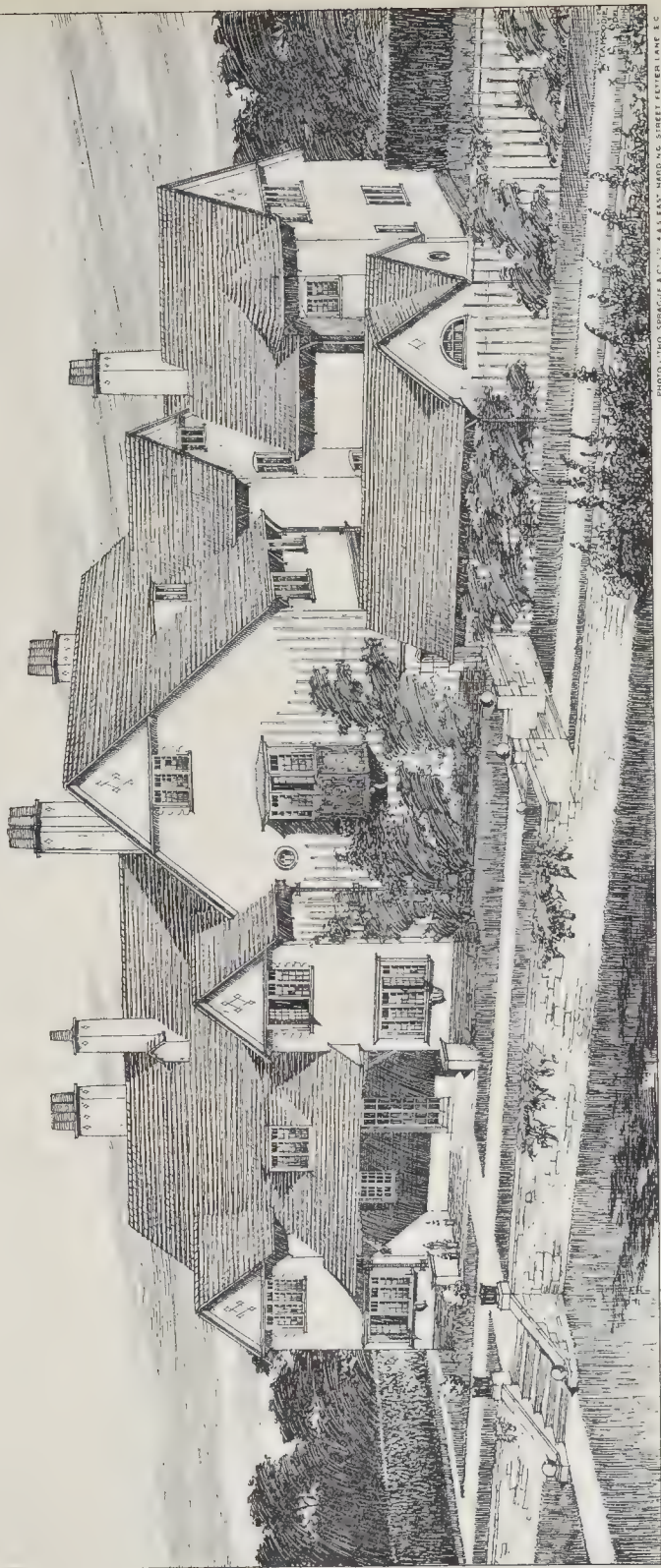
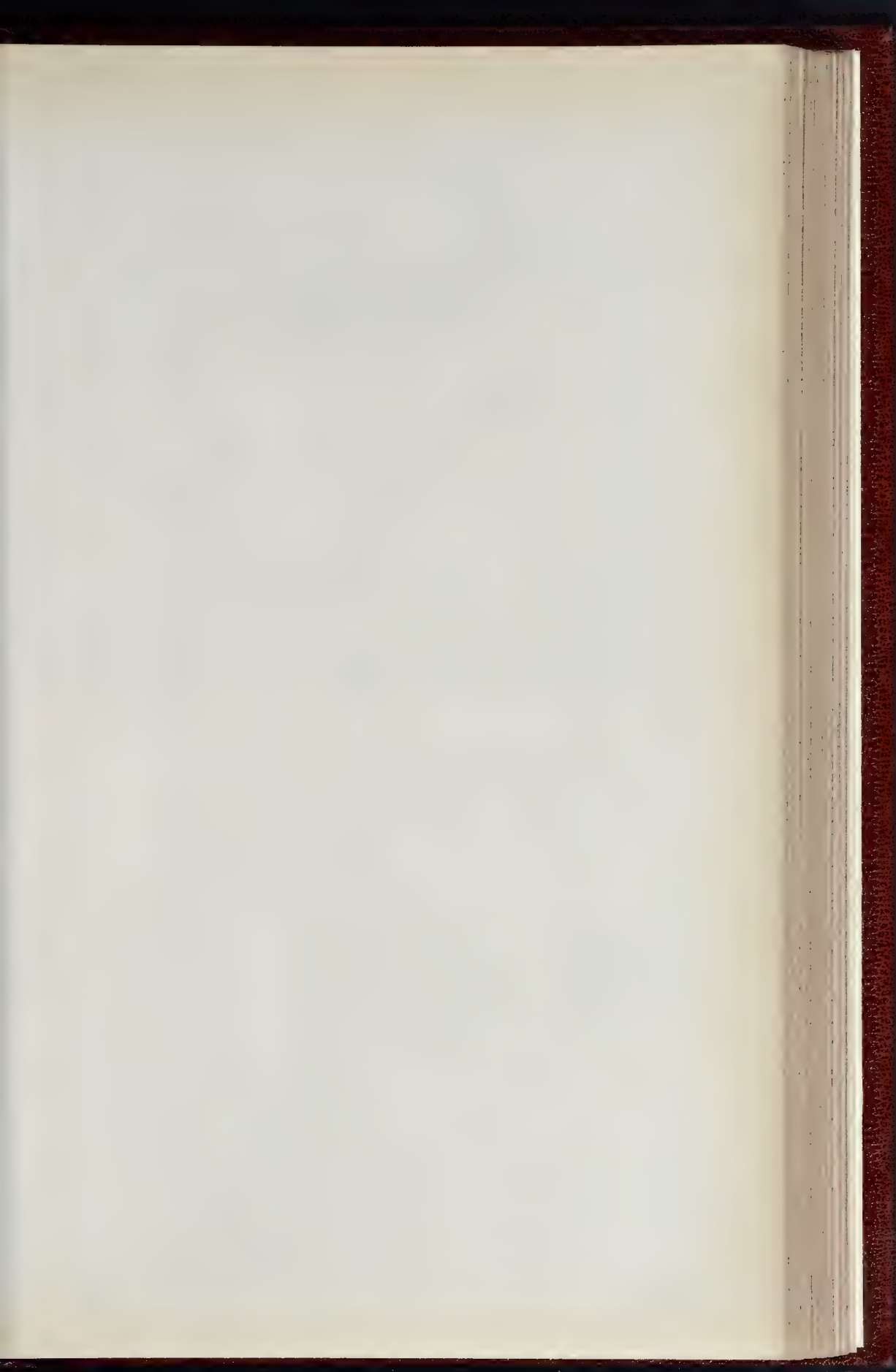
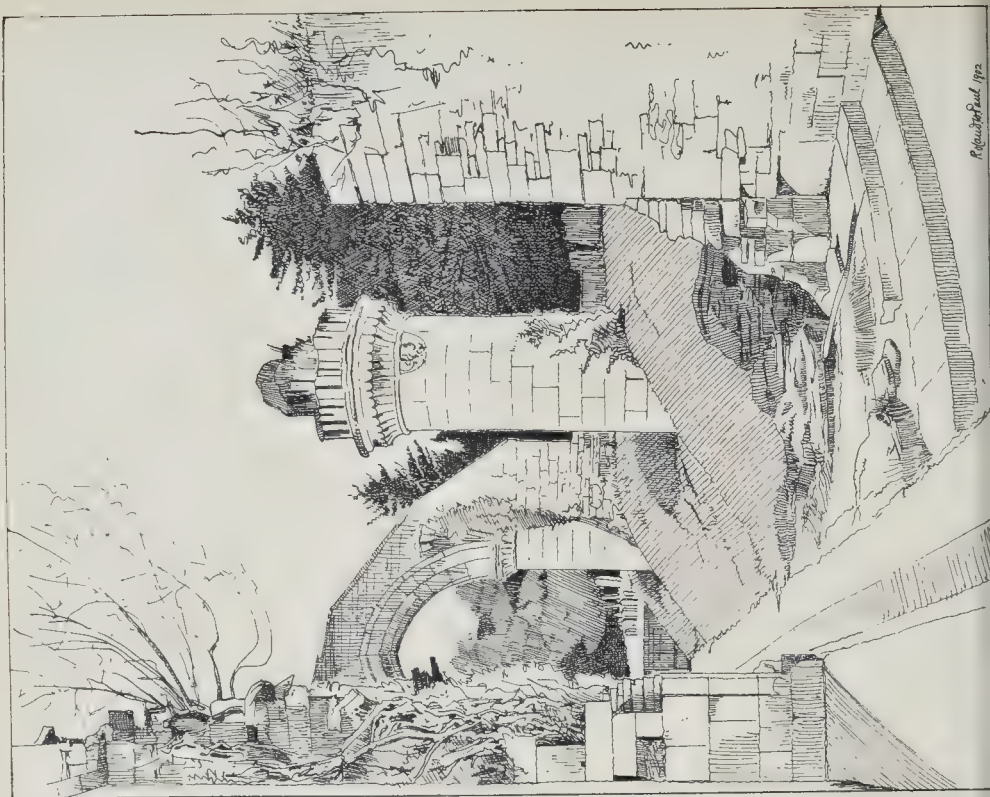
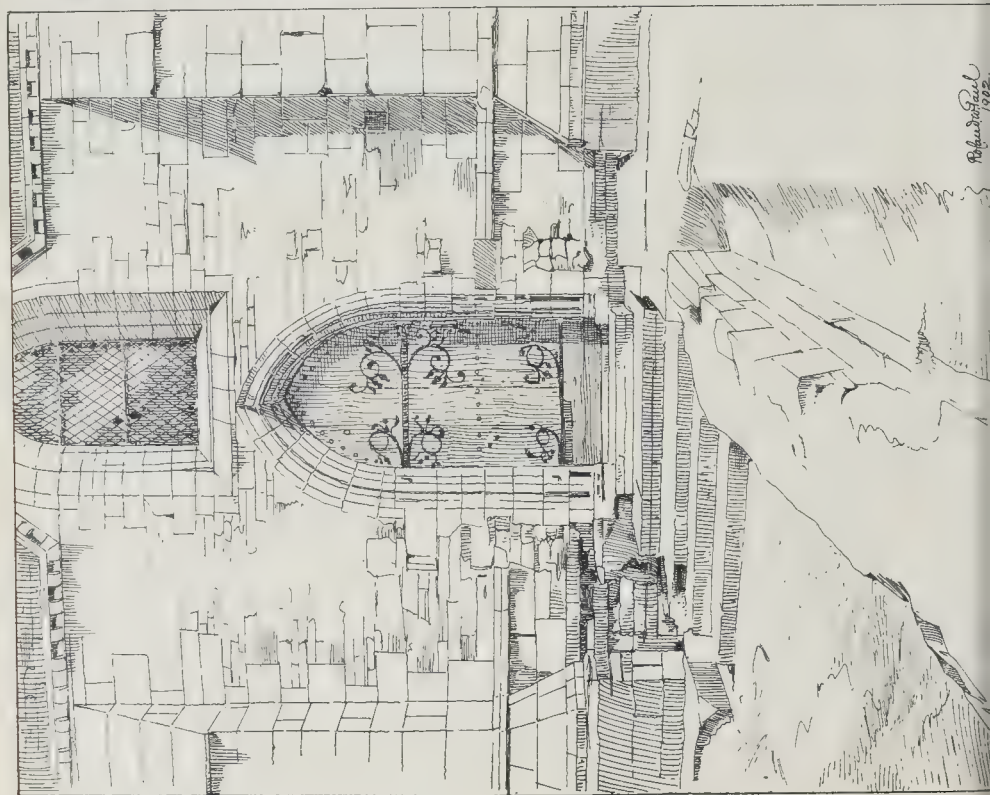
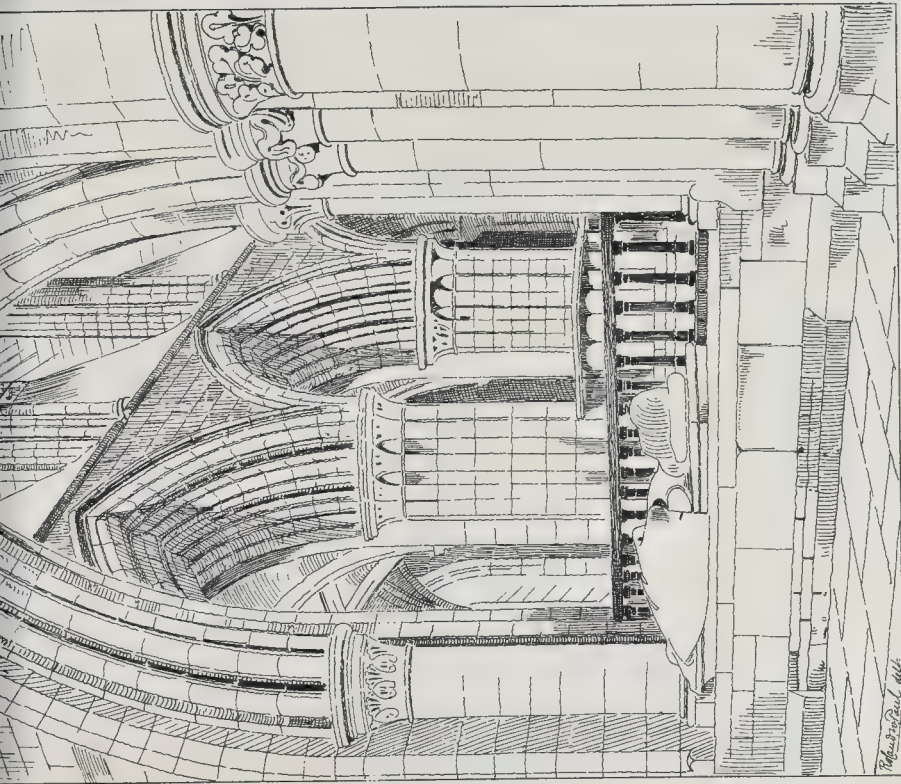


PHOTO - TWO SPACIES B.O. - 445 EAST NADON ST. STREET FEVER LANE & C



THE BUILDER, NOVEMBER 15, 1902





EASTERN ARCHES OF THE PRESBYTERY.

ABBAY DORE CHURCH, HEREFORDSHIRE.

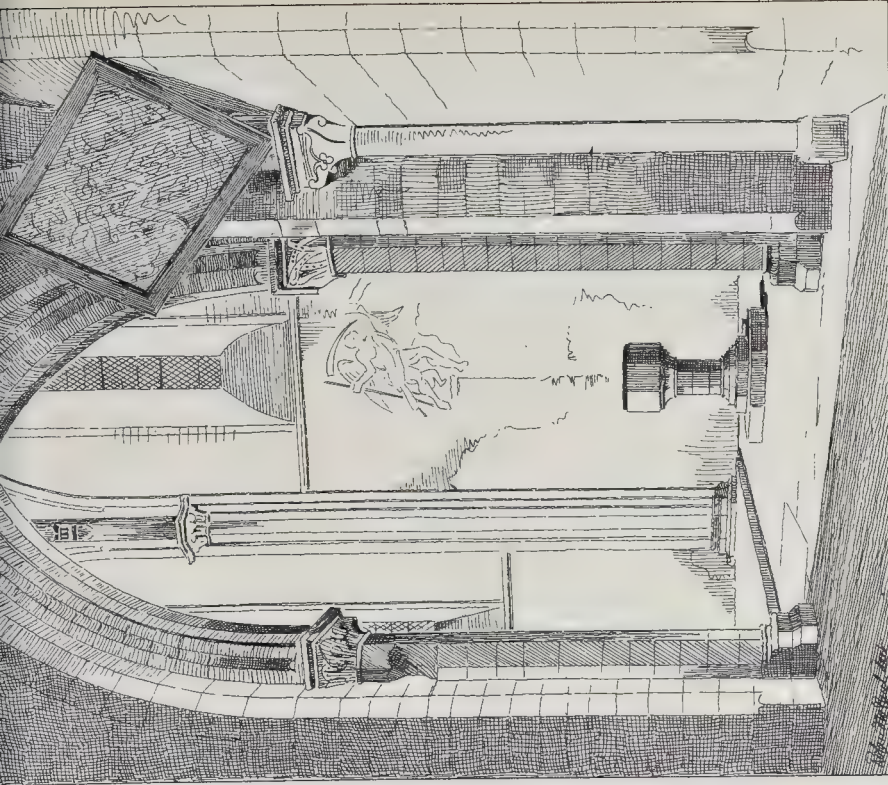


PHOTO LIND SPRAGUE & CO. LTD. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

VIEW ACROSS THE SOUTH TRANSEPT.

November 26, at 7.30 p.m., when a paper on "Decorative Plaster Work" will be read by Mr. George P. Bankhart.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday afternoon at the County Hall, Spring-gardens, Sir J. Douglas, Chairman, presiding.

Vauxhall Bridge. Sir J. W. Collins presented a petition from the Royal Institute of British Architects in regard to the scheme for building Vauxhall Bridge. The petitioners said: "We again desire to impress upon the London County Council the vast importance of such a structure as a great architectural memorial of our time and of twentieth-century art. A bridge across the Thames has an architectural value to the City hardly second to that of our great monumental buildings, and we respectfully desire to express our earnest hope that the erection of a stone or granite bridge may be found possible, and that the necessary powers as originally contemplated for such a scheme may be obtained. The Council of this Institute has been favoured with an opportunity of inspecting the new design for the proposed steel bridge, with ornamental facings and parapets in cast iron carried by granite piers. We express no opinion on the engineering questions involved, but we feel it our duty to point out that there is a total lack of any artistic quality in the ornamental portions of the design. We remain of the opinion so often expressed by us that in dealing with great architectural monuments, which in their simplicity of form rely only upon competent artistic treatment for their monumental success, it is essential to adopt the system common in other countries of associating an architect with the engineer. We have no hesitation in saying that if the scheme of the pseudo-Gothic type illustrated should become a reality it will mean a discredit to the art of the century to the London County Council, and to all concerned in its conception.—Aston Webb, President; Alex. Graham, Hon. Secretary; W. J. Locke, Secretary."

The petition was referred to the Bridges Committee.

At a later period of the sitting, Dr. Longstaff asked the Chairman of the Bridges Committee whether the present Engineer of the Council was in favour of constructing the bridge of concrete as proposed in the former recommendation? But was it found that the foundations would not be sufficient to carry a concrete bridge?

Mr. Horniman asked if the drawings of the proposed bridge could be put up in the lobby. Mr. E. Sheffield, Chairman of the Committee, replied that the drawings should be put up in the lobby. As to Dr. Longstaff's question, the Engineer was not so favourably disposed towards concrete construction as was the late engineer, in the conditions which are necessary for Vauxhall Bridge as regards non-interference with the traffic on the river. He would prefer either a granite or a steel bridge to a concrete structure. In excavating for the piers of the bridge the clay has not been found to be of so satisfactory a character as was disclosed by the borings made before the contract was let. The Engineer wishes to keep the weight on this clay as light as possible, and he considers, therefore, that it would be preferable not to have a concrete bridge.

Dr. Longstaff: Why was not this put in the Report?

Mr. Sheffield said all that would be gone into when the Report was discussed.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Battersea Borough Council £705, in connexion with a housing scheme; Wandsworth Borough Council £2,000, for plant for removal of street refuse; Hampstead Borough Council £2,850, for erection of walls at depot; and Stepney Borough Council £1,935, for street lighting purposes.

Public Clocks.—It was agreed, on the recommendation of the General Purposes Committee, to insert in the next General Powers Bill a clause to enable Metropolitan Borough Councils to incur expenditure in the maintenance of public clocks in their respective boroughs.

Underground Railways.—The following recommendations of the joint meeting of the Parliamentary, Highways, Housing of the

Working Classes, and Finance Committees were agreed to, after a long discussion:—

(a) That, in the opinion of the Council it will be detrimental to the interests of London if any Bill for the construction of a tube railway is proceeded with in Parliament until a full inquiry shall have been held and a Report presented upon the following questions:—

1. How far it is possible to adapt the provisions of the Light Railways Act, 1896, to underground railways in London as recommended by the Joint Select Committee of 1901.

2. Whether it is possible and desirable to formulate some general scheme of underground railway accommodation capable of serving the requirements of London as a whole, and, if so, what should be the main features of such general scheme.

3. Whether a system of deep level tube railways will afford the best results, or whether it will not be preferable to adopt either wholly or partially the system of underground locomotion in operation in Continental and American cities.

4. How and by whom such general scheme can best be carried out having regard to—

The general traffic within London.
The special need of supplying means of access to the suburbs.

The housing problem.

The need for cheap fares.

The raising of necessary capital.

Existing means of locomotion.

(b) That, with a view to obtaining such inquiry as above mentioned, a deputation do wait upon the President of the Board of Trade and ask him to assist in obtaining the appointment of a Commission to hold such inquiry, with power to consider all proposals that may be brought before them for the construction and supervision of underground railways in London, and to report as to the desirability of establishing some Authority to prepare and issue provisional orders for confirmation by Parliament authorising the construction of such underground railways as such Authority may be satisfied will be for the public benefit; and in the meantime to use his influence to obtain the suspension of any Bills that may be introduced into Parliament for the construction of tube railways in London.

(c) That it be referred to the Parliamentary, Highways, Housing of the Working Classes, and Finance Committees to jointly arrange for the proposed deputation, and to report again to the Council as to any further steps they may deem it advisable that the Council should take."

Improvement: High-street, Notting Hill.—The Improvements Committee recommended, and it was agreed:—

"That the estimate of 4,500l. submitted by the Finance Committee be approved; that application be made to Parliament in the Session of 1903 for powers to enable the Council of the Royal Borough of Kensington to arrange for the acquisition of the whole of the properties between High-street, Notting Hill, and West Mall needed for the widening of the former thoroughfare from No. 21 to No. 35 (inclusive) in accordance with the plan presented to the Improvements Committee on January 30, 1901; and that provision be made in the Bill for the Council to pay half the net cost of the improvement, provided that if the ultimate net cost exceeds 9,000l., the Council's contribution shall be limited to 4,500l., the remainder of the cost of the improvement being borne by the Borough Council."

Cross Traffic in Main Thoroughfares.—They also brought up the following Report:—

"We have proceeded upon the following reference from the Council on January 21, 1902:—'That, having regard to the fact that the traffic in main thoroughfares becomes daily more congested, and that such congestion, though assisted by the mixture of slow and fast draught and the narrowness of the streets, is even more certainly caused by cross traffic, it be an instruction to the Improvements Committee to consider the possibilities of some 'over and under' arrangement, by means of bridges or subways, in or about every spot where two large streams of vehicles have now perforce to wait to cross each other.'

Our first action was to consult the Highways Committee, with the result that a Joint Sub-Committee of the Improvements, Highways, and Bridges Committees was appointed. The Chief Engineer was directed to bring up a full Report, and we also made arrangements for returns of the traffic at particular places to be taken. It occurred to us that perhaps the most striking places where some arrangement could be made for assisting the cross-traffic were:—

1. At the junction of Wellington-street with the Strand.

2. At the junction of Southampton-row with Holborn.

The Statistical Officer in due course submitted to us a Report giving in great detail the returns of the traffic taken at the two points in question on two successive days between the hours of 8 a.m. and 8 p.m. These returns showed the number and particular kind of vehicles passing in each direction; the number and duration of the stoppages at traffic on each route; and the maximum and minimum number of stoppages per hour. From these returns

we endeavoured to form an estimate of the possible financial loss caused by the frequent delay of the traffic. In attempting to estimate this loss, we found that the matter was one of considerable difficulty and uncertainty. The Statistical Officer, in reporting the result of an examination of the detailed returns, pointed out that in the Strand 6,341 vehicles were affected by the stoppages out of a total of 19,774 vehicles passing along the thoroughfare, i.e., about one-third of the total number of vehicles.

In estimating the value of the time lost to the various parties concerned, we attempted to average the number of occupants of omnibuses and other classes of vehicles separately, and to make allowance for such of the passengers as might not be engaged in business. Vehicles carrying goods had to be dealt with on a somewhat different basis, and something was allowed for bicyclists. The statistical officer has advised us that, making the best estimate possible in the circumstances, and taking the lower figure in every case in doubt, he estimates a total loss of time to the value of 7,180l. per annum in respect of the stoppages at the junction of the Strand with Wellington-street, and of 3,430l. per annum at the junction of Holborn with Southampton-row. These estimates are in respect of loss of time incurred by individuals only, and the following items are excluded altogether from the calculation:—(a) Delays by temporary checks; (b) delays occurring outside the limits of the twelve hours during which observations were made; (c) persons not travelling on business; (d) losses by detention of goods; (e) losses on vehicles; and (f) losses due to the delay of pedestrians.

We felt that further facts could be obtained if we pursued the examination of the case further, but before doing that we proceeded to consider the practicability of constructing bridges or subways to relieve the cross-traffic. We instructed the Chief Engineer to report (1) what gradient would be necessary to carry a thoroughfare over or under another thoroughfare; (2) what are the gradients of Wellington-street north of the Strand, Trafalgar-square, Haymarket, and Piccadilly near Half Moon-street; (3) the minimum headway necessary to enable vehicles now in ordinary use to pass under a bridge in safety; (4) the least thickness needed for the road across a bridge; and (5) whether it would be possible, in order to reduce the gradient, to arrange for the carriage of a bridge to be only a few inches in depth, but supported by the sides of a bridge, the footway being, perhaps, of greater depth. Dealing with these points in order, the Engineer has advised us (1) that a gradient of 1 in 30 is the steepest which is admissible in providing facilities for cross-traffic; (2) that the gradient of Wellington-street is 1 in 23, the east side of Trafalgar-square 1 in 23, the Haymarket 1 in 34, and Piccadilly near Half Moon-street 1 in 27; (3) the minimum safe headway for a bridge is 10 ft. to 17 ft., and that for a bridge over such a thoroughfare as the Strand a headway of not less than 18 ft. should be adopted; (4) if the width between the parapet girders of a bridge were 30 ft., a depth of 2 ft. 6 in. would be the minimum in which a satisfactory structure could be obtained; (5) that it is not practicable to make the depth of construction for the carriageway only a few inches.

The Chief Engineer, in dealing with the suggestion for the construction of a subway to meet the cross-traffic at the junction of the Strand with Wellington-street and of Holborn with Southampton-row, has pointed out that the scheme already sanctioned by Parliament for the construction of a shallow underground tramway from Theobalds-road along the new street to the Strand, would make the construction of a subway for ordinary vehicular traffic impracticable, and that it would also be impracticable to find space for the approaches to a bridge over Holborn in consequence of the tramway subway scheme, where it will come to the surface in Southampton-row. If a bridge with inclined approaches were constructed from Wellington-street to Waterloo Bridge, it would be necessary to remove the western steps of Waterloo Bridge and to carry the approach to the first abutment of the bridge, with the result that even then the gradient would be as steep as 1 in 20. This could be improved to 1 in 30 if the inclined road were extended a considerable distance on to Waterloo Bridge, involving a widening of the northernmost span of the bridge. This widening could not be carried out by merely widening the arch, but would necessitate a girder span over the Victoria Embankment, unless the bridge were widened for its entire length across the river. It would be necessary to widen Wellington-street, and to place the inclined approach in the middle of the widened thoroughfare, because if the inclined approach were placed on one side of the street, one line of the traffic using the approach would, upon reaching Waterloo Bridge, have to cross one line of the traffic passing on a level to the Strand, with the result that the construction of the bridge would do little more than tend to remove from the Strand the congestion caused by cross traffic to the point where the inclined approach delivered on to Waterloo Bridge.

To construct a subway for general traffic from Southampton-row under Holborn would not only involve considerable interference with the projected tramway-subway scheme, but would also make it necessary either to syphon the Fleet sewer in

Holborn or to divert the sewer at considerable expense. The gradients of such a subway would be about 1 in 17 on the north side of Holborn, and about 1 in 25 on the south side, whilst if a bridge were constructed the gradients would be 1 in 20 on the north of Holborn and about 1 in 17 on the south.

With these particulars before us, supplied by the Joint Sub-Committee, we feel that we have no alternative at the present moment but to advise that the question of the construction of a subway or bridge at the junction of the Strand with Wellington-street and at the junction of Holborn with Southampton-row should be postponed until after the formation of the new street from Holborn to the Strand, when we shall be in a position to decide as to the necessity or otherwise of the construction of a bridge or subway, having regard to the effect of the formation of the new street upon the general traffic, and also the effect of the working of the tramway subway from Southampton-row to the Strand.

We are of opinion, however, that the general question raised in the Council's resolution of January 21, 1902, should be borne in mind, so that whenever we are contemplating the widening of main thoroughfares or the construction of new streets, consideration may be given to the question whether, in connexion with any such improvements, some arrangement may be made for the relief of the cross-traffic. Our recommendations, suggested by the Joint Sub-Committee, are accordingly as follows:—(a) That the consideration of the question of the construction of a subway or bridge at the junction of the Strand with Wellington-street, and at the junction of Holborn with Southampton-row, be allowed to remain in abeyance until after the formation of the new street from Holborn to the Strand, when it will be possible to ascertain the effect of the construction of that street upon the general traffic, and also the effect of the working of the tramway subway from Southampton-row to the Strand.

(b) That it be an instruction to the Improvements Committee to bear in mind the general question raised in the Council's resolution of January 21, 1902, whenever the widening of main thoroughfares or the construction of new streets is in contemplation, so that consideration may be given to the question whether, in connexion with any such improvements, some arrangement may be made for the relief of the cross-traffic.

Bermondsey Abbey.—The Historical Records and Buildings Committee reported that during the recent excavations made in connexion with the erection of working-class dwellings by the South-Eastern Railway Company on land belonging to the Council in Abbey-street, Bermondsey, some interesting discoveries were made of the remains of Bermondsey Abbey. Several additional portions of the old masonry were also obtained from a wall near the White Bear public-house. A few bronze coins, a token dated 1605, and a broken crucible containing glass, had also been found. The remains had been removed to the Horniman Museum.

The Report was received.

Hours of Keeping Open District Surveyors' Offices.—The Building Act Committee reported as follows:—

"By the regulations which were made by the Council on July 1, 1890, relating to the appointment of District Surveyors, every District Surveyor appointed since that date is required to keep his district office open on Saturdays until 2 p.m. We recently received an application from a District Surveyor for permission to close his office at one o'clock on Saturdays, and although there did not appear to be any objection to the application being granted, we were of opinion that, if the surveyors affected by the regulation were in favour of the time being changed, it would be advisable to recommend the Council to alter the regulation rather than for us to assent to a departure from it in particular instances. We accordingly caused the District Surveyors concerned to be communicated with, and as the result all but one have informed us that, in their opinion, no inconvenience would be caused to the public if the hour of closing districts offices on Saturdays were changed to one o'clock. We recommend—That the following be substituted for paragraph (a) of the regulation relating to the appointment of District Surveyors—That he will keep his district office open from Monday to Friday (both inclusive), between the hours of 9.30 a.m. and 5 p.m., and on Saturdays from 9.30 a.m. to 1 p.m., and give his personal attendance there daily from 9.30 to 10.30 a.m."

Mr. Bruce asked if District Surveyors were able to charge in the case of small internal alterations half the fee which would be charged in the case of a new building? A recent charge worked out at about 17. per minute and about 25 per cent. of the whole alteration.

Dr. Longstaff said he believed the facts were so, and the charges were made under a schedule of Act of Parliament.

Mr. Bruce: Can we get that altered?

Dr. Longstaff: I see no prospect of altering

it. Although District Surveyors have the power to charge so, they generally take much less.

The Council adjourned shortly after 7 o'clock.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Hampstead.—That the application of Mr. J. F. Bell, for an extension of the period within which the erection of a block of residential flats on the northern side of Flaxley-road, Hampstead, at the corner of Heath-drive (late West Hampstead-avenue) was required to be commenced be granted.—Agreed.

Lewisham.—The retention of a water-closet addition at the rear of No. 4, Halesworth-road, abutting upon Shell-road, Lewisham (Messrs. Hodson & Whitehead for Messrs. Hodson Bros.).—Refused.

Width of Way.

Southwark, West.—Completion of a building commenced to be erected on a site abutting upon Kell-street, Earl-street, and Daintic-street, Southwark (Mr. W. Downs for Messrs. R. Hoe & Co.).—Consent.

Space at Rear.

Clapham.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of seven blocks of buildings on a site abutting upon Clapham Park-road, Abbeville-road, and Park-place, Clapham, with an irregular open space at the rear (Mr. R. C. Overton for Mr. E. Messiter).—Consent.

Formation of Streets.

Clapham.—That an order be issued to Mr. J. Cobbold refusing to sanction the formation or laying out of new streets for carriage traffic on the Heathfield estate, West-side, Clapham-common, Clapham.—Agreed.

Norwood.—That an order be issued to Messrs. R. Ellis & Son refusing to sanction the formation or laying out of new streets for carriage traffic on the Sanders estate on the south-east side of Coldharbour-lane, Drixton, for Mr. K. A. Sanders.—Agreed.

Height of Buildings, Cubical Extent, &c.

Fulham.—The erection at the Mantré Saccharine Works, Brandenburgh-road, Fulham, of buildings with (a) three blocks (Nos. 1, 2 and 5) each to exceed in extent 250,000 but not 450,000 cubic feet, and to be used only for the purposes of the manufacturing and treatment of maize in the wet state (b), a portion of block No. 1 to exceed in height the distance of such portion from the opposite side of Rannoch-street, and (c) external iron gangways and staircase to connect blocks Nos. 2, 3, 4 and 5.—Consent.

Means of Escape from Top of High Buildings.

Kensington, North.—Means of escape in case of fire proposed to be provided in pursuance of Section 63 of the Act, on the seventh and eighth stories of Lansdowne House, Lansdowne-road, Kensington (Mr. W. Flockhart for Mr. E. Davis).—Consent.

* * * The recommendation marked † is contrary to the views of the Local Authority.

THE LONDON BUILDING ACT, 1894:

TRIBUNAL OF APPEAL CASE.

The Tribunal of Appeal under the London Building Act sat at the Surveyors' Institution on Tuesday to hear an appeal by the Hon. Sydney Holland on behalf of the Governors and House Committee of the London Hospital, against the disapproval by Mr. Arthur Crow, District Surveyor for Whitechapel, of works proposed to be carried out at the East wing of the London Hospital, and his requirements in relation thereto, under Section 78 of the Act.

The members of the Tribunal sitting were Messrs. Penfold (Chairman), Hudson, and Gruning. The case for the appellants was conducted by the Hon. S. Holland in person, and the respondent was represented by Mr. Andrews, from the Solicitor's Department of the L.C.C.

According to the opening statement of Mr. Holland, the appeal was from an order made by the District Surveyor to strengthen certain piers to the east wing of the hospital on the ground that the existing external walls are in places out of the upright and insufficient to support the additional load of the proposed extra stories, concrete roof, and water tanks. The requirement of the District Surveyor was that against each of the twenty piers buttresses, 4 ft. 6 in. wide, and ranging in projection from 1 ft. 11 in. to 9 in., should be built. The

appellant contended that this was unnecessary, and that, in fact, the wall is good and sound and fit to bear the superstructure. The history of the case was this: The London Hospital contains nearly 800 beds, not one of which can be spared. Any work that is necessary has therefore to be done a floor at a time. When it was decided to improve and heighten this wing, the appellants' architect, (Mr. Rowland Plumble, F.R.I.B.A.) proceeded to carry out the necessary works to the basement, and prepared drawings showing what he thought would be necessary in carrying the walls down by underpinning in concrete to the solid gravel. Drawings of these works were submitted to Mr. Crow in October, 1901. The appellant's architect met the respondent the same month, and had many interviews with him in reference to the work that was required to be done to the basement walls, and all work necessary to be done was carried out under the respondent's superintendence and to his satisfaction. The respondent objected that the middle wall of the ward was not thick enough in view of the large openings cut in it, and also in view of the weight of the extra stories with the water tanks and concrete. Ultimately it was arranged to build into this wall steel riveted stanchions, which would take the main girders on each floor—both those existing and those to be fixed. The wall sent me and stipulated that all defective work, and at the respondent's request the external walls were tied to the cross-beams by means of substantial wrought-iron anchors. In discussing the strength of these walls, a drawing was submitted to the respondent showing that on one floor the thickness of the wall hardly agreed with the thickness required for the walls under the arches in occupation of the Act. Although there is nothing in the Act requiring such walls to be of the thickness of the warehouse class, Mr. Plumble offered to thicken them, but after discussion the respondent thought it was not necessary. The work went on, and was continued as far as the first floor, and the three lower floors were done in occupation. There was considerable discussion from time to time as to the walls, and calculations were gone into showing the weight which would come upon them. On May 24 the respondent wrote to this effect: "I shall not now raise any further objection to the work being executed to this block in accordance with the drawings which you have sent me, and stipulated that all defective work to the old walls should be cut out and made good. In the following June the respondent wrote that, while he was not wishing in any way to open the question, he asked for diagrams showing the plumbing of the walls. The appellant's architect, in the meantime, had offered to pull down the top portion of the walls to the springing of the second floor window arches, and, if found necessary, when the work was being pulled down, to demolish such of the second-floor parts as were found to be defective. The plumbings were sent to the respondent, and it was not until September 4 that the respondent wrote demanding that enormous buttresses should be built against the outside piers to strengthen them, with the object of giving the appellant's architect an opportunity of appealing to the Tribunal in the event of his disagreement with the respondent's views. This letter was withdrawn in consequence of the holidays and the absence of the Hospital authorities, and a formal notice served upon the Governors of the Hospital.

Mr. Holland complained that the respondent failed to make these demands at the time the works to the foundations were carried out, and although a large amount of work had been done, only made these demands within the past few weeks, and that a roof would be necessary to carry them out. Mr. Holland submitted that the respondent's demands were due to an excessive nervousness, and, although the appellants were willing to meet any reasonable demand, they could not acquiesce in that which they regarded as unreasonable.

Mr. Plumble gave evidence that in his opinion the walls were amply strong enough for the two additional stories now being built, and he produced diagrams showing the plumbing of the walls, fully half of which were absolutely upright. Moreover, the walls were in excess of the thickness required by the Act, and the tying in of the walls had made them secure with regard to the south section of the east wing; the thickness of the wall as existing and proposed to be raised was at the basement 27 in. as compared with 24½ in. (and pier) required by the schedule, while on the ground floor the thickness was 22½ in. as against 17½ in. (and pier) and 21½ in. (and pier) required by Part 1 and 2 of the schedule respectively. On the fourth floor the thickness was 18 in., as compared with 13 in. and 17½ in. (and pier) of Part 1 and 2 of the schedule. The width of the pier at the basement was 7 ft., which compared with 5 ft. 6 in. required by the Act. Then in regard to weight, the total on each pier in tons at the basement was 78.5, the weight per foot superficial in tons being 5.6. On the ground floor the figures were 66.5 and 5.7 respectively, while on the fourth floor they stood at 17.6 and 1.8 respectively. The weights coming upon the walls were moderate in the extreme.

Mr. Andrews, for the respondent, pointed out that the District Surveyor, as a public officer, had a great responsibility in regard to public buildings. If he sanctioned plans which were defective and

anything happened, his responsibility would be held up against him. In the present proceedings, therefore, he recognised that the Tribunal was taking upon itself the responsibility attaching to the plans. The grounds upon which his refusal to pass the plans were based were that the settlements had taken place in the main building, that the walls were out of plumb and the axis of pressure was not coincident with the axis of resistance; the failure to take out the old piers, as suggested to Mr. Plümbe in May. Further, it was the duty of those who proposed to put an additional two stories with water-tanks on top of the roof to show that the walls were sufficiently strong to bear the weight.

Mr. Crow then gave evidence. He stated that from an inspection he made of a section cut out of the east wall of the basement of the north section in the early part of the summer he found certain defects in the construction of the brickwork. There was a larger percentage of bats than there should be. Many of the bricks were not "good, hard, and well-burnt," such as would be required in the present day for external walls. Likewise, the bonding was not at all well done; in many places there were false headers. The bond was English, with Flemish facings externally. He produced a sketch showing the interior of the wall as disclosed by the cut out of the section. Both the east and west walls of the northern section were bulged on a level with the first floor window arches, and overhanged to the following extent:—East wall: First pier from north end, 2½ in.; second pier, 3 + ¾ = 3½; third pier, 3 + ¾ = 3½; fourth pier, 3 + ¾ = 3½; fifth pier, 2½ + ¾ = 3½. West wall—first pier from the north end, 2½ in.; second pier, 1½; third pier 1½ + ¾ = 1½; fourth pier, 1½ + ¾ = 1½; fifth pier, ¾. In addition to this both walls appeared to lean over badly to the east in the centre. The East London Railway passed under the result of these being to show that the average load at which fracture commenced for brick piers not 10 diameters in height and referred to certain tests carried out by the Science Committee of the Royal Institute of British Architects from 1896 to 1898, the result of these being to show that the average load at which fracture commenced was 100 tons per square foot. This result gave a safe working load of 2 tons per square foot, whereas, according to the figures supplied by the appellants, the load was to be about 6 tons per square foot.

In cross-examination Mr. Crow stated that since he dealt with the matter in May circumstances came to his knowledge with regard to the main block, and the effect of the increased weight being put upon the foundations there made him hesitate to accept the responsibility with regard to the east wing.

The Tribunal adjourned the further hearing of the appeal, and to enable them to view the *locus in quo*.

PLUMBERS' REGISTRATION:

DEPUTATION TO LOCAL GOVERNMENT BOARD.

THE President of the Local Government Board, Mr. Walter Long, received a large and influential deputation on Thursday, the 6th inst., in support of the Plumbers' Registration Bill. All the chief cities and towns of the Kingdom were represented, also the following bodies:—The British Medical Association, the Royal Institute of Public Health, the National Health Society, the Royal Institute of British Architects, the Birmingham, Leas Valley and Grand Junction Water Boards, the Metropolitan Boroughs, the Sanitary Committee of the Corporation of London, the National Association of Master Plumbers of Great Britain and Ireland, the United Operative Plumbers' Association of Great Britain and Ireland, the London Society of Associated Master Plumbers, the Central Registration Committee, and the Plumbers' Apprenticeship Board.

Sir Lewis McIver, M.P., introduced the deputation. The Clerk of the Plumbers' Company explained the constitution of the deputation, and laid much stress upon its representative character. He also pointed out that more than one-half of the Members of the House of Commons had expressed their sympathy with the movement, either by their vote or by their personal presence. The Minister, who was present some time ago to the Prime Minister, asking for facilities for the passage of the Bill.

Alderman Sir John Kail, Master of the Plumbers' Company, assured Mr. Long that the object of the deputation was not an individual one. It was to protect the public from defective sanitation. It was to ensure that the Plumbers' Registration Bill should be pushed forward in the House of Commons as soon as possible. Already some 12,000 men were certificated. This fact was sometimes brought forward as an argument that registration was not essential, but as registration stood at present it was little or no protection to the public. The cause men used certificates belonging to others, and the Plumbers' Company had no control over them. They desired to protect the public against all plumbing work and against scamped work, to achieve that end they were determined to do no stone unturned.

Mr. Harrison, President of the National Association of Master Plumbers of Great Britain and

Ireland, expressed full concurrence with the action of the Plumbers' Company.

Mr. Collicott, the representative of the United Operative Plumbers' Association of Great Britain and Ireland, said that he believed that the Bill would be beneficial not only to the public health, but also to the plumber himself, because it would distinguish the genuine plumber from the sham.

Dr. A. Hill, Medical Officer of Health, Birmingham, spoke of the movement for registration from the medical point of view, which he thought was the most important aspect.

Baillie Crawford, late Chairman of the Public Health Committee, Glasgow, and Warden of the Plumbers' Company, said that he had been associated with the movement for eighteen years, and he was convinced that the country desired to have the power of distinguishing between good and bad plumbers. They now found that they could not proceed further with the movement without the assistance of the Government. The Plumbers' Company had spent in 1902, and the plumbers themselves had contributed about 12,000, to carry out voluntary registration. They had brought in private Bills over and over again, they had petitioned, they had done everything that was lawful and constitutional, and they had had very considerable encouragement, but as yet they had not got the Bill, and they earnestly trusted that the Government would take it up.

Mr. Long, in reply, said that he hoped it was unnecessary for him to say that he entirely recognised the very influential and very important character of the deputation. He had been asked, in the first place, what was the view of the Local Government Board as to the principles of this measure. He had no hesitation in saying that they regarded the measure with hearty approval and goodwill. As it had been admirably put by one of the speakers, the object of the Bill was not to benefit a particular trade or industry, but it was to benefit the general community and to improve the condition of the public health. That was one of the objects for which the Local Government Board existed. He entirely believed that there was great room for improvement in regard to plumbing work. However great might have been the discoveries of science, and however anxious the householder might be to have the very best system of drainage in his house, science and the householder were defeated if the work was so carelessly or so badly done that all the appliances were rendered useless, and the diseases which they desired to prevent were just as rampant as if science had never made its discoveries. He took it from the deputation that they believed that these dangers to the public health were in a very large measure to be removed if their Bill were passed into law. How did the Bill stand now compared with the position when in former times the matter had been brought before him? The deputation had reason to believe that the position had materially improved. In the first place, it was his duty on previous occasions to point out that there were certain parts of the Bill which he could not see his way to support. They had now removed those proposals, and subject to one or two small matters of detail, there was nothing in the Bill now which his Department and the Government would find any difficulty in heartily supporting. Mr. Crawford had described the history of the present position of those who were interested in this movement, and he appealed to the Government to support them and help them out of their difficulties.

The practical question was, "How were they to accomplish their further steps?" They were now almost in sight of the gates of paradise, and they wanted to get these gates open. He should like to say that he personally regretted the present position of non-controversial legislation. There was no Department where there was so much need for departmental legislation as in the Local Government Board. During the twenty years he had been in Parliament there had been few sessions in which a number of Departmental measures had not been passed, but he now found it practically impossible to carry even the least of Departmental measures, and when he was asked to come to the assistance of this deputation, he was bound to ask whether he was able to comply with the request. He turned to the deputation, and he noticed with the greatest possible interest and hope that, not only was it representative of all parts of the country, but it was representative of the various Parties in the House of Commons. If the Members of Parliament present, drawn as they were from both sides of the House, had really come to support the movement, and would turn themselves into advocates and whips for the Bill in the House of Commons, then there would be no difficulty whatever in giving the Bill the sympathy and support of the Government and in passing it into law.

A vote of thanks to Mr. Long closed the proceedings.

SURVEYORS' INSTITUTION.—The President's prize for papers to be read at the junior meetings of the Surveyors' Institution for this year has been awarded to Mr. G. P. Knowles, P.A.S.I., for a paper dealing with local government questions. Mr. Knowles, who is a Surveying Assistant in the Architect's Department of the London County Council, won this prize last year also.

Correspondence.

WOODEN COTTAGES AND RURAL BY-LAWS.

SIR,—I am thankful for your protest last week (see p. 410 *ante*) against the absurd regulations which hamper building operations in rural places. Nothing but larger powers at Whitehall will relieve us, for though I have been four years fighting, single-handed, against the Dartford Authority, the Local Government Board are now only able to advise, not compel, the Dartford Council to act with common sense. I send you a local paper, that you may see the present stage of the prosecution against me for erecting the most convenient cottage in the parish.

Wherever Rural Authorities adopt the antiquated by-laws, and not the new Advisory Code of 1901, which was expressly framed by Whitehall to relieve Rural Districts, they virtually "hold a brief for the bricklayer." I would not speak disparagingly of that most useful craftsman; but he has now become an expensive luxury, and you cannot construct a cheap cottage except with cheap muscle and material. Cottage unsuitable by-laws are "in restraint of trade," for they discourage enterprise and invention. The moment a man contrives a cheap dwelling, down comes the law and forbids its erection!

The King of Scandinavia lives in a wooden palace. Every thrifty rural labourer ought to be able to construct a cottage for himself which would be a "palace" in comparison with the pigsties many have to put up with (unfortunately, the "inside" of the house is often the most difficult to contrive, but that is not a by-law question).

Sir William Chances, Orchard, Godalming, Surrey, President of the Poor Law Conference, writes in last week's issue of *Country Life* to advocate immediate formation of an association to further the work of reform, inasmuch as single-handed, an individual cannot fight so successfully as an organised body. I certainly shall support his suggestion, and I hope, Sir, you will be kind enough to advocate it in the *Builder*. Then, perhaps, "slavery" will really become extinct in Britain.

E. D. TILL.

The Priory, Eynsford, Kent,
November 11, 1902.

CHEAP COTTAGES.

SIR,—I noticed in your last issue some remarks concerning workmen's dwellings in wood, and objections raised to them. Some years ago I was at the building of some houses which would serve exceedingly well, and still be cheap. A foundation was made of brickwork; also all fireplaces and flues; and wall-plates laid on brick foundations. Standards of wood were then placed to height of the walls required, let into the wall-plates, and placed, say, about 15 in. or 16 in. apart—of course, trimmed for doors and windows. The standards were 6 in. by 25 in. or 3 in. with a lath 3 in. in width nailed to each side of standard. These, when fixed in position, were lathed and plastered on each side, and filled in between with either sawdust or dried sand. When the plastering was hard enough the standards were lathed on each side—inside, of course, the same as any ordinary room; outside mortar was gauged with Portland, and then rough-cast while in the soft state, which makes the work durable, and looks well if properly done. The roofs were covered with shingles instead of slates, both cheaper and lighter. The shingles were cut about 16 in. to 18 in. by about 11 in. or 12 in. wide, and put on exactly like slates.

I think houses of this description, if passed, would make good, cheap, and warm houses for workmen. I have seen a hotel in Scotland done on this principle. They look as well as any cemented front if the rough-casting be properly done, and durable into the bargain.

G. R. M.

QUICK WORK.

SIR,—There has been considerable writing during the year to some of the daily and other newspapers tending to the disparagement of English methods of work, especially with regard to the speed of production of the materials for and the erection of buildings. There are few who considered these criticisms entirely just, but as an example of what is accomplished by English organisation, direction, control, and labour, when allowed free exercise, we should be obliged by your inserting this letter, giving a general record of work performed within our own immediate knowledge in this city, and under normal conditions of wages, &c.

We are the tenants on lease of a seven-storied warehouse at 9, Portland-street, Manchester. The building covers about 1,000 square yards of land, and has frontages to three streets. The premises were recently so badly gutted by fire that the roof of the outer walls was undamaged. Two of the other fronts had each to be taken down 15 ft. for the sake of safety, and the fourth side wall had to be taken down 50 ft. and re-erected.

The building is one of the best class of Man-

chester home trade warehouses, constructed of iron columns, steel beams, and joisted floors. The fire caused so much damage that the whole internal work had to be cleared out, and complete reinstatement made from basement floor to roof.

The fire took place on July 24, 1902; the insurance company, the owners, and ourselves the tenants appointed Messrs. Charles Heathcote & Sons, of Manchester, the architects for the reinstatement.

Quick reconstruction was desired by each interest involved. The Law Union and Crown Insurance Co. were very prompt in settlement of their position, and on September 3 instructions were given to the architects to proceed with placing the contracts. Accordingly, on September 3 the orders for the preparations and erection of the steel and iron work were given out to Messrs. Skipworth & Jones, engineers, Manchester, and the contract for the remainder of the work put in the hands of Messrs. R. Neill & Sons, builders, Manchester, on September 8.

The whole of the cast-iron columns, steel beams, and floor joists of seven floors (in addition to other portions of the work) and also the iron principals of the roof, were fixed in position by October 29.

Thus all this constructive work of a large seven-storyed warehouse has not only been erected but prepared in eight weeks, and of excellent quality and perfect construction.

This splendid progress has given us such satisfaction, and is so creditable to workmen and contractors and to the superintendence and organising skill of the architects, that we consider such should have, if possible, at least a part of the publicity which has been given to statements suggestive of slackness in our English "methods."

(For George Peak & Co., Ltd.)

JOHN KENDALL, Chairman.

November 6, 1902.

* * We have pleasure in publishing a letter which is creditable both to the writers and to those in whose favour they bear witness. At the same time we may repeat what we have often said before, that building against time, however it may be necessary under some circumstances, is not the way to secure either the best architecture or the best building.—Ed.

COMPETITIONS.

NEW HIGHER ELEMENTARY SCHOOL, FINCHLEY.—In response to an invitation issued by the Finchley School Board, eleven selected architects submitted designs for the higher elementary school proposed to be built by the Board. Mr. Thomas E. Colcutt, F.R.I.B.A., the assessor, having made his award, the sealed letters accompanying the plans were opened, when it was seen that the first premium had been awarded to Mr. W. G. Wilson, A.R.I.B.A., Bloomsbury Mansions, Hart-street, W.C.; the second to Mr. G. E. T. Lawrence, A.R.I.B.A., Chandos Chambers, Strand, W.C.; and the third to Messrs. Mitchell & Butler, 16, Finsbury-circus, E.C. In terms of the conditions issued to the competitors the Board have instructed Mr. Wilson to proceed with the work.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

19.—FIXED OILS—FATS—LUBRICANTS.

FIXED OILS are those which, like linseed oil or olive oil, do not volatilise appreciably at ordinary temperatures, and which cannot be distilled because they undergo decomposition when heated to boiling point. **Volatile oils** are those oils which evaporate when exposed to the atmosphere, and can be distilled without decomposition. Spirits of turpentine or "turps" is a volatile oil, and the various plant essential oils are volatile oils. The volatile oils are not true oils, and are very different in their chemical character from the fixed vegetable oils. **Mineral oils**, such as petroleum and shale oil, are mixtures of hydrocarbons, and do not, like the fixed vegetable and animal oils, contain oxygen. The group of compounds in which the mineral oils are classified is totally different in every way from that in which the fixed vegetable and animal oils are included. Animal fats are grouped with the fixed vegetable oils because they are of very similar chemical composition and have similar properties.

Saponification.—When fixed oils or fats are boiled with caustic soda solution the oil or fat is decomposed into *glycerine*, which remains in solution, and into fatty acids, which unite with the soda to form solid *soap*. Fats may also be converted into *glycerine* and fatty acids (stearic

acid, palmitic acid, &c.) by distillation with steam alone. Mineral oils cannot be saponified. Commercial *glycerine* sometimes consists of *glycerine* recovered as a by-product in soap manufacture.

Classification of Fixed Oils.—Fixed oils may be divided into the following three classes:—

1. Drying oils.
2. Semi-drying oils.
3. Non-drying oils.

There is, however, no sharp line of demarcation between the drying and non-drying oils, for the one class gradually merges into the other, and some of the non-drying oils may be converted into drying oils by special treatment.

Drying Oils, when exposed in thin films to the atmosphere, solidify in the form of a skin, which is usually more or less elastic. Drying oils are valuable for the manufacture of paints, but useless as lubricants. The drying oils include linseed oil, Chinese or Japanese wood oil, poppy-seed oil, walnut oil, and hemp-seed oil.

Semi-Drying Oils become viscid when exposed to the air, but never perfectly dry. These oils are not the best for paints or for lubricating, but are frequently used for both purposes. Cotton-seed oil is one of the most abundant of these semi-drying oils, and is frequently used as an adulterant in paint oils; while castor oil, which is another semi-drying oil, is often used as a lubricant.

Non-Drying Oils are valuable as lubricants, but useless for paints. Among the non-drying oils are olive oil, sperm oil, lard oil, colza oil, and rosin oil.

Linseed Oil is the oil most extensively used in this country for the manufacture of paints. It is used in both the "raw" and "boiled" form. Raw linseed oil is obtained by pressing the seeds of the common cultivated flax (*Linum usitatissimum*). When the raw oil is heated by itself or with "driers" a product termed "boiled oil" is obtained. The largest supplies of linseed come from Russia and India, but flax is also extensively cultivated in Ireland, Belgium, Holland, and America. The fibre of the plant is used for the manufacture of linen, while the oil from the seeds is chiefly used for the manufacture of paints, varnishes, and printing inks. The quality of the oil is largely dependent upon the locality in which the plant was cultivated. The oil pressed from Russian seed is usually the best, while that which comes from East India is inferior. Russian seed is usually imported in a cleaner and purer condition than that from India. The presence of the seeds of weeds or plants other than the flax, if they yield non-drying oils, reduces the value of the linseed oil.

Raw oil may be obtained from linseed by pressing the cold seed, by pressing the hot seed, or by dissolving the oil out of the seed by means of carbon bisulphide and subsequent distillation to separate the oil from the carbon bisulphide. The oil in the seeds varies from 28 to 45 per cent., but only about 20 per cent. is extracted by cold pressure, 27 per cent. by hot pressure, and 33 per cent. by carbon bisulphide. The best oil is obtained by cold pressure, but most of the oil of commerce is obtained by pressing the heated seed.

Properties of Linseed Oil.—The most important property of linseed oil is its power of absorbing oxygen from the atmosphere when exposed in thin layers and becoming transformed into a solid elastic skin. The raw oil has a yellowish-brown colour, and is soluble in turpentine, petroleum spirit, shale naphtha, or chloroform. It dissolves in about forty times its own volume of alcohol at ordinary temperatures, but is more soluble in hot alcohol.

Boiled Oil.—The drying power of linseed oil may be increased by heating it to about 350 deg. Fahr., while a stream of air is blown through it. A small quantity of "driers" (red lead, acetate of lead, manganese borate, or some other suitable metallic compound) is usually added. The proportion of "driers" commonly employed is $\frac{1}{2}$ lb. to 1 lb. of driers for every 1 cwt. of oil. Air is blown through the heated oil for six or seven hours. This so-called "boiled" oil dries in from twelve to twenty-four hours when exposed to the atmosphere in a fine film, whereas the raw oil when exposed in the same manner requires exposure for two or three days before it becomes dry. Linseed oil begins to boil at about 500 deg. Fahr., but it simultaneously undergoes decomposition, and it is not, therefore, practicable to boil linseed oil in the true sense of the term.

Boiled oil is not suitable for use by itself as a

paint oil; for, although it dries quickly, it forms a brittle coat which is liable to crack. By using a mixture of boiled oil and raw oil the paint dries more rapidly than when raw oil alone is used, and yet dries with a sufficiently elastic skin. Several methods of preparing boiled oil are in vogue, but the process described is that most commonly adopted.

Adulterants.—Both raw and boiled linseed oil are commonly adulterated with rosin oil or mineral oil. Less frequent adulterants are fish oil and the oils from cotton-seed, mustard-seed, hemp-seed, poppy-seed, and rape-seed.

Poppy Oil is obtained from the seed of the opium poppy (*Papaver somniferum*) by pressure. It has a faint yellow colour, but may be completely decolourised by filtration through charcoal. The oil is almost tasteless and odourless. It dries less rapidly than linseed oil, but on account of its freedom from colour, has been extensively used by artists as a vehicle for pigments of a white or pale colour. The usual adulterant is cotton-seed oil, but other cheap oils of light colour may be used.

Nut Oil or Walnut Oil is obtained from the peeled kernels of the common walnut (*Juglans regia*). It is a drying oil, and must not be confounded with the non-drying nut oils. It has a pale yellowish-green colour, but can be bleached. Walnut oil much resembles linseed oil in its properties, and dries quite as rapidly. It is more costly than linseed oil, and is principally used for artists' colours. It has an agreeable smell and nutty flavour. When the walnut kernels are not peeled, but stored for two or three months and then crushed without peeling, they yield 25 per cent. of oil called "Virgin Nut Oil," which is used as an edible oil, and sometimes as a substitute for linseed oil.

Second quality nut oil is obtained by grinding with hot water the residue left after extracting the "virgin oil," and then again pressing it. The oil obtained by this second extraction is of inferior quality, and has an acrid taste. It is used as a paint oil. The commonest adulterants are linseed oil and poppy oil.

Hempseed Oil is a drying oil, much used as a paint oil in Russia and other places, where the hemp plant (*Cannabis sativa*) is extensively cultivated. It is not much used in England, as it is more costly than linseed oil. It has a somewhat unpleasant taste and odour.

Wood Oil (Chinese or Japanese), or *Tung oil*, is an oil which dries even more rapidly than linseed oil. It is obtained by pressing the seeds of the oil tree (*Elaeococca orientalis*). The tree is known as the tung tree or tong yeou, and is grown principally upon the banks of the Yangtze, in China. The seeds yield about 35 per cent. of their weight of oil. The oil is colourless and odourless, but when exposed in a thin layer to the atmosphere forms a skin which is duller, more wrinkled, and more opaque than that formed by linseed oil. If the oil be first heated with a little litharge, the dry skin will be transparent instead of possessing a milky opaqueness, but will still retain a slightly wrinkled surface. Wood oil, when heated to 212 deg. Fahr. for several days, slowly gelatinises. When heated to about 550 deg. Fahr. the oil is at once transferred into a transparent jelly, which is insoluble in spirits of turpentine or any of the usual solvents, whereas the raw oil is soluble in any of them.

Cotton-seed Oil is a semi-drying oil obtained by refining the oil extracted from the seed of the cotton plant (*Gossypium barbadense*). It is so cheap that it is not often adulterated, but is largely used as an adulterant for more costly oils. It is not very suitable for lubricating, because it has a tendency to become sticky; nor for use in paints, because it does not dry sufficiently rapidly or completely. It is used in cooking, soap-making, and in the manufacture of butterine.

Castor Oil is a semi-drying oil often used as a lubricant. It is extracted from the heated seed of the castor oil plant by pressure, unless required for medicinal purposes, when the seed is pressed cold. Castor oil differs from other oils in being completely soluble in alcohol.

Rosin Oil is a non-drying oil obtained by distilling rosin in cast-iron stills. It is dark brown or pale yellow in colour, according to the refining treatment to which it has been subjected. When fresh the rosin oil is fluorescent, but upon exposure to light and air, or to the action of oxidising substances, the fluorescence disappears. Rosin oil is used as a lubricant and as a constituent of varnishes,

printers' inks, train oil, and soap. It is also commonly used as an adulterant in more costly oils. Rosin oil is not saponifiable. It is soluble in alcohol or glacial acetic acid.

Colza Oil or Rape-seed Oil is a non-drying oil obtained from the seeds of various species of Brassica. Colza oil is liable to have an acid reaction owing to the decomposition of the albuminous matter it contains. It is often purified with sulphuric acid, which tends to increase the acidity of the oil by decomposition of the glycerides, and also because it is difficult to remove the last traces of the sulphuric acid from the oil. Colza oil is yellow or brown in colour. It is used as a lamp oil, and also in the manufacture of indiarubber, and as a lubricant.

Olive Oil, Salad Oil, or Sweet Oil is a non-drying oil obtained from the fruit of the olive tree (*Olea Europaea sativa*). The best quality oil is obtained by hand pressure, but inferior qualities are obtained by pressing the heated fruit by machinery. It is too expensive to be largely used in this country as a lubricant, and is apt to decompose and acquire an acid reaction. It is frequently adulterated with cheaper oils. It is principally used for cooking and wool-dressing.

Palm Oil is a fat varying in consistency from that of vaseline to that of hard tallow, and is obtained from the fruit of palms (*Avocira elais* or *Elais guineensis*). It has a yellow colour, and, as it often contains free fatty acid, is liable, if used alone, to have an injurious effect upon metals. Palm oil is largely imported into England from the West Coast of Africa for the manufacture of railway grease, soaps, and candles.

Mineral Oils are non-drying oils composed of a mixture of hydrocarbons which are usually of the paraffin series. Vaseline, petroleum jelly, and petroleum residuum are semi-solid products obtained from petroleum after the lighter portions have been separated by distillation. The mineral oils of commerce are derived either from the natural petroleum found abundantly in the United States and in Russia, or by the distillation of shale. The lighter distillates obtained from these natural oils are used for illuminating purposes, while the heavier portions, having higher boiling points, are used as lubricating oils, and for the adulteration of linseed and other more costly oils.

Tallow is usually either mutton or beef fat, but other animal fats are sometimes sold as tallow. Tallow is a mixture of stearine, palmitin, and olein, and sometimes has an acid reaction owing to the formation of oleic acid during the process of melting to which the tallow is subjected in order that the fat may be separated from the organic tissue. Palmitin and stearine are solid at ordinary temperatures, while olein is liquid.

Tallow Oil is an oil obtained by subjecting tallow to pressure, and consists mainly of olein.

Neatsfoot Oil is obtained by boiling the feet of oxen with water.

Sperm Oil is a non-drying oil obtained from the spermaceti whale. It is a pale yellow fluid of low viscosity, and is very serviceable as a lubricant for light machinery. The crude oil contains a wax-like substance called "spermaceti" which has to be separated by cooling the oil and filtering it as soon as the temperature has become sufficiently low to cause most of the spermaceti to solidify. **Bottlenose oil** is obtained from the bottlenose whale, and closely resembles sperm oil.

Solid Lubricants.—Graphite is the principal solid lubricant, but powdered soapstone mixed with oil is sometimes used.

Grease.—The greases used for railway wagons and for lubricating work of a similar character are manufactured by mixing various oils with soaps and fats with the aid of steam heat. H. J. Phillips states that the average percentage composition of good yellow and black grease respectively is as follows:—

	Yellow Grease.	Black Grease.
Water	37	25
Tallow	30	17
Palm oil	10.5	4
Soap (containing 30 per cent. water)	21	13.5
Petroleum residue	—	40
Soda ash	1.5	1.5
	100.0	101.0

The following table enumerates the lubri-

cants commonly employed for different kinds of machinery:—

Machinery.	Lubricants.
For steam cylinders,	Heavy mineral oils, lard, tallow.
Ordinary machinery,	Tallow oil, lard oil, heavy mineral oil, rape oil.
Very heavy pressures with slow speed,	Graphite or soapstone.
Heavy pressures with slow speed,	Tallow, lard or other grease.
Heavy pressures with high speed,	Sperm oil, castor oil, rape oil, heavy mineral oil.
Light pressures with high speed,	Sperm oil, refined petroleum, cottonseed, olive, or rape oil.
Watches, clocks, &c.,	Light mineral oils, sperm, porpoise, or olive oil.

Specific Gravities of Oils.—The following table shows the normal specific gravities of the principal commercial oils. The determination of the specific gravity is one of the tests usually made when examining an oil for the presence of an adulterant:—

Oil.	Specific Gravity at 60 deg. Fahr.
Castor oil ... ..	.961 to .965
Cod-liver oil ... ..	.915 to .929
Cotton-seed oil ... ..	.922 to .932
Hempseed oil ... ..	.925 to .931
Linseed oil, raw ... ..	.932 to .936
Boiled ... ..	.930 to .934
Mineral lubricating oils ... ..	.850 to .925
Olive oil ... ..	.914 to .918
Palm oil ... ..	.920 to .927
Poppy oil ... ..	.924 to .929
Rape-seed oil (colza) ... ..	.914 to .910
Rosin oil ... ..	.973 to .981
Suam oil ... ..	.881 to .888
Walnut oil ... ..	.925 to .928
Wood oil ... ..	.938 to .940

GENERAL BUILDING NEWS.

CONVENT CHAPEL, HARROW.—A chapel has just been completed in connexion with the recently built Convent of the Visitation Nuns on Sudbury Hill, Harrow. The chapel, which is attached to the convent, is of red brick, with external stonework of very hard Bath stone, that used in the interior being of a finer character. The whole of the arches, pillars, windows, doorways, and piers of the building are made of this material, the intervening space being covered with plaster. The style is fifteenth-century Gothic. The length of the chapel, which is built in three parts—the sanctuary, nuns' choir, and externs' chapel—is 62 ft., width 28 ft., while the octagonal turret, which contains the bell, is 75 ft. high. The floor of the sanctuary is composed of squares of black and white Belgian and Sicilian marble respectively. The high altar consists of a block of green Grecian marble. Mr. Thomas Garner, of London, was the architect. Some of the carved work was entrusted to Messrs. W. Wilmut & Sons, of Bristol.

CHURCH HOUSE AND HALL, ASHINGTON, NORTHUMBRIA.—The new church house and parish hall, erected in connexion with the Aslington Parish Church, have just been opened. The hall is constructed of white brick, with stone facings, and will accommodate 250 people. It will be heated throughout by Dining & Cooke's hot-water system. Sunday-school classes and church entertainments will be held in the hall. Adjoining the hall, a house consisting of eight rooms has been built for the curate. The buildings have been erected from plans by Mr. Charlton, of the Colliery office, Aslington. Messrs. Gibson Bros., Newbiggin, were the contractors.

METHODIST CHURCH, SUTTON COLDFIELD.—A new Methodist church is being erected at Sutton Coldfield. The completed design for this church will accommodate about 525. The plan is cruciform, and consists of porch, outer and inner lobbies, nave, aisles and transepts, chancel, organ chamber, and vestries. The total length is 103 ft. The width of the transepts is 54 ft. The width of the nave and aisles is 31 ft. The lighting is by means of the aisle windows, clerestory, and the windows to transepts, and by large traceried windows over the western entrance and at the end of the chancel. A square central tower will be built at the junction of the nave and transept, and carried up to a height of about 70 ft. The roof is of open timber, of the hammer-beam type, and flat over the greater portion of the area. The exterior of the church is of Northamptonshire stone, from the Weldon Quarries. The roofs are to be covered with stone shingles from Colley Weston. The nave and south transept only are being proceeded with at present, and the accommodation in this portion is for about 250. The completed scheme will provide a school for about 300 scholars, with a number of classrooms, and a church parlour. The architects are Messrs. Crouch & Butler, of Birmingham; and the builders are Messrs. James Smith & Sons, also of Birmingham.

RESTORATION OF WREXHAM CHURCH.—On the 3rd inst. the Bishop of St. Asaph dedicated the restored Yale porch of Wrexham Parish Church, and the door which has been erected to the memory of the late Duke of Westminster. The porch was restored by the graduates of Yale University on the 20th anniversary of the founding of Yale College, in recognition of the bounty of Elihu Yale, formerly a resident of Wrexham. Yale's tomb is within six paces of the porch. The builders were Messrs. Thompson & Son, Peterborough; and the architect was Mr. Prothero.

CHURCH, NUNHEAD.—The foundation-stone of St. Silas Church, in Ivydale-road, Nunhead, was laid recently. The church will seat 700 when completed, and will cost, with fencing, about 10,000. It is to be built of brick, with external facings of Kentish rag and Bath stone. The section which is being built now will accommodate 500 people, and will cost about 6,500. Messrs. J. E. K. & J. P. Cutts are the architects, and Mr. J. Bentley the builder.

CHURCH BUILDING IN WALES.—The contract for the restoration of the Welsh Calvinistic Methodist church at Menai Bridge has been let to Messrs. R. & J. Williams, contractors, Bangor, at 2,139l.—The contract for the Welsh Wesleyan chapel at Menai Bridge is also being carried out from the designs of the same architect, Mr. Joseph Owen.—The Building Committee of the Welsh Calvinistic Methodist church proposed to be erected at Garth-road, Bangor, from the designs of Mr. Cubitt, London, at an estimated outlay of 10,000l., opened the tenders on the 5th inst. Considerable interest was attached to the action of the Committee, local contractors having been debarred from tendering, it being set out that they had no experience in such work. The tenders opened being in excess of the estimate, the acceptance of any contract remains in abeyance.—*Liverpool Mercury*.

SCHOOL, INVERURIE.—The foundation-stone of the new Public School-buildings at Inverurie was laid recently. The new schools are situated to the rear of the United Free Church. The estimated total cost of the school amounts to 7,000l., of which that of the schoolhouse being erected adjacent, 870l. 8s. 6d., making an aggregate of 7,870l. 18s. The plans are by Mr. A. Marshall Mackenzie, architect, Aberdeen. The contractors are as follows:—For school—Mason, Mr. John Smith. Kintore; carpenter, Mr. John Watt, Inverurie. Slaters, Messrs. George Currie & Co., Aberdeen; plasterers, Messrs. Rodger & Baxter, Aberdeen; plumbers, Messrs. James Laing & Sons, Inverurie; painters, Messrs. J. & S. Fyfe, Aberdeen; for iron railings, Mr. William Simpson, blacksmith, Inverurie; for laying out playground, Mr. William Duncan, contractor, Inverurie. For schoolhouse—Mason, Messrs. Paul & Ritchie, Inverurie; carpenter, Mr. John Buchan, Monymusk; slaters, Messrs. Currie & Co.; plasterers, Messrs. Rodger & Baxter; plumbers, Messrs. Laing & Sons; painter, Mr. J. Masson, Aberdeen.

ST. ANNE'S INSTITUTE, BIRKENHEAD.—This building, in connexion with St. Anne's Parish Church, was opened on Monday, the 10th inst. There is a hall about 54 ft. by 30 ft., and 18 ft. to ceiling, with a gallery at one end and three classrooms adjoining, 20 ft. by 18 ft. each, the whole of which can be thrown into one room so as to accommodate about 400 people on the ground floor and about eighty in the gallery. There is a gymnasium at back, 50 ft. by 18 ft. and 14 ft. high, with a kitchen between it and hall for tea and cookery. The hall has two cloakrooms at front and two retiring-rooms and platform or stage at the other end, with space under for storing of forms and chairs. The heating is by hot water from boiler in basement. There is a playground with the necessary conveniences. The whole has been built with bands and dressings of terra-cotta and red brick by Mr. James Merritt, builder, of Birkenhead, under the supervision of Mr. James W. Crofts and Mr. Charles Wise, of Liverpool, who have acted as joint architects. The cost of the building was about 2,400l.

NEW SCHOOLS, HANWELL.—The St. Ann's schools, Springfield-road, Hanwell, comprise three distinct blocks. A school for boys and girls on one hand, an infants on the other, with the school boards' offices and caretakers' house between the two. The buildings will accommodate 1,230 children, in two departments of one story, viz.: A school for mixed school, consisting of twelve classrooms grouped round a central hall, and an infants' department as a separate building. The site on which the schools are erected was formerly known as the "spring field" of about two and a half acres, and contained the famous St. Ann's well, which has now been drained, filled in, and covered over. The schools for 750 boys and girls, although designated a mixed school, is not strictly so, because the upper standards of boys and girls have separate and distinct classrooms, and it is only in the lower standards where the boys and girls are in mixed classes. The school is designed on the central hall plan, with twelve classrooms, six on either side of the hall, male and female teachers' rooms, stockrooms, boys' and girls' cloakrooms, lavatories, caretakers' sink; entrances are respectively provided at either end. All the classrooms are lighted by windows to the left hand of the scholars, and separated from the central hall by glazed screens. The central hall is

22 ft. long, 40 ft. wide, and 30 ft. high at the ceiling line, and has five open hammer-beam principals supporting the roof. The hall is lighted by windows in each gable end and by the glazed screens at the sides. In the basement under the cloakrooms at one end of this building a heating-chamber, coal and coke stores, a repairing shop, and general store for chairs, desks, and spare furniture are provided. The floor over the basement is of fireproof construction. A subway from the basement connects the three blocks of buildings and contains all main supplies and junctions to the buildings for heating, water, and gas pipes, thus facilitating inspection and repairs without breaking up the surface of the playgrounds. The infants' school, for 450 infants, consists of a schoolroom, 58 ft. long, 24 ft. wide, and 18 ft. high, three classrooms, each for sixty first, second, and third class infants, and a babies' department of two rooms, for kindergarten instruction to 130 children. The teachers' room and stock room are approached from a gallery over the senior infants' cloakroom and entrance. Two entrance cloakrooms and lavatories are provided, one each for senior and junior infants respectively, and an exit is provided immediately from the schoolroom to the playground. Lavatory accommodation for the teaching staff, and a wash-up sink and store for the caretaker, are provided near one entrance. The babies' entrance is placed directly facing the entrance to the girls' school so as to conveniently allow sisters to bring and take home their smaller brothers and sisters. The design of the buildings represents a free treatment of Early English Renaissance, the whole of the buildings of pitch pine wood blocks. All internal walls have brown glazed brick dados, the upper part of the walls are faced with gault bricks. The schools throughout are heated by hot water on the low pressure system of pipes and radiators, assisted by open fires when requisite. All school and classrooms are provided with fresh air inlets, and top lights of all windows are made to open at the ceiling level, actuated by steel rods and screw-gear. The vitiated air is extracted by means of ventilation flues and ceiling ventilators. The ceiling ventilators take the form of a compass marked with the cardinal points, thus in every room the north point and the aspect of the rooms are readily obtained, and this is an instructive object lesson to the scholars. The desks throughout are dual and executed in oak. In the senior schools the three back rows of desks are raised on stepped floors. In the infants department the desks are on the level. Floors except that a gallery for fifty babies is arranged in a separate room. The Board's offices block consists of a board room, Mr. E. L. E. office and lavatory accommodation, and the caretaker's apartments of parlour, kitchen, larder, three bedrooms, and offices. The external walls throughout are faced with yellow stock bricks with roof dressings and purple grey bands. The parapet copings, eaves, and other stone-work are executed in red Dumfriesshire stone. The roofs of the school buildings are covered with green slates, while the offices and caretaker's block is roofed with red Broseley tiles, which gives a domestic character to the central block and makes a pleasing break in a large mass of roof covering. The playgrounds are tar paved, and are divided and mainly enclosed with brick walls and each provided with a large covered play area, including a fountain, and the usual offices. Great care has been exercised in fitting up the children's out offices to ensure perfect cleanliness and healthy surroundings. The contract price for the whole of the works was 21,457*l.*, and the furniture 921*l.* Messrs. Ringier & Sons, of Oxford, were the general contractors, and the whole of the works have been carried out from the designs, and under the personal superintendence of Mr. William Pywell, architect, of Hanwell. The heating apparatus was supplied and fixed by Messrs. Benham & Sons; the wrought-iron casements and window fittings by Messrs. Hy. Hope & Sons; the wrought-iron gates, railings, and gas fittings by Messrs. Jones & Willis; the locks and door furniture by Messrs. Nettelfield & Sons; the school bells by Messrs. Warner & Sons; the school furniture by Messrs. Fisher, Son, & Weaver; the Board's office furniture by Messrs. Maple & Co.; and the window blinds by Mr. George Ormond. Mr. W. Coppock was foreman of the bricklayers, and Mr. George Prior acted as general foreman on behalf of the contractors.

ROYAL MASONIC INSTITUTION SCHOOLS, BCSHEY.—New schools at Bushey for the Royal Masonic Institution for Boys are nearly completed. The main entrance is distinguished by a central clock tower, and the residential blocks at each corner of the main quadrangle by square towers. The buildings stand on an eminence. They are built of red brick, with stone facings. The designs show a complete arrangement for a school of 500 boys, but dormitory accommodation is built for 100 only at present. The administrative offices and hall are adapted for the greater number, so as to avoid expense in alterations, &c., in the future. The general scheme is quadrangular, the administrative block with its central tower occupying the principal or south-west side and facing the main road and entrance. This block contains the museum and library on the first floor. The educational block, with its separate quadrangle, containing the assembly-hall, the music school,

the various arts and physics schools, classrooms, together with the chapel and headmaster's residence adjoining, are placed on the north-west side. The classrooms have one and a half northern light, and the windows are as low as possible. The north-east side is occupied by the dining-hall, the kitchen, and service department, with its separate courtyard; and beyond this the technical schools, swimming bath, gymnasium, and five courts are placed. The south-east side is left partially open for the present with a view to the erection in the future, if necessary, of an additional residential block. The residential blocks are placed at each corner of the main quadrangle, and arranged to accommodate 100 boys, each block comprising two houses, with day schools, dormitories, and masters' and service rooms, complete. A feature of the design is that all the principal blocks are connected by cloisters, subways being provided for domestic service. Baths on each floor are provided. The assembly-hall is panelled, and has a carved oak roof. The engineering block comprises engine, boiler, dynamo, storage, culinary rooms, and laundry, and the technical school block, carpentry, printing, book-binding, engineering, and shoemaking shops. The dimensions of the assembly-hall are 66 ft. by 20 ft. 11 in., giving 55 superficial and 95 cubic ft. for each boy. It is intended to fill the west-end windows of the assembly-hall with stained glass, as a memorial to the late Mr. Richard Eve, Chairman of the Board of Management, 1891-1900. The chapel is to the south-west of the main block of buildings. It is composed of flint with Ham Hill stone facings, and a window tracery of flint. It was designed by Mr. E. Doran Webb, F.S.A., and consists of a long nave with a low bell turret at the south-west angle, and a vestry and tribune on either side at the east end, and small chancel or sanctuary, which terminates in a semi-octagonal apse. The internal measurements show it to be about 55 ft. in length and 28 ft. in breadth. The windows in the eastern apse, one to each tribune, three on either side of the nave, and one at the west end, all being of three lights, and with four centred arches. The chapel is entered at the west end by a double doorway, a small antechapel being formed by an oak screen, which supports a gallery for the organ. The floor of the main part of the nave is paved with alternate squares of Hopton and Pennant or Kenton stone, that of the east bay and chancel with white marble. The roof, which is coved and panelled, is of English oak, supported on stone vaulting shafts, attached to the wall at intervals on either side. The seating is arranged on the collegiate plan, and the ends of the choir are carved poppyheads. The western screen and gallery, the fronts of the tribunes, and the Communion table, which is raised on two steps, with a stone superaltar behind it, are all of English oak. There is a piscina with stone shelf on the south side of the sanctuary. The three east windows are of flint and stained glass, and designed by Mr. P. H. Newman. A scheme of decoration for the walls is also being carried out under the direction of Mr. Newman. The buildings are lighted throughout by electricity generated on the premises. The heating of the buildings is carried out by means of radiators placed in the rooms and passages. The radiators are supplied with steam at atmospheric pressure on the Webster system of radiators, and steam heating. All parts of the buildings are connected together by means of telephones arranged on the exchange system. There are two exchanges, one in the porter's room at the main entrance, and the other in the head-master's house. The new schools have been erected as a memorial of the centenary of the institution, the requirements of which have outgrown the buildings at Wood Green. With the approval of the subscribers, the Board of Management in 1896 purchased the Bushey Grove Park estate of about sixty-seven acres in extent; and subsequently they prepared a scheme, with the assistance of Mr. Roland Plumble, superintendent of works, and invited six firms of architects to submit designs. Those sent in by Messrs. Gordon, Lowther, & Gunton, of London, were accepted, and the contract for carrying out the work was secured by Mr. Henry Martin, of Northampton.

SANATORIUM, EASTRY, YORKSHIRE.—The foundation stone has just been laid of a sanatorium for pueral convalescents which is being erected by the Bradford Board of Guardians at Eastry. The plans of the building were prepared by Mr. F. Holland, Engineer and Architect to the Board. The administrative block is a two-story building, and is to be built of stone with grey slated roofs. The building will be so constructed as to enable an enlargement to be effected, if at some future time such a course is found necessary. The veranda and stores will form part of the administrative block, and all the cooking for patients will be done here. The patients' quarters are two one-story pavilions, elevated from the ground on stone pillars. In the centre is a nurses' room, and each pavilion will contain four single-bed rooms, four two-bed rooms, one five-bed room, one five-bed room, and one dining-room. The veranda is dispensed with in favour of a glass-screened gangway or corridor behind, going the entire length of the building. This corridor is not in any way designed as a promenade or place of recreation for the patients, but is

intended chiefly to protect the patients' rooms during the severe weather in the winter months. Each patient's room will have a window in front opening the full width, and a large unglazed window at the side opening into the veranda. Each room will be connected by electric bells with the nurses' room in the pavilion. Bath and lavatory accommodation will be provided behind each pavilion. The pavilions will be built of wood, with red tiled roofs, and the interior walls will be of compo board, painted and varnished. The floors are to be laid with linoleum, and all the angles of the rooms are to be rounded. The whole of the establishment will be illuminated by the electric light. The heating will be by means of hot water on the low-pressure system; the administrative buildings will be fitted up with radiators and open fireplaces; the patients' quarters with either radiators or hot-water pipes, each room throughout the establishment being separately controlled. The ventilation system is that of open windows. The sanitary arrangements include earth-closets for the administrative block and the pavilions, the latter to be connected by an open gangway to the building, and the earth after use will be deposited on the land. The waste water from baths and sinks will be conveyed in an open channel to the veranda to the land. The rain water will be collected in a tank, from which it can be drawn for domestic purposes. The water supply can either be from a well or the Eastry service. The approved plans show accommodation for forty-two patients.

NURSES' HOME, WALSALL HOSPITAL.—The increasing number of nurses at the Walsall Hospital have rendered it necessary to provide enlarged accommodation, and a scheme has just been completed for providing new nurses' home and out-patients' department. The building is situated in Wednesday road. The front elevation is in the Queen Anne style, and is entirely faced with stone. The new nurses' home department includes a waiting hall, lavatory accommodation for both sexes. This is approached by a porch, and at the entrance the secretary's office has been provided. To the left of the hall are the house surgeon's room, surgeons' room, operating-room, and dressing-room, with a special entrance for the staff. On the right are the physicians' and two rooms for patients, whilst at the end of the hall is a room designed and fitted up for the treatment of the eyes. The whole of the upper floors of the building, which is four stories high, is set apart for the nurses. They have a separate entrance from the high ground in the rear. There are twenty-three bedrooms, a general office, writing room, out-patients' department, and a hall and the corridor are fitted as a lounge. The contract has been carried out by Mr. J. Mallin, builder, of West Bromwich; and Messrs. Bailey & McConnell, of Walsall, were the architects. The structure is lighted throughout by electricity and heated by hot water. The total cost has been between 5,000*l.* and 6,000*l.*

SCOTTISH PROVIDENT INSTITUTION'S PREMISES, BELFAST.—Premises for the Scottish Provident Institution are being erected in Donegal-square West, Belfast. The architects are Messrs. Young & Mackenzie. The large block occupies a frontage in Donegal-square West of 240 ft. It is built of Glasgow stone, in Italian style adapted to modern requirements, and the front elevation of the building is formed by a carved bay. The building rises to a height of 130 ft., a large group representing Britannia protecting her children and a copper panel containing the arms of Scotland being displayed. Each side of the central pediment is flanked by figures of the Sphinx. Effect is added to the whole structure by two flanking towers, crowned by emblematic figures at the height of 140 ft. The arms of England, Ireland, Scotland, and the Australian Commonwealth are placed in part of the centre, and further down a representation of the four leading industries of Belfast—printing, weaving, shipbuilding, and rope-making—finds a place. The main entrance is of large dimensions, formed of white marble. It is intended to let a number of shops which are being constructed on the ground floor. On the first lobby there will be a stained-glass window bearing the arms of Scotland. An electric lift establishes communication between the five floors of offices. Messrs. Musgrave & Co. have installed a system of heating the premises by hot air, and the lighting is arranged by electricity and gas on the most modern American principle. Messrs. W. D. Henderson & Sons supplied and fixed throughout these buildings Messrs. Minton, Hollins, & Co.'s glazed and enamelled tiles for the walls of staircases and corridors. Mr. Robert Corry was the builder. The carving of the pediment by Messrs. G. H. & Millar, Belfast; the stained glass was supplied by Messrs. Ward & Partners; and the marble pavements by Mr. J. F. Ebner.—*Irish News.*

NEW QUARTERS FOR THE 4TH V.B. EAST SURREY REGIMENT, CLAPHAM.—The new quarters of the 4th V.B. East Surrey Regiment, which were opened by Major-General Sir Henry Trotter, recently arrived, are situated on St. John's Hill, opposite Clapham Junction Station. The new building is of red brick and Portland cement, with battlements on the top frontage, the architects being Messrs. Wakeford & Son. The building is about 60 ft. in length, with a considerable depth, a large drill ground being in the

rent. In the centre is the main entrance, which will be used by the officers, whilst a pair of gates farther on admit the men to the drill ground or to their new quarters.

SANITARY AND ENGINEERING NEWS.

DOCK IMPROVEMENT PLYMOUTH.—The new entrance gates to the floating basin of Millbay Great Western Railway Docks were opened on the 3rd inst. The work of constructing a new entrance to the westward of the one which has done duty since the construction of the docks was commenced about June, 1898, and the work has cost more than 120,000l. Mr. B. A. Anthony is the engineer of the works.

WATERWORKS EXTENSION, RUNCORN.—An addition to the waterworks of Runcorn Urban District Council was completed on the 3rd inst. Weston is situated on a hill, and for some time the inhabitants of this township had complained that the water supply was insufficient and intermittent. To remedy this the Council have caused to be built from the designs of Mr. J. Wilding, the Town Surveyor and Water Engineer, a stone tower, which rises to a height of 250 ft. above ordnance datum. On the summit is an iron tank having a capacity of 20,000 gallons. The water is pumped into this tank by a double ram pump at Runcorn pumping station, and is thence distributed throughout the township. The tower has been built of local stone by Messrs. T. Robinson & Sons, and the tank has been supplied by Messrs. E. Timmins, Limited. The cost of the work is 1,100l.

BEDWORTH DRAINAGE AND SEWAGE DISPOSAL SCHEME.—A Local Government Board inquiry was held on the 31st ult. by Colonel W. R. Slack, R.E., in an application by the Foleshill Rural District Council for sanction to borrow 25,000l. for a new drainage and sewage disposal scheme for Bedworth. Mr. Oswin, Clerk to the Council, explained that the necessity for a complete scheme had arisen owing to the insanitary position of the town. The sewerage of Bedworth, Dr. Bostock Hill, County Medical Officer, spoke as to the pressure brought to bear by the County Council on the Rural District Council, and he stated that there had been several outbreaks of typhoid in Bedworth, and that until an efficient sewage disposal scheme was carried out it was impossible to minimize many of the evils that existed. Mr. C. Nicholson, Lailey, of Westminster, who has been retained by the Council, described the scheme, which includes about ten miles of sewers. Mr. Lailey suggested that as the land at the site of the outfall works is clay, the Local Government Board should insist on the purchase of the land on which to irrigate the filtered effluent. The purification scheme adopted embodies the most approved and efficient bacterial oxidation beds, which will be fed by the Candy Whittaker automatic revolving sprinklers. Mr. Lailey, in reply to inquiries, said the scheme he had laid before them was the cheapest, and to his mind the best, that could be carried out. The inspector stated that the Council were acting under expert advice, and that the County Medical Officer, Dr. Bostock Hill, who had great experience in these matters, concurred in the scheme.

FOREIGN.

FRANCE.—The Department of Fine Arts has approved of the scheme drawn up by M. Daumet, the architect, for the continuation of the work of restoration at the chateau of Saint-Germain. The total cost of the work will be 344,000 francs, half of which is paid by the Department of Travaux Historiques. The Government has decided on the construction of a bridge over the Rhône between Avignon and Villeneuve-les-Avignon. The Municipal Council of Bordeaux has under consideration a proposal for two "ponts transbordeurs" (travelling bridges or stages) within the port, to connect the two banks of the Garonne. Mr. Redon is continuing the arrangement of the Musée des Arts Décoratifs in the Marsan pavilion at the Louvre, where he has constructed a large central staircase, in the place of the one grand staircase with which M. Lefuel had proposed to occupy the whole pavilion. The Government has decided on the creation of a new type of postage stamp for which M. Mouchon is making the design, and which is to be a reproduction of M. Roty's design on the silver coinage; a figure of a woman in a tall, tapering Phrygian cap, and wearing a field, behind which is a representation of the rising sun. The Department of Fine Arts has commissioned M. Chartreaux to paint a large picture, to be placed in the Versailles Museum, representing the ceremonial of the centenary of Victor Hugo at the Pantheon. M. Darcy, Departmental Architect, and M. Garnier, an architect at Laval, are commissioned to direct the work of restoration at the church of Evron, of which the oldest portion dates from the twelfth century, with a choir of the thirteenth century. M. Clément has been entrusted with the restoration of the church of Carenton, which dates from 1466. The Chamber of Deputies has passed the Act relating to the restoration to the City of Paris of

the area of the Champ de Mars, and has invited the Government to consider, in conjunction with the Paris Municipality, the means of preserving the Galerie des Machines, by rebuilding it near the Porte Maillot, on the site of the fortifications which are to be demolished. The death, at the age of fifty-seven, of M. Eugene Mintz, has left a great gap in the world of French art-criticism. M. Mintz was a member of the Institut, Vice-President of the Académie des Inscriptions et Belles Lettres, and Librarian of the Ecole des Beaux-Arts. Among his numerous works may be mentioned "Précursus de la Renaissance"; "L'histoire de l'Art Pendant la Renaissance"; "Léonard de Vinci l'Artiste, le Penseur, le Savant"; "Raphaël—sa vie, son Œuvre et son Temps"; "Florence et la Toscane"; and lastly, a masterly work on Tapestry, which constitutes the leading and authoritative book on the subject. We have to record also the death, at the age of seventy-eight, of M. Charles Brun, architect, of Bordeaux; a member of the Société Centrale des Architectes, which, in 1898, awarded him their silver medal for domestic architecture. He was architect of the Customs House at Bordeaux, and of the Church of St. Louis in the same city, as well as of numerous ecclesiastical edifices in the Department of the Gironde.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. Henry Lovegrove, architect, has removed from Herne Hill to 13, Postgrove-road, Beckenham, Kent. Messrs. White & Page, architects, of 4 and 5, Warwick-court, Grays Inn, have dissolved partnership. Mr. Edward White and Mr. E. Godfrey Page will continue to practise independently at the same address as before.

BUILDING TRADES EXHIBITION, SOUTH AFRICA.—A Permanent Building Trades Exhibition has been opened at Johannesburg, in a building which is also the headquarters of the Johannesburg Architects' Society and of the Master Builders Association. The exhibition, which is intended as practically a kind of sample room of building materials, is thus convenient for inspection by architects and builders, and is also open to the general public. It is hoped by the managers that English firms would exhibit their materials there. The London agent is Mr. P. Wynter Robinson, of 2, Gresham Buildings, Basinghall-street.

WAR MEMORIAL, LIVERPOOL.—A meeting of the committee in charge of the movement for a memorial to those members of the King's (Liverpool Regiment) who had fallen in the South African war, &c., was held at Liverpool Town Hall on the 4th inst. Mr. W. Goscombe John, A.R.A., who had been invited by the committee to submit models, attended the meeting, and explained the details of two models suitable for the memorial to be placed in St. John's gardens. It was unanimously resolved to select one of the designs subject to the approval of the joint committee of the Corporation which has in hand the laying-out of St. John's gardens, and to give the commission to Mr. Goscombe John for the sum of 5,000l.

PROPOSED NEW OFFICES AND BRIDGE, NORTH RIDING COUNCIL.—The quarterly meeting of the North Riding County Council was held recently at Northallerton. Mr. J. Hutton, M.P., presiding. The Works, Highways, and Bridges Committee reported that they had further considered the question of erecting a new bridge at Whitby to replace the present swing bridge. It is estimated that a bridge on the lines of the present one, with a 22-ft. roadway, on the present piers, would cost 4,500l.; and a bridge with a 70-ft. waterway and 24-ft. roadway, it is estimated, would cost 9,000l. To these figures must be added 2,500l. the cost of a temporary roadway. The recommendation was adopted. Amended plans were presented for the County Hall, which it is proposed to erect on a recently-purchased site near the railway station at Northallerton. Alderman Hugh Bell explained the plans in detail. They wanted a building which would contain 663,593 cubic feet, and estimating the cost on a basis of 9d. per cubic foot it gave them an estimated cost of 23,810l. He moved that the plans be approved, and that the County Hall Committee be empowered to obtain tenders for the execution of the work. Alderman Lascelles seconded the motion, which was carried.

LONDON CHAPEL EXTENSION FUND.—At the recent annual meeting of the Free Church Committee in connection with the Methodist Free Churches, a Report was presented setting forth that the invested funds amount to nearly 10,000l. During the past twelve months new churches were opened at Streatham, Vauxhall, Willesden, Westcliff, Ilford, and East Ham. A new chapel is now being built at Plaistow, a site is given for one at Leyton, and new churches will shortly be begun at Woodford Green and Seven Kings at a cost of 12,000l. and 5,500l. respectively.

DARLINGTON BUILDING BY-LAWS.—At the meeting of the Darlington Town Council on the 10th inst., a question was raised as to the building by-laws and their effect upon the erection of back-to-back houses. Alderman Widdowfield, in moving the adoption of the minutes of the Streets Com-

mittee, said the past month had been a record one in regard to the number of plans for new buildings passed by the Committee. Alderman Sedgwick stated that at a meeting in the town last week, at which he presided, the Rev. T. C. Gobat stated that houses were being built in the town the plans for which could never to have been passed. Councillor Leach said at the last meeting of the committee plans were approved which ought not to have been, as they were reverting to a system of back-to-back houses. He was told that under the present by-laws they could not object, though the houses were upon a system long condemned by the Medical Officer of Health. The Town Clerk explained that the plans were in accordance with the by-laws as they stood. Alderman Bartlett said houses with no ventilation through them were being condemned by the magistrates. He was astonished if Darlington began to erect houses of the kind, and they had no law against it. Alderman Wilkes said no back-to-back houses could be built in accordance with the by-laws. In fact, as they were considering there was a gap of 10 ft. between the houses, and a 15-ft. back street, and a 30-ft. street in the front. He did not say the houses in question were not objectionable, but they were not back-to-back houses. Councillor Henderson said there was no ventilation, except by a passage, which was made as a way into the back house. Thus a worse class of house would be erected than existed at Leeds or Bradford. If they had the power, they ought to prohibit the erection of such houses. Alderman Barron said the principle upon which such houses were built was most objectionable, and if they could they ought to stop it. He suggested sending the plans referred to back to the Committee. If these sort of houses could be stopped by all means let it be done; if they could not, the sooner they had the power the better. He moved that the plans relating to the houses in question be referred back to the Committee, and that they be asked not to approve of any of a similar character without reporting direct to the Council as to their powers in the matter. Councillor Henderson seconded the motion. In reply to Councillor Harbottle, Alderman Widdowfield said no similar plans had been passed during the past year. The Streets Committee felt quite as strongly about the question as the other members of the Council, but they were helpless in the matter. The motion to refer the plans back was then agreed to, and the remainder of the Committee's report adopted.

GLASGOW HOUSING SCHEME.—An inquiry was held in Glasgow on the 10th inst., as ordered by the Secretary for Scotland, into the provisional order sought by the Glasgow Corporation to empower them to purchase fifty acres within or without the city boundary with a view to erecting houses for the poorer and labouring classes. The order provided for borrowing 750,000l. After hearing the evidence, the Commissioners declared the preamble had not been proved, but granted borrowing power up to 150,000l. to carry out the present scheme.

LONDON TRAFFIC.—In the House of Commons a few days ago Mr. Bryce had the following question on the paper:—"To ask the First Lord of the Treasury whether, having regard to the increasing congestion of traffic in the streets of London, and to the need for more rapid modes of transit between distant parts, his Majesty's Government will consider the desirability of instituting an inquiry, by Royal Commission or otherwise, into the means of locomotion and transportation in London on the one hand, and the means of conveying traffic beneath the surface, including the regulation of vehicular traffic, the possibility of appropriating certain thoroughfares to certain kinds of traffic, the means of facilitating the construction of electric tramways along or immediately beneath the streets, and the steps to be taken for creating a properly-arranged and conveniently inter-connected system of deep-level electric railways." In putting the question, the right hon. gentleman added that it was not intended by the question to suggest that such an inquiry should in any way supersede any ordinary inquiries before committees of the House specially appointed to consider the question of particular Bills. It was meant to lay down the outlines of a scheme, and especially to consider the question of deep-level railways. Mr. Balfour: I think that the subject to which the right hon. gentleman refers is one of the first importance, not merely for the metropolis, but for the country at large. The only hesitation I have in giving an affirmative reply to the interrogatory on the paper is lest a Royal Commission might have the effect of unduly delaying necessary steps, but I will consider the matter, and I think in all probability a Royal Commission would be the best course.

CAPITAL AND LABOUR.

JOINERS' WAGES ON THE NORTH-EAST COAST.—At Newcastle recently the voting returns from the joiners of the North-East circuit were decisive. There was a large majority against the employers' proposals. The employers asked the men to resume work immediately at 1s. a week reduction, the offer of 6d. to be submitted to arbitration. The men had previously offered to accept 6d. a week reduction, which the employers refused to accept. The employers originally asked for a reduction of 1s. 6d. weekly.

LEGAL.

EMPLOYERS' LIABILITY ACT:

QUESTION AS TO WORKING NEAR HOISTS.

At the Marylebone County Court (London), on the 7th inst., before Judge Stonor and a jury, William Waite, a bricklayer, 40, St. Margaret's-road, Kensal Rise, N.W., brought an action, under the Employers' Liability Act, against Messrs. J. E. Johnson & Son, builders and contractors, 90, High Cross-street, Leicester, claiming 200l., in respect of personal injuries, alleged to have been sustained owing to negligence on the part of the defendants or their servants.

Mr. Chester Jones, counsel, appeared on behalf of the plaintiff, and Mr. C. B. Marriott, counsel, for the defendants.

Plaintiff's counsel explained that his client had been employed by the defendants on some buildings in Acton-lane, Willesden, N.W. On April 29 last plaintiff was directed by the foreman of the job to do some bricklaying in a trench, or hole, within some two or three yards of which was a large steam hoist. Although the latter was so near the hole, no protection had been put up, and this, mainly, was the negligence of which they complained. Some iron sash bars for patent glazing were being hoisted, but one of them, it appeared, slipped from the sling, and fell upon the plaintiff's back, causing most serious injuries.

The plaintiff bore out his counsel's opening statement.

Cross-examined: Before starting to work in the hole it struck him that there should be some protection in case anything fell from the lift, but he made no complaint.

Mr. E. Smethwaite, M.R.C.S., &c., spoke as to the plaintiff's injuries. He thought that possibly the man might be able to work in a year's time, but was doubtful whether he would ever fully recover.

Arthur Ingram, a bricklayer, who also was working in the hole, stated that the iron bars were slung by the rope in such a way that, if they tilted to an angle, they might slip out and fall. The usual way to hoist such iron bars was to interlace them with old sacking or something of the kind, and then bind them with a collar, so that they could not slip out.

John Tucker, also a bricklayer, who was working in the hole, said that he saw the bar of iron in question falling from the lift.

Counsel for the defence submitted that the mere fact of the iron bar falling was not evidence of negligence on the part of the defendants.

His Honour said he thought that there was some evidence of negligence.

Mr. Edward G. Younger, M.D., expressed the opinion that the plaintiff could now do light work, and in about a month's time might be able to resume work involving stooping.

Edwin Ulyett, the defendants' foreman on the job in question, stated that although the hoist belonged to the defendants, and one of their men was working it, Helliwell's Patent Glazing people were having the iron bars drawn up. The hoist was about 18 ft. from the hole, and was intended mainly for bricks and mortar, which could not very well fall so wide as to reach the hole.

In cross-examination, witness said that his people had no control over Helliwell's men, for both firms had contracts running concurrently. He had previously cautioned Helliwell's men not to use the hoist. He was aware that any of the men working on the job would use the hoist if they had the chance when his back was turned.

Peter Rooke, the defendants' general manager, said that he had directed the foreman on the job not to let the men employed by the other firms use the hoist.

In answer to a jurymen, witness said that there was no notice put up at the job to the effect that the men of other firms were prohibited from using the hoist.

Charles Dagrell, who was working the hoist, said that Helliwell's men told him it was in the contract that their goods should be raised by the hoist. Witness added that he had been told by the foreman not to hoist goods for any of the other firms.

The questions put by the Judge, and answers given by the jury, were as follows:—Was there any defect in the works of the defendants that caused the accident, or in the mode of carrying on the works?—Yes. Was there any negligence on the part of the special foreman, Ulyett, in sending the men to work down the hole while the hoist was liable to be worked by the man who was in charge of it?—Yes. Was there any negligence on the part of the defendants' general foreman in not taking precautions as to the proper use of the hoist?—Yes. Was the special foreman negligent in not taking such steps on this occasion?—Yes. Did the plaintiff know of the danger of working in the hole, and did he voluntarily and willingly run the risk?—No. This was a verdict in favour of the plaintiff, and the jury assessed the damages at 238l.

His Honour gave judgment for this amount, amending the claim accordingly from 200l. and allowed costs.

Counsel for the defence: I am instructed to apply now for a new trial, on the ground, principally, that the damages are excessive. I shall

further submit that upon the evidence given by the plaintiff, he accepted the risk.
His Honour: If you are obliged to make that application you must do so in the ordinary way.

GOVERNMENT BUILDING DISPUTE:
IMPORTANT CASE.

THE case of Ben Graham and others (trading as B. Graham & Sons) v. the Commissioners of H.M. Works and Public Buildings, came before the Court of Appeal composed of the Master of the Rolls and Lords Justices Romer and Mathew, on the 6th and 7th instants, on the application of the defendants for judgment or new trial on appeal from a judgment of the Lord Chief Justice of England after trial with a special jury at the Leeds Assizes, on August 6, 1901, awarding the plaintiffs an inquiry as to damages.

The Solicitor-General (Sir Edward Carson, K.C., M.P.), Mr. Tindal Atkinson, K.C., and Mr. Atkinson, appeared for the appellants; and Mr. Scott-Fox, K.C., and Mr. Waugh, for the respondents.

The Solicitor-General, in opening the case, said that the defendants appealed on the ground of misdirection by the learned Lord Chief Justice. The action was brought by the plaintiffs, a firm of builders at Huddersfield, to recover from the defendants damages upon the ground that the defendants had wrongfully terminated a certain building contract dated September 11, 1899, and had wrongfully taken possession of certain unfinished work, materials, and plant, the property of the plaintiffs.

The contract in question was for the erection of a new head post office at Salford, in Cheshire. The defendant's action of the defendant was that the defendant had a right under the circumstances which had arisen, and under the conditions of the contract, to serve a notice terminating the contract, and to enter into possession with a view to completion of the building and taking possession of the materials and plant. Stated shortly, the question really was this, viz., whether the defendants' architect, who had certain powers under the contract, had adjudicated on certain defaults of the builders, which adjudication was a condition precedent to the defendants having power to determine the contract and to enter into possession of the works. The whole judgment of the late Lord Chief Justice turned on this one question, viz., whether there was no evidence of adjudication by the architect at all, and if there was no adjudication the defendants had no right to terminate the contract. His Lordship thought there was no question to be left to the jury. This Court would see that in one aspect of the case there might be one question which ought to be left to the jury. At an early stage in the case the Lord Chief Justice said that he would not allow evidence on the question as to whether there was in fact default by the builders to be left at all to the jury. The learned counsel then referred to the contract which had been entered into between the parties. Clause 3 provided that the work was to be commenced immediately on possession of the site being given, and completed to the satisfaction of the architect by a certain date. Clause 5 provided that every part of the work was to be executed as directed by the specification, and in a sound, workmanlike, and substantial manner, and all the materials used in the construction of the building were to be new and of the best of their respective kinds, except as otherwise provided in the specification. No. 10 was an important clause. By that clause the architect had power to direct the builders to execute any part or parts of the work before any other part or parts, and he had authority to judge of the manner of execution of any part of the work and the quality of any materials used or intended to be used therein. The architect also had power to order the removal of any part or parts of the work which should appear to him to be of an improper description, and any materials which he should consider to be of an improper size or description, and the builders had to remove all such materials from the site.

The learned counsel submitted that in both those matters the architect was made by the parties the sole judge. Clause 21 provided that, if the builders should make default in the due performance of these conditions or delay proceeding with the work, the architect should give notice of such default to the builders and specify the same, and on the builders continuing in default for a period of seven days after the receipt of the notice, the Commissioners had power on the written certificate of the architect of the fact of the builders' failure or default to comply with such notice to determine the contract, and all sums of money due to the builders and all the builders' goods and chattels on the works should be forfeited to the Commissioners. It was also provided that the Commissioners had in such cases the power to employ other persons to complete the work, and that without prejudice to any claim they might have against the builders for breach of contract. It was under that clause that the Commissioners purported to take possession of the site. What happened was this. On November 7, 1900, the defendant's architect, Mr. W. T. Oldrieve, went in the ordinary course of business to inspect the work as it was going on at the time the builders were putting in the wood-

work of the roof of the sorting-office. Mr. Beaumont, the clerk of the works, pointed out to the architect certain timber which was lying on the ground, of which certain joists which had been actually put in the roof formed part. Mr. Beaumont pointed out that the timber was inferior to that specified for the roof. The architect did not go on to the roof to inspect the joists himself, but being satisfied from what he saw of the timber on the ground, and of what Mr. Beaumont said about it, he instructed this gentleman not to allow the timber to be used. On November 14 he received a report from Mr. Beaumont that, notwithstanding his protest, the builders were still using the timber in the roof. On November 15 the architect wrote to the builders that he was compelled to insist upon their removing from the roof all such timber as was objected to, and that such parts would be pointed out to them by the clerk of the works. He told the builders also that unless this was done within a week the work under the contract would be stopped. On November 16 Mr. Beaumont wrote to the builders and specified the pieces of timber objected to. He had gone on to the roof and marked with a blue pencil the pieces of timber objected to. One of the plaintiffs' firm then seemed to have come down and seen Mr. Beaumont, and said he would remove the timber. In the whole of that would be the end of the matter, and the whole of the grievances and complaints. Mr. Beaumont said he had no power to say any such thing, and then the builder said he would do nothing. On November 24 a gentleman acting for Mr. Oldrieve, who was ill, gave the builders notice that they had made default in removing the defective timber from the roof, and requiring them to remove same and replace with new timber. The building which the Commissioners would proceed as they might be advised. No notice was taken of that, and eventually the defendants terminated the contract, and took possession of the works. The learned counsel said that the Lord Chief Justice, while agreeing that there had been sufficient notice to the plaintiffs, and that the defendants' architect brought themselves within clause 24, because the defendants allowed Mr. Beaumont to mark the individual pieces of timber objected to, and that their architect did not do so. He held there had been no adjudication by the architect at all. The whole question was whether the architect had sufficiently indicated to the builders what was complained of. The Lord Chief Justice said: "What I suppose the other side will say is that this was not notice by the architect of defects which he had satisfied himself were defects; but notice of defects which his subordinate had decided were defects."

The Solicitor-General said that the contention from the other side seemed to be that in every such case the architect must himself get a ladder and go up on to the roof, or down a manhole into a drain, and specify every particular piece of timber, brick, or pipe he objected to as being defective. His (counsel's) contention was that the architect had the right to say to a competent man, and whom he knew to be competent, "You pick out the pieces of timber, bricks, or pipes you say are defective."

The Master of the Rolls: This matter has often been discussed; I mean the limits of the architect's rights where he is himself delegating, and how far he can delegate to anybody else.

The Solicitor-General: Yes; there are some authorities. I think the correct one is this:—The architect says "I am not going there at all; I am not going to look at the timber, and I appoint another man to do that because I am too busy," that would not be enough. But if he is in daily, or the customary, contact with the work, and exercising proper supervision over the work, and leaves the carrying out of certain details to another, he is not delegating his position at all. He is merely having the assistance of persons he is entitled to have.

The learned counsel, in conclusion, submitted that the learned Lord Chief Justice had misdirected himself on the matter, and that the defendants, in all the circumstances, were within their rights in terminating the contract.

Mr. Tindal Atkinson followed on the same side. Mr. Scott-Fox, on behalf of the defendants in support of the judgment in the Court below, contended that inasmuch as the defendants' architect had not himself personally inspected the timber used in the roof which was objected to by the clerk of the works, the defendants had no power to terminate the contract. The contract provided that the architect was to be the judge in such matters, and he could not delegate such duty to the clerk of the works. The plaintiffs contracted to rely on the discretion and judgment of the architect, and not on the discretion and judgment of anybody else. In the present case the architect relied and acted on the discretion and judgment of the clerk of the works, but that was not sufficient to enable the defendants to give notice terminating the contract. The learned counsel next dealt with a cross-appeal by the plaintiffs, which was that if the Court should be of opinion that the defendants had the right to act on the architect's certificate, the defendants had waived their right to terminate the contract. Mr. Oldrieve, the architect, after the time they gave plaintiffs notice determining the contract, and had ordered goods to be sent on the

site from sub-contractors, for which the plaintiffs were liable to pay. He submitted that a question ought to have been left to the jury whether, even supposing the defendants had the right to give the notice determining the contract, defendants had not waived their right to do so.

The Solicitor-General having replied on the whole case, and Mr. Waugh having replied on the plaintiffs' cross appeal,

The Master of the Rolls, in giving judgment, said this was a case of some difficulty. The first question to be decided was whether the architect had acted in accordance with the terms of the contract so as to justify the defendants determining the contract. If the court was of opinion that there was a consummated forfeiture, then there arose a second question of whether the defendants had waived their right to exercise that forfeiture. As to the first point, the Lord Chief Justice held that the architect had not adjudicated on the matter, in that he delegated the duty of the inspection of the timber to the clerk of the works. By the terms of the contract the architect could order the removal of any materials used in the building that appeared to him not up to the specified quality. The plaintiffs' contention was that that being so, he must himself determine and decide upon what quality the timbers were not up to. What the architect actually did was to examine the wood on the ground, and finding that it was not of the required quality, he directed the clerk of the works to mark the timbers already put in the roof of the sorting-house to which he objected. Upon that gentleman's report the architect held that the timbers were not up to the required quality, and he directed the clerk of the works to mark the timbers already put in the roof of the sorting-house to which he objected. Whether in these circumstances the architect could be said to have adjudicated on the matter. It was perfectly obvious as a matter of business that one could not expect an architect to go into every detail himself, and his lordship had no hesitation in holding that the authorities that the architect having himself inspected the timber being used, and that it was not of the stipulated quality, was perfectly entitled to delegate the duty of particularising which of the timbers had to be removed. That being so the defendants had the right to terminate the contract had they not waived their right of doing so. In his lordship's opinion, having regard to the time that was allowed to elapse between the commitment of the default and the termination of the contract, and to the fact that the architect ordered the plaintiffs to execute certain extras after default, there was a question of waiver on the part of the defendants which ought to have been left to the jury. That being so, unless the parties could come to some agreement, there must be a new trial.

The Lords Justices concurred.

IMPORTANT CASE IN THE CHANCERY DIVISION.

MR. JUSTICE BUCKLEY, on the 8th inst., in the Chancery Division, delivered a considered judgment in the case of *Boyc v. the Paddington Borough Council*. The question to be decided was whether the owners of land circumjacent to and abutting upon other land which had become an open space within the Metropolitan Open Spaces Act, 1877, and the Disused Burial Grounds Act, 1884, could be allowed to become, after the period of the Prescription Act by virtue of an enjoyment which could not be excluded by the erection of hoarding, entitled as of right to the access of light to the windows of any buildings which they might erect contiguous to the space.

The short facts are as follows:—The open space in question is the disused burial ground of St. Mary's, Paddington. The plaintiff recently erected a large block of flats immediately abutting upon that open space with several windows overlooking it. The defendants asserted that they were entitled to erect a hoarding in front of those windows so as to preclude the plaintiff from prescribing for rights of light. The plaintiff said they were not so entitled, and asserted his case on two grounds. He said, first, that he, as a member of the public, was entitled to insist that the space should be an open space, from which it would result that there would be free access of light to his windows; and, secondly, that whether this was so or not, the defendants could not erect a hoarding so as to prevent his becoming entitled by prescription because they were by the relevant Acts of Parliament forbidden to erect any building, temporary or movable, except for the purpose of enlarging the church. His contention was that a hoarding erected for the purpose of preventing the acquisition of a prescriptive right to light was a building. The defendants contended, first, that the plaintiff could not maintain the action without the concurrence of the Attorney-General; and secondly, that they were not precluded by the Acts in erecting such a hoarding as was necessary to prevent the plaintiff from obtaining the benefit of the Prescription Act.

Mr. Justice Buckley, in giving judgment, held that the plaintiff's action was well constituted, and that he could maintain the action without the concurrence of the Attorney-General. The plaintiff was suing either in respect of an alleged right to the free access of light to his windows over the open space, or in respect of a public right to have

the space maintained as open and without the erection of a hoarding, which he (plaintiff) called a building. In the former case he was suing upon an alleged private right; there was no public right of access of light to private property. In the latter he was suing in respect of an interference with a public right from which he personally sustained special damage. In either case he could sue without joining the Attorney-General. Passing on to deal with the point as to the right which the plaintiff claimed, his lordship said it seemed to him to be an extraordinary proposition that because an open space was devoted to the public for enjoyment in an open condition free from buildings for exercise and recreation, the result should be to give, immediately, or by the unavoidable operation of the Prescription Act, to the circumjacent owners as a matter of right an easement of light which therefore they had not enjoyed. There was no public right to have free access of light to windows on the land surrounding the open space or any part of it. What he had to consider was whether such a hoarding as the defendants would put up to prevent the plaintiff from acquiring prescriptive rights would be a "building" within the Acts with which he had to deal. In his opinion it would not. It would be an erection, not put up for any purpose of building, but as a necessary act to prevent the acquisition of a prescriptive right. The word in Section 5 of the Act of 1881 occurred in the connexion that the land was to be enjoyed "in an open condition free from buildings." He thought that this meant such buildings as would preclude or diminish its enjoyment in an open condition from exercise and recreation. (Act of 1877, Section 1.) In Section 3 of the Act of 1884 the erection of any buildings upon a disused burial ground was forbidden, except for the purpose of enlarging a church. He thought that the word "buildings" there meant erections which would cover some part of the ground, as the enlargement of a church would do. It did not refer to something in the nature of a fence or barrier to prevent the acquisition of prescriptive rights to light. Upon these grounds therefore he held that the plaintiff had not by virtue of the Acts acquired such an easement as he sought to enjoy, and that the defendants were not by the Acts precluded from erecting such a hoarding as was necessary to prevent him from obtaining the benefit of the prescription Act. His lordship accordingly dismissed the action with costs.

CARDIFF LIGHT DISPUTE.

LORDS JUSTICES VAUGHAN-WILLIAMS, STIRLING, and COZENS-HARDY in the Court of Appeal on the 10th inst. heard an appeal by the defendant in the case of *Lewis v. Baisio* from a judgment of Mr. Justice Kekewich, in the Chancery Division, by which he granted an injunction restraining the defendant from erecting in or upon the area at the rear of Custom House-street, Cardiff, any building so as to obstruct the access of light to the plaintiff's premises.

Mr. Renshaw, K.C., and Mr. Boxall, K.C., appeared for the appellant; and Mr. Warrington, K.C., and Mr. Cohen for the defendant.

Mr. Renshaw said this was not a case of ancient lights, or lights by prescription, but a question depending upon circumstances that existed at the time certain leases were granted by the Corporation of Cardiff to the predecessors in the title of the plaintiff and the defendant. The plaintiff's premises, No. 13, Custom House-street, ran through to the defendant's premises, No. 6, New-street, and the two windows as to which the injunction was granted were one in the basement, and the other in the ground-floor, both looking into the area dividing the two properties. In 1875 an Act called the Cardiff Improvement Act was passed which enabled the Corporation to clear away a certain insanitary area, and required them to let on building leases the land so acquired. On July 30, 1884, the Corporation demised to Augustus Lewis, a builder and the brother of the plaintiff, a piece of parcel of land having a frontage of 21 ft. to Custom House-street for a term of seventy-five years, and the lease contained a covenant that the lessee would erect upon the land a substantial shop, warehouse, or other building to the satisfaction of the Borough Engineer. A building was erected which was No. 13, Custom House-street, and the lease was assigned to the plaintiff on July 24, 1894. On the same date that the lease was granted a lease in similar terms was granted to the same lessee of a piece of land on which No. 11, Custom House-street now stood, and that was assigned in April, 1889, to the defendant. A third lease, also to Augustus Lewis, was that of No. 6, New-street, which was assigned to the defendant in June, 1890, and the question was whether, although at the dates of the leases the property was treated as land, there was anything in the leases to make them tantamount to a demise of a house, so as to imply a grant of a right to light as it existed when the old houses stood on the site. In 1896, just after the defendant acquired the lease of No. 6, New-street, he put a sort of platform over the area at the rear, and in January, 1900, he erected a wood and glass structure upon the platform. That was not objected to; but in March, 1901, he put up the building of which the plaintiff complained.

Mr. Warrington having supported the judgment in the court below.

Lord Justice Vaughan-Williams, in giving judgment, said that in respect of No. 11, Custom House-street, and so much of the area as being part of the property, the defendant had a right to exercise all the rights of an owner, and so much of the injunction as went to restrain him from erecting such walls as he liked upon that property as proposed by the lease was therefore wrong. But so far as related to the property No. 6, New-street, the injunction was right, because the defendant had not got the assignment of No. 6 till the plaintiff had got the assignment of No. 13. There would be no costs of the action, but the defendant was entitled to the costs of the appeal.

The other Lords Justices concurred.

IMPORTANT QUESTION ON A CONTRACT.

In the Court of Appeal on the 12th inst., the Master of the Rolls and Lord Justices Romer and Mathew gave judgment in the case of *Bow, McLachlan, & Co. v. Dutilleul, Smith, McMillan & Co.* The appeal was by plaintiffs from a decision of Mr. Justice Jelf in Chambers, staying the action and allowing the case to go to arbitration. The short facts were these: The plaintiffs are electrical engineers, carrying on business in Glasgow, and the defendants are a firm of electrical engineers who have a contract with the Southend Corporation for the installation of the electrical tramway system in the town. They submit the engineering part of the contract to the plaintiffs, the total amount of which sub-contract was about 8,000l. The claim in the action was for about 3,000l., the balance alleged to be due under the sub-contract from the defendants, and 900l. for extras. The defendants, by a counter claim sought from the plaintiffs 3,500l. It appeared that under the contract between the defendants and the Southend Corporation, that any dispute arising between the parties was to be referred to the arbitration of the Southend Corporation Borough Engineer, Mr. Fidler, and the sub-contract between the parties contained an exactly similar clause. Mr. Justice Jelf, in view of this, on the application of the defendants, stayed the action started by the plaintiffs, and referred the matter to the arbitration of Mr. Fidler. The plaintiffs appealed from this decision on the ground that Mr. Fidler's interests were so fully mixed up in the dispute that he could not approach the matter with a sufficiently open mind to give an unbiased decision upon it. The dispute had reference to the supply by the plaintiffs of two engines, each capable of producing 200 kilowatts of electricity, and a third engine of 125 kilowatts. These engines did not pass the tests of Mr. Fidler, and he made the defendants substitute a new engine for one of the engines supplied by plaintiffs and made them repair two of the other engines, the amount of this contract being the amount of the counterclaim for 3,500l. Plaintiffs alleged that if anything was wrong with the machinery, it was the boilers, which the Borough Engineer himself supplied, and that, in the circumstances, he was not the proper person to arbitrate on the matter.

The Master of the Rolls, in giving judgment, said that it seemed to him that there was no reason to anticipate that Mr. Fidler would not honestly act between the parties in his position as arbitrator. The appeal would be dismissed with costs.

Lord Justices Romer and Mathew concurred.

On the application of Mr. Hamilton, K.C., who appeared for the plaintiffs, their lordships stayed the proceedings under the arbitration for a week to enable the plaintiffs to consider whether they would appeal to the House of Lords.

DISTRICT SURVEYOR OF BLOOMSBURY v. FOLDEN.

AT Bow-street Police-court, on the 6th inst., before Mr. Fenwick, judgment was given in the case (heard on October 16) of a building, No. 116, High Holborn, being over ten squares in area and not properly separated as required by Section 24, Sub-section 2, of the Building Act.

The magistrate remarked that a portion of the vaults shown on plan had been bricked up and abandoned, and therefore was not now calculated in the area of the building.

An order was made to comply with the requisition of the District Surveyor within fourteen days and to pay three guineas costs.

DISTRICT SURVEYOR OF BLOOMSBURY v. DANIEL.

AT Bow-street Police-court, before Mr. Fenwick, magistrate, on the 16th ult., a summons was heard for neglect to comply with a notice of irregularity, under the London Building Act, 1894.

The defendant had erected an enamelled iron advertising sign over and covering the first-floor window, obstructing all light and ventilation to a habitable room at No. 190, Shaftesbury-avenue, contrary to Section 70.

The District Surveyor stated that the structure had been removed, and the summons was withdrawn upon payment of 13s. costs.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

14,006.—APPARATUS FOR SHUTTING DOORS: *Id. Schaner*.—As the door is being closed by a lever, which is turned with a spiral spring, a stud mounted upon an axis which works a cam having a V-shaped profile presses up a piston, joined by a tube to the cam, and compresses a spring set around the tube, and as the piston compresses air in a cylinder above it it serves, together with the latter spring, to check the action of the door; but as soon as the lever has passed over the lowest point of the cam the two springs and the compressed air above the piston combine to close the door just before it becomes shut.

14,008.—PROCESS OF MOULDING BRICKS: *J. Laurentes*.—Bricks and similar goods having frogs or recesses in their bearing surfaces are made with certain moulds and plungers, or dies, by various methods. In one adaptation, when the brick is ejected from the mould, air is admitted into the recess by means of recesses made in the frame and die. In another form, the upper die is bolted on to the plunger, or cross-head, the lower middle part of the die being enveloped in a loose frame, and having a middle and pivoted lift valve for the admission of air into the recess after the frame has been lifted; the movement of the middle die is stopped, and the frame, with the brick, is lifted as high as the top of the mould, as soon as a washer of a rod that is screwed into a cross-bar of the die touches the table; otherwise, one ejecting-rod is screwed into a cross-bar of the die-frame, and there are slots that take sliding end-projections from the middle portion of the die.

14,031.—MANUFACTURE OF EARTHENWARE PIPES: *C. E. Robinson and F. Staley*.—For finishing the surface of the goods before they are burned and removing blisters and similar blemishes, the inventor joins pickers or needles to the sections of a ring that is controlled with a spring, and to the expanding and smoothing parts of the machine; the wedge-shaped expanding contrivance is joined to a rod or rods, inserted through a handle, and having stops to restrict the projection of the needles.

14,061.—AN APPLIANCE FOR WINDOW-SASHES: *W. Deane*.—A dovetail shaped block is inserted into a recess in the sash-tile, the sash-cord is nailed to the block, and to enable one to take the sashes out of the frame the beads at the right-hand side of the frame are made detachable, being held in position with dowel pins.

14,152.—MEANS OF FASTENING WINDOW-SASHES: *F. Polack*.—In a standard affixed to one sash is centrally pivoted a weight which may be plugged with lead, and to which is secured a screwed arm carrying a button or nut and set to engage with a crutch upon a stem fastened to the other sash. The screwed arm when unfastened will be held vertically and disengaged from the crutch by the weight. The motion of the arm is regulated with pins upon the weight. For fastening the crutch and the arm are to be engaged, and the nut is then turned until the engagement of its neck with the crutch pulls the meeting-trails to one another.

14,111.—AN INSTRUMENT FOR SURVEYORS' USE: *F. Smith*.—The inventor causes a telescope or sighting-tube to be carried at 45 deg. with the level. For measuring the height of an object the observer having sighted its top, measures the distance to the base of the object and so obtains its height; for measuring the width of an object with a pointer that traverses a scale the telescope is mounted adjustably about a pivot at its lower end with a screw.

14,200.—IMPROVEMENTS IN MANHOLE COVERS: *G. W. Kirk*.—An annular ledge is fashioned about the inside of the frame in order that it may take the rim of the cover, whereby the manhole will be rendered air-tight.

14,308.—A CRAMP AND MITRE BLOCK COMBINED: *C. Matthews and F. H. Payne*.—In this contrivance, which constitutes an improvement of that specified under No. 28,191 of 1897, there are screws that secure the guiding-plates for the jaw to the top of uprights; a slot in one of the plates provides for its due adjustment.

14,311.—A FASTENING FOR DOORS WHEN CLOSED: *G. W. Mallory*.—The anti-friction roller of a curved arm is carried at 45 deg. with the level. The spring is joined to a bracket as well as to an arm formed in one piece with the curved arm and spindles in bearings at the ends of arms upon the bracket. As the door is opened the curved arm will be forced outwards, to be so held by the spring until the door is closed; thereupon the roller is returned into its position for action by means of the curved flanges or lips of a metallic plate.

14,310.—AN APPLIANCE FOR INCANDESCENT BRACKET BURNERS: *E. F. Shaw*.—The inventor seeks to obviate the heating of the gas supply on its way to the burner, and the tarnishing by heat of the faceted or brass supply pipe. He joins to the wall plate, or to an arm thereof, a U-shaped gas supply-pipe or bracket, and causes it to be passed downwards outside the chimney and the globe to the burner connexion. Insulated rings upon the bracket keep the globe steady, and an extension piece of the bracket below the connexion furnishes a plugged trap for drawing off moisture.

14,333.—SOLDERING—IRONS USED WITH GAS: *C. Karjunkslein*.—A tube in the handle conveys the gas supply, which is regulated with a screw, and as it flows out through the nozzle and a barrel, draws in air at two apertures; with its escape in flame from the upper end of the tube, it draws in air through other openings; but a cap, having open ends, mounted upon the tube, prevents the flame from passing through the latter openings.

14,304.—CONSTRUCTION OF KILNS: *F. Prince*.—A mud main flue is built lengthwise beneath the floor of a long-arched kiln, and pairs of fire-grates divide it into a range of chambers. Branch-flues that open into the floor near the side walls are set in front of each pair of grates. After the chambers have been charged through their openings they are bricked up; the grates are then fed through doors, and it may be, through openings in the roof. The charging and the fire-lighting are performed progressively from the end that is most remote from the chimney, and the disposition of the dampers enables the gases to flow through a prearranged number of chambers on their way to the flue. The kiln is stated to be available for the burning of bricks, tiles, pipes, lime, &c.

14,308.—LAY-OUT BASINS AND THEIR FITTINGS: *A. N. Chamberlain and W. L. B. Hall*.—The rear ends of a horse-shoe carrier in which the basin is pivoted are pivoted in vertical slots, and when the carrier is horizontal the rear-ends press against a cross angle-bar. The frame is folded up by turning the carrier into a vertical position, raising it clear of the bar, and then lowering it out of the way, a pivoted carrier holds up the receiver, which can also be folded up vertically.

14,423.—DISTRIBUTION OF ELECTRICITY: *A. M. Stark*.—For a system of three-wire distribution, having its main leads and common return bridged with secondary batteries, the leads at the subscribers' stations are branched to supply lamps or motors, the main leads and returns being tapped so as to constitute, with secondary conductors, circuits for telephone and telegraph systems. At each station a call will be set in circuit with the secondary wire whenever the telephone is hooked up, but when the telephone is not on the hook the secondary and telephone are not in circuit at the exchange with a plug when socketed, a battery supplies current, and re-opens the clearing-out or "busy" test lamp into or out of circuit with that battery. "Busy" rings connected in parallel to the spring-plug socket are provided for the jacks.

14,427.—SLEEVE-JOINTS FOR COUPLING PIPES: *J. Stewart*.—Some pipe thin metal, such as alloy or lead, which may be manipulated by the workman, is used instead of rubber or canvas for the outer envelopes or sleeves in making a joint with the plaster material between a water or other pipe and the inlet or outlet of a sanitary appliance. A jointless and shaped sleeve may be adopted, or it may be fashioned of sheet metal lapped and creased to make the joint.

14,433.—SOCKETS FOR THE HANDLES OF PICKS: *F. Nelson*.—Instead of the customary socket, inside of which the handle is fitted and upon which one drives the pick-eye, the inventor devises a socket in two portions which spikes, that enter into the handle, maintain in their proper positions.

14,436.—A LIQUID SOLVENT: *L. Shooter*.—Solvents, such as spirits or naphtha, are dispensed with by this process for dissolving shellac. Borax or boric acid is added to a boiling solution of shellac in water, and then liquid ammonia is added to complete the solution. In another method, for a varnish that must be used when it is hot, soda or an admixture of borax and soda is substituted for the boric acid or borax.

14,403.—THE BUILDING OF WATER-RESISTING WALLS FOR SUBTERRANEAN OR SUBAQUEOUS FOUNDATIONS: *F. F. O'Rourke*.—The invention chiefly concerns the arrangement of the caissons, each of which is built up with vertical timbers held and bound together with horizontal angle-irons, and has a roof; an opening in the roof communicates with the air-shaft, and a cover normally shuts another hole near one end of the caisson. When one caisson has been sunk and some of the wall has been built up within it—a semi-cylindrical part at the end beneath the latter hole excepted—the second caisson is sunk into the first—a tight joint about the middle timbers is effected by securing the abutting ends together; then, after removal of the lower angle-irons and the middle timbers of the abutting ends, the building of the wall is resumed through the opening into the second caisson as sunk, and the next length of the wall is built. The covers are taken off the hole at the end of the caisson for the removal of the upper angle-irons and the middle timbers, and so the work proceeds. In order that the completed wall shall enclose a circular or polygonal space (to be filled with concrete or to form the foundation of a pier or other structure) the two vertical ends of each caisson are turned slightly towards each other. In another adaptation, the covers are turned inwards, and the caisson is affixed to the topmost angle-iron below the upper ends of the vertical timbers, that will engage with the lowest projecting angle-iron of a coffer-dam extension.

14,490.—SUPPORTS FOR LAMPS: *H. F. Harrison*.—A support for incandescent and other lamps

consists of flexible conductors that are wound upon a drum that will turn about a rod affixed in a carrying frame; a pinion gears the rod to a wheel upon a shaft joined to the inner end of a spring-coil which balances the weight of the lamp. The lamp is sustained at any height by means of the engagement of two pivoted catches upon the drum with notches cut in the rod. Concentric rings on the outside of the drum join the flexible conductors to two contact-springs that are connected to the supply-wires, and are carried by an insulator upon the frame.

14,498.—CONSTRUCTION OF FIREPROOF FLOORS, CEILINGS, &c.: *New Jersey Wire Cloth Co.*—Hooked hangers or wire loops fasten the centering supports of floors, arches, and so on. The loops and hangers are cut level with the lower flanges of the beams after the concrete has become set, or their ends will serve to hold up the wire netting and ceiling bars. The hanger can be looped around the beam and a centering support, or its crossed sides may be tightened by pressing the upper ends asunder. The centering supports carry the centering that is between the bricks, tiles, blocks, or concrete are laid, and they are to be fastened to one another with nails driven through cleats.

14,502.—AN IMPROVED PLIER OR NIPPER: *W. A. Bernard*.—The handle and jaw are fashioned in one piece, and that limb is recessed into the other limb, to which it is joined with the projection that fits into a recess, and with screws or rivets affixed to plates and inserted through holes. The tool is provided with cutters and nipping jaws.

MEETINGS.

FRIDAY, NOVEMBER 14.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. E. Worth on "Water Supply, Sources of Supply, and Distribution." 7 p.m.

SATURDAY, NOVEMBER 15.

Institution of Junior Engineers.—Visit to Messrs. Yarrow & Co.'s Shipbuilding and Marine Engineering Works, Poplar. Train leaves Fenchurch-street at 9.13 a.m.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at the Sewage and Destructor Works, Ealing. 9.15 p.m.

British Institute of Certified Carpenters.—Visit to the University Hospital, in course of erection in Gower-street, W. 3 p.m.

MONDAY, NOVEMBER 17.

Royal Institute of British Architects.—(1) Mr. F. C. Penrose, F.R.S., on "The Drawing and Construction of the Ionic Volute." (2) Dr. A. S. Murray on "A Fragment of the Parthenon Frieze," with lantern illustrations. 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. E. Worth on "Sewage." 7 p.m.

Royal Philosophical Society of Glasgow (Architectural Section).—Mr. Jas. Chalmers, 1 A, President of the Section, will deliver the Presidential Address, entitled, "The Romance of Two Abbeys; Holyrood and Abbotsford." Illustrated by drawings and limelight views. 8 p.m.

TUESDAY, NOVEMBER 18.

Institution of Civil Engineers.—Paper to be further discussed, "Electric Tramways," by Messrs. Charles Hopkinson, B.Sc., Bertram Hopkinson, B.Sc., and Ernest Talbot. 8 p.m.

Glasgow Architectural Association.—Mr. W. U. Muir on "The Duties of a Clerk of Works." 8 p.m.

WEDNESDAY, NOVEMBER 19.

Society of Arts.—Inaugural address by Sir W. H. Preece, Chairman of the Council. 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. E. Worth on "Sewage Disposal." 7 p.m.

British Archaeological Association.—The Rev. W. S. Lach-Szymra, M.A., on "Ancient History of Hannau Forest before the Roman Conquest." 8 p.m.

THURSDAY, NOVEMBER 20.

Leeds and Yorkshire Architectural Society.—(Craft Evening.)—Mr. J. Wright on "Evolution of an Etching, by practical illustration." 6.30 p.m.

FRIDAY, NOVEMBER 21.

Architectural Association.—Papers by Mr. Cecil C. Bowyer and Miss Jane Walker, M.D., entitled "Some Notes on Sanatoria for Consumptives." Illustrated by lantern views. 7.30 p.m.

Institution of Junior Engineers (Westminster Palace Hotel).—Inaugural Meeting of twenty-second Session. Col. Edward Kaban, C.B., R.E., will deliver his Presidential Address on "The Preparation of Engineering Projects." 8 p.m.

Birmingham Architectural Association.—Mr. W. H. Hennen on "The Development of Hospital Design, illustrated by the Royal Victoria Hospital, Belfast." 7 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. E. Worth on "Scavenging, Disposal of House Refuse." 7 p.m.

Institution of Mechanical Engineers.—(1) The adjourned meeting will be resumed and concluded upon Captain C. C. Longridge's paper on "Oil Motors of 1902." (2) If time permits, the following paper will be read and discussed:—"Recent Practice in Design, Construction, and Operation of Raw Cane Sugar Factories in the Hawaiian Islands," by Mr. J. N. S. Williams. 8 p.m.

SATURDAY, NOVEMBER 22.

The Craft School (Globe-road, Bethnal Green, E.).—Mr. H. Llewellyn Smith on "Stage Scenery as an Art," with illustrations. 8.30 p.m.

PRICES CURRENT (Continued).

BRICKS, &c.

Boston Portland Cement	s. d.
Best Ground B or Lias Lime	31 o per ton, delivered.
NOTE.—The cement or lime is exclusive of the ordinary charge for sacks,	
Grey Stone Lime	..... ros. 6d. per yard, delivered.
Stourbridge Fire-clay bricks	37s. od. per ton at rly. depot.
STONE.	
s. d.	
Ancaster in blocks	... 12 11 per ft. cube, del'd. rly. depot.
Fairleigh Down Bath	" 7 "
Bees in blocks	" 8 "
Girishill	" 10 "
Mowtown Portland in blocks	" 9 "
Hartley Dale in blocks	" 12 "
Red Corsehill	" 5 "
Clooseburn Red Freestone	" 5 "
Kerel Mansfield	" 4 "
YORK STONE—Robin Hood Quality.	
cappled random blocks	2 10 "
in-sawn two sides & end-	
landings to sizes (under	" "
40 ft. super.)	... 2 3 per foot super. "
in Rubbed two sides	
dittos	... 2 6 "
in Sawn two sides	
(random sizes)	... o 11 "
in, to 2½ in. Sawn one	
side slabs (rounded 3	" "
sides)	... o 7½ "
in, to 2 in. ditto, ditto o	
6"	" "
BEST HARD YORK—	
cappled random blocks	3 o per ft. cube "
in-sawn two sides,	
landings to sizes(under	" "
40 ft. sup.)	... 2 8 per ft. super. "
in Rubbed two sides	
dittos	" "
in-sawn two sides	
slabs (random sizes)	" 2 "
in self-faced randcm	
flags	... o 5 "
Dorpton Wood (Hard Bed) in blocks	2 3 per ft. cube, del'd. rly. depôt.
" " 6 in. sawn both sides landings	
2 7 per ft. super., del'd. rly. depôt.	
" " 3 in. do. "	
2 2½ "	
SLATES.	
s. d.	
1 in. to best blue Bangor ... 13 2 per 1000 of 12x30 try,dep't	
X 12 " " 13 5 "	
X 12 " " 13 7 "	
X 8 best " " 15 0 "	
X 8 best " " 13 10 "	
X 8 best " " 7 0 "	
do. to best blue Portmado	
doc. " 12 5 "	
X 8 best bluePortmadoc 6 0 "	
do. to best Eureka un-	
fading green.... 15 0 "	
X 12 " " 10 0 "	
8 X 10 " " 12 10 "	
X 8 X 8 " " 8 7 "	
do. permanent green 10 0 "	
8 X 10 " " 9 0 "	
8 X 8 " " 6 5 "	
TILES.	
s. d.	
best plain red roofing tiles... 5 0 per 1,000, at rly.	
Hip and valley tiles... 3 7 per doz.	
best Broseley tiles... 50 o per 1,000	
Ditto ditto ditto... 56 0 "	
Hip and valley tiles... 4 o per doz.	
best Ruabon Red, brown or	
brindled Do. (Edwards) 57 o per 1,000	
Do. ornamental Do. 52 0 "	
Hip tiles 6 o per doz.	
Valley tiles 3 8 "	
best Red or Mottled	
tiles (Peaks) .. 51 o per 1,000	
Do. Ornamental Do. 54 6 "	
Hip tiles 4 x per doz.	
Valley tiles 3 8 "	
plain tiles—Roseman brand	
Do. 43 o per 1,000	
Do. Ornamental Do. 50 0 "	
Hip tiles 10 0 "	
Valley tiles 3 8 "	
Do. 17 2½ "	
WOOD.—YELLOW.	
At per standard.	
Deals: best 3 by 7, by 11 in. and 4 in. by 6 in. and 11 in. 6 s. d. 6 s. d.	
Deals: best 3 by 9, by 9 in. 14 s. d. 15 s. d.	
Battens: best 2½ in. by 7 in. and 8 in., by 12 in. 11 s. d. 12 s. d.	
Battens : best 2½ by 6 and 3 by 6 .. 10 0 less thanbatns.	
Deals : seconds 7 in. and 8 in.	
Battens : seconds 10 0 less thanbatns	
2 in. by 4 in. and 2 in. by 6 in. 9 0 o 9 0	
2 in. by 4½ in. and 3 in. by 5 in. 8 0 o 9 0	
Foreign Saw Boards :	
1 in. and 2½ in. by 7 in. 10 0 more than battns.	
3 in. 10 0	
Fir cladding (including Dango or Menrel (average specification))	
4 10 s. d. 50 s. d.	
Seconds 4 5 o 4 10 o	
Small timber (6 in. by 12 in.) 3 15 o 3 15 o	
Small timber (6 in. to 8 in.) 3 0 3 10 o	
Swedish balks 2 15 3 15 0	
Pick-pine timber (30 ft. average). . . 3 5 3 15 0	
JOINERS' WOOD.	
At per standard.	
White Oak: First yellow deals, 3 in. by 21 in. 93 0 24 0	
Battens, ¾ in. 21 0 22 0	
Battens, ¾ in. and 3 in. by 7 in. 17 0 18 0	
Second yellow deals, riding Dango or Menrel, 3 in. by 7 in. 18 0 19 0	
Battens, ¾ in. and 3 in. by 7 in. 17 0 18 0	
Battens, ¾ in. and 3 in. by 7 in. 17 0 18 0	
Third yellow deals, 3 in. by 11 in. and 3 in. by 21 in. 15 0 16 0	
Battens, ¾ in. and 3 in. by 7 in. 15 0 16 0	

[See also next page.

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Central Home and Cottage Homes for Children.....	Kington Guardians	25l, 15l, and 10l.	Jan. 15
*New Public Library	Worington Corporation	25l, 15l, and 10l.	Jan. 20
Designs for University Buildings, Cape of Good Hope	Agnt.-gen. for Cape of Good Hope	400l, 200l, 100l.	Jan. 31

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Bricks and Cement	Rhyl (Wales) U.D.C.	L. G. Hall, Civil Engineer, Paradise-street, Rhyl	Nov. 17
Shed, &c., Llaney-street	Sheffield Corporation	C. E. Wike, Civil Engineer, Town Hall, Rhemaud	Nov. 18
Grants road-metal, Brades-road	Wealdstone (Middlesex) U.D.C.	F. Hill-Pair, Civil Engineer, Wealdstone	do.
School, West Hill	Dartford School Board	H. Hal, Architect, 19, Doughty-street, W.C.	do.
ten Cottages, Windmill-lane	Drogheda Corporation	H. Hal, Architect, 19, Doughty-street, W.C.	do.
Additions to Premises, Ruckel-street, Kendal	Nessia W. Musgrove & Son	S. snaw, Architect, Highgate, Kendal	do.
Additions to Hospital	Swausa Hospital Committee	G. Moxham, Architect, Castle-street, Swausa	do.
Schools, Jennings-street	Swindon School Board	ishop & Pritchett, Architects, Swindon	Nov. 13
Additions, &c., to Chapel, Trinity-road, Halifax	Bristol Guardians	La robe & Western, Architects, 20, Caro-street, Bristol	do.
Homes, Hall, &c., Downend	Llanudno U.D.C.	E. P. Stephenson, Civil Engineer, Town Hall, Llanudno	do.
Cement, &c. (75 tons)	Conway Bridge Commissioners	J. J. Webster, Civil Engineer, 30, Victoria-street, S.W.	Nov. 20
Widening Suspension Bridge	Midland Railway Company	Engineer, Midland Railway Station, Derby	do.
Schools, Denton-street, Carlisle	The Admiralty	M. A. Robinson, Architect, Richmond-street, London	Nov. 21
Station Buildings, &c., Nottingham	Pontypridd School Board	Director, Works Dept., Admiralty, 21, Northumberland-st., W.C.	do.
Buildings, Granha, Londonderry	Pontypridd U.D.C.	R. W. Williams, Architect, Barry Park, Llanely	do.
Readence, Coast Guard Station, Greenock	Cowenry Corporation	Works Department, Admiralty, Northumberland-avenue, W.C.	Nov. 22
Additions to School, Felt, Llanely	Aspatia (Cumberland) Water Co.	R. E. Wilson, 66, Victoria-street, Westminster, S.W.	do.
*Guaranteed Buildings, at Grove Point, Portland	Manchester Corporation	F. W. Stevenson, Gas Works, Coventry	do.
*Revised Plans for General, Stn., Offices & Car Shed	Lauchlin & Co.	J. Forrest, Architect, Forces	do.
*Two Concrete & Brick Gasholder Tanks, Folehill Wks	Lauchlin & Co.	Pickering & Urmpton, Cvl. Engrs., 11, Lowther-st., Whitehaven	do.
Additions, &c., Bank House, Carnarthen	Lauchlin & Co.	D. Phillips, Surveyor, Carnarthen	do.
Eighty-two Cottages, Backley Estate	Lauchlin & Co.	City Architect, Town Hall, Manchester	do.
Laundry Buildings, Llanely	Lauchlin & Co.	A. G. Evans, Architect, Pontypridd	do.
School buildings	Lauchlin & Co.	C. Davidson, Architect, Terrace Buildings, Paisley	do.
Ironwork (117 tons) Folehill	Lauchlin & Co.	F. W. Stevenson, Engineer, Gasworks, Coventry	Nov. 23
Technical school, &c.	Lauchlin & Co.	J. L. Harper, Surveyor, Town Hall, Midway Hill	Nov. 24
Additions to School, Hollington	Lauchlin & Co.	C. A. Pigot, Architect, London-road, St. Leonards	do.
Public Convenience, Rock-a-Nore-road	Lauchlin & Co.	P. H. Palmer, Engineer, Town Hall, Hastings	do.
Road Works, &c., near Farrar-road	Lauchlin & Co.	J. Gill, Civil Engineer, Bangor	do.
Sewer, &c.	Lauchlin & Co.	Borough Surveyor, Town Hall, Lewes	do.
Pavilion at Recreation Ground	Lauchlin & Co.	City Surveyor, Town Hall, St. Albans	do.
Flags and Kerbs	Lauchlin & Co.	Borough Engineer, Municipal Buildings, Middlesbrough	Nov. 25
Reservoir, near Dalry, Ayrshire	Lauchlin & Co.	Leslie & Reed, Civil Engineers, 724, George-street, Edinburgh	do.
*Making-up Glasgow, Tweedmouth, Stirling, &c., roads	Lauchlin & Co.	Borough Engineer, Town Hall, West Ham, E.	Nov. 21
*Supply of Horse Ambulance	Lauchlin & Co.	Master of Workhouse, Leytonstone, N.E.	do.
*Making-up and Paving Road	Lauchlin & Co.	Borough Surveyor, Town Hall, Fulham, S.W.	Nov. 27
*Furter's Lodge at Crown Hill, West N.wood	Lauchlin & Co.	Clerk to the Guardians, Brook-street, Kennington-road, S.E.	do.
*Erection of Office	Lauchlin & Co.	H. Williams, Architect, Alliance Chambers, Corn-street, Bristol	Nov. 27
*Laying New Fire Main at Workhouse	Lauchlin & Co.	W. Smith, Architect, 65, Chancery-lane, W.C.	Nov. 25
*Supply of Eucalyptic Tablets	Lauchlin & Co.	County Hall, Spring Gardens, S.W.	do.
*Furniture for Farmer-road School	Lauchlin & Co.	J. Mausergh & Sons, Civil Engineers, 5, Victoria-street, S.W.	do.
*Superstructure of Evesley's bridge	Lauchlin & Co.	Vigers & Co., 4, Frederick's-place, Old Jerry	do.
Sewers, &c., near Millbay Pier	Lauchlin & Co.	Aston Webb, Architect, 19, Queen Anne's-gate, S.W.	Dec. 11
Sewerage Works	Lauchlin & Co.	Paigraive & Co., Architects, 28, Victoria-street, S.W.	No date
*Making-up Roads, Muswell Hill	Lauchlin & Co.	Manager of Works, Belvedere-road, S.E.	do.
*Superstructure of Museum, South Kensington	Lauchlin & Co.	J. L. Moyley, 5, Wormald-street, Leeds	do.
*Block of Residential Flats, Ealing	Lauchlin & Co.	County Surveyor, The Castle, Winchester	do.
*Purchase of Surplus Stores	Lauchlin & Co.	J. Mausergh & Sons, Civil Engineers, 5, Victoria-street, S.W.	do.
*Rebuilding Business Premises, Market-st., Bradford	Lauchlin & Co.	A. Cullen, Architect, Brandon Chambers, Hamilton, N.B.	do.
*Repairing Church, Dandyvan, Cambridge, N.B.	Lauchlin & Co.	I. George & Sons, Architects, Old square, Ashton-under-Lyne	do.
Three Houses, William-street, Ashton-under-Lyne	Lauchlin & Co.	J. P. Briggs, Architect, Edingham House, Artindale-st., Strand	do.
House, Kuper, Sussex	Lauchlin & Co.	J. W. Taylor, Architect, Newcastle-on-Tyne	do.
House, Colindale, near Bishop Auckland	Lauchlin & Co.		

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Applications to be in
*Draughtsman	Hackney Borough Council	2l. 2s. per week	Nov. 18
*Teaching of Drawing	Secretary of State for the Colonies	4,000 Rupees per annum	Nov. 23
*Clerk of Works	Islington Borough Council	3l. 10s. per week	Nov. 23
*Clerk of Works	London County Council	Not stated	Nov. 24

Those marked with an asterisk (*) are advertised in this Number. — Competitions, iv.

Contracts, pp. iv. vi. viii. x. & xi.

Public Appointments, xvii.

PRICES CURRENT (Continued).

WOOD.	At per standard.
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0 21 10 0
Do. 3 in. by 9 in.	18 0 0 18 10 0
Battens.	13 10 0 13 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0 17 0 0
Do. 3 in. by 9 in.	14 10 0 15 0 0
Battens.	11 10 0 12 10 0
Third yellow deals, 3 in. by 11 in.	13 10 0 14 0 0
Do. 3 in. by 9 in.	12 0 0 13 0 0
Battens.	10 0 0 11 0 0
White Sea and Petersburg:—	
First white deals, 3 in. by 11 in.	14 10 0 15 10 0
Do. 3 in. by 9 in.	12 10 0 13 10 0
Battens.	11 0 0 12 0 0
Second white deals 3 in. by 11 in.	13 10 0 14 10 0
Do. 3 in. by 9 in.	12 0 0 13 0 0
Battens.	10 0 0 11 0 0
Pitch-pine: deals	10 0 0 11 0 0
Under 2 in. thick extra	0 10 0 1 0 0

PRICES CURRENT (Continued).

WOOD.	At per standard.
Yellow Pine—First, regular sizes	33 0 0 upwards.
Second, regular sizes	28 0 0 24 0 0
Yellow Pine Odments	24 10 0 20 10 0
Kauri Pine—Planks, per ft. cube	20 0 0 22 0 0
Danzig and Stettin Oak Logs—	0 3 6 0 4 6
Large, per ft. cube	0 2 6 0 3 6
Small	0 3 6 0 4 6
Wainscot Oak Logs, per ft. cube	0 5 0 0 5 6
Dry Wainscot Oak, per ft. sup. as in. do.	0 0 7 0 0 8
Do. do.	0 0 6 0 0 7
Dry Mahogany—	
Bonduras, Labasco, per ft. sup. as in. do.	0 0 9 0 0 11
Selected, Figury, per ft. sup. as in. do.	0 1 6 0 0 2 0
Dry Walnut, American, per ft. sup. as in. do.	0 0 20 0 0 1 0
Teak, per load	16 10 0 20 0 0

PRICES CURRENT (Continued).

WOOD.	At per standard.
American Whitewood Planks—	
Per ft. cube	0 4 0 0 4 0
Prepared Flooring—	
1 in. by 7 in. yellow, planed and shot	0 13 6 0 17 6
2 in. by 7 in. yellow, planed and matched	0 14 0 0 18 0
2 in. by 7 in. yellow, planed and matched	0 15 0 0 19 0
1 in. by 7 in. white, planed and shot	0 11 6 0 13 6
2 in. by 7 in. white, planed and matched	0 12 0 0 14 0
2 in. by 7 in. white, planed and matched	0 14 6 0 16 6
3 in. by 7 in. do. do. do.	0 11 0 0 13 0
3 in. by 7 in. white do. do. do.	0 10 0 0 12 0
3 in. by 7 in. do. do. do.	0 11 6 0 13 6
6 in. at 6d. to 9d. per square less than 7 in.	

FINSBURY-GILLESPIE-ROAD (boys and girls): Removing existing partition and providing two sliding glazed partitions to divide classrooms B and C into three rooms, including the provision of a lobby in the middle room for direct access to one of the side rooms. Also providing an open fire portable stove for warming the middle room in each case, and constructing brick flues in connexion with same, together with lengthening the windows in the same room:—

Deering & Son £265
Thompson & Son 518
London School Furniture Co. 495

FINSBURY (Rotherfield-street).—Providing sliding glazed partition to divide Classroom B in each department:—

Deering & Son £281 0 0
H. Bouneau 255 0 0
London School Furniture Co. 237 74 9

GREENWICH (Kilmore-road).—Providing and fixing complete low-pressure hot-water apparatus to three halls (boys, girls, infants) also to six classrooms on each floor, drawing classroom, cloakrooms, corridors, and lavatories:—

Paragon Heating Co. £785
Wentner-Smith, Gray, & Co. 720
Cannon & Sons 691
Stevens & Sons 666
I. & F. May 588
R. Clarke 574

[Provision of £405 included in contract for new school.]

HACKNEY (Bergin-road).—Rebuilding offices, all departments; providing additional offices for girls' playground; refitting offices on roof playground; backing up tar-paving, rearranging levels and falls and repaving, and providing part new drainage scheme:—

Willmott & Sons £2,430 0 0
C. Neal 2,376 10 0
Stevens Bros. & Co. 2,246 0 0
Williams & Son 2,231 0 0

SOUTHWARK (West-square).—Revised. Enlargement—boys and girls, 162, on arches. Providing room for practical science, 472 ft. area; demonstration room, 363 ft. area; balance room, &c., and housewifery centre:—

Martin, Wells, & Co., Ltd. £6,808
Smith & Son 6,268
T. L. Green 6,238
Johnson & Co., Ltd. 6,180
F. & H. F. Higgs 5,817
J. Greenwood 5,778
J. Appleby 5,739
W. Downs 5,639

STORES (Clerkenwell).—Purchase and clearing away of old wood and metal, on a running contract:—

	Wood.	Per cubic yard.	Metal.	Per cwt.
	s. d.		s. d.	
£. E. Bonall	2 0	....	2 3	....
J. Kelley	3 0	....	1 0	....
J. A. Richardson	5 6	....	1 6	....

TOWER HAMLETS (Smith-street).—Dividing off portion of playground and erecting offices for the use of the girls attending the special school; also providing the necessary drainage and connecting it to an existing chamber:—

J. Shelly £368 5
Johnson & Co. 295 0
G. Parker 280 0
J. Peattie 288 0

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WEST LAMBETH (Telferscot-road).—Revised.—Accommodation: Boys and girls, 584; infants, 388—total, 972. Mixed boys' and girls' school on one story, and one-story infants' school. Hall (mixed school), 71 ft. 6 in. by 32 ft. 6 in. Hall (infants' school), 55 ft. by 26 ft. Classrooms (mixed school), 60, 60, 48, 48, 48, 48, 48, 48, 48, 48, 48, 48. Classrooms (infants' school), 56, 50, 50, 48, 48, 48, 48, 48. Drawing classroom and science-room, 1,265 ft. area. Heating by low-pressure hot-water apparatus in mixed school and open fires in infants' school, school-keeper's house:—

Lathey Bros. £25,435
F. & H. F. Higgs 24,986
Martin, Wells, & Co., Ltd. 24,772
Holloway Bros. (London), Ltd. 23,478
Simpson & Son 23,149
Garrett & Son 22,753
Lawrence & Sons 22,593
Lorden & Son 22,475
Spencer, Santo, & Co., Ltd. 22,170

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	Addition.	Invicta-gardens.	Invicta-road.	Grove-vale.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
F. & R. Edbrooke	106 9 2	140 8 4	147 2 0	
Carter & Aynsley, Ltd.	95 12 0	120 4 0	132 5 11	
J. Gibbons	82 7 2	105 1 0	112 8 3	
W. & R. Leggott	78 12 11	105 2 7	110 13 10	

Item (b):—

	Carter & Aynsley, Ltd.	£101 12 8	F. & R. Edbrooke	£95 15 0
W. & R. Leggott	101 5 0		J. Gibbons	75 10 3

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The Builder.

VOL. LXXXIII.—No. 3100.

NOVEMBER 25, 1902.

ILLUSTRATIONS.

Christ Church, Brixton	Professor Beresford Pile, F.R.I.B.A., Architect.
County of Lanark District Offices, Hamilton	Mr. Alex. Cullen, F.R.I.B.A., Architect.
"The Mount," Cookham	Mr. Theophilus Allen, A.R.I.B.A., Architect.
House at Bournemouth	Mr. T. Ballantine, Architect.
The Schloss-Hof, Meissen, Saxony	From Photographs.

Blocks in Text.

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Modern Practical Joinery.



THE art of joinery is concerned with the preparation and fixing of the permanent wooden furniture of a building, and is thus to be distinguished, on the one hand, from the art of carpentry, which deals only with the structure of the building, and, on the other, from that of cabinet-making, which deals with its movable furniture. There is, however, hardly a single important operation, either in carpentry or cabinet-making, with which a really good joiner is not necessarily familiar. The constructive woodwork of an important building, when it is exposed to view (as, for instance, in the case of a church with an unceiled wooden roof), would usually be executed by the joiner rather than the carpenter; whilst, on the other hand, the permanent furniture of first-class shops and of public buildings, though executed by the joiner, is really cabinet work of a very high order. Of these three branches of wood-working, joinery is therefore the most comprehensive and representative. The carpenter merely specialises in the strength and celerity of his work at the expense of its finish, the cabinet maker in finish and celerity, not infrequently at the expense of strength. Moreover, though it is true that an otherwise uneducated and ignorant man may become a good average joiner, the theoretical knowledge requisite for ideal proficiency in this art is no less various and comprehensive than the practical skill. A sound knowledge of draughtsmanship, geometry, and the properties of timber; an acquaintance with the elementary laws of physics and mechanics; and (if he is to co-operate intelligently with the architect) some familiarity with the principles of architecture, colour, and design;—these are all more or less indispensable qualifications of a really expert joiner. It is partly because of the number and magnitude of these subsidiary subjects, which it is almost impos-

sible to treat of adequately in a single volume, and a knowledge of which, on the other hand, it is futile to assume, that really good books on joinery are still so few, and will always be so difficult to produce; but a still more cogent reason is to be found in the inherent difficulty of the subject itself. Excepting only fine literature of the first class, there is probably no kind of literary work that needs higher mental qualifications than the exposition of one of the useful arts in all its modern complexity and perfection. The journalist who would dispose in a couple of hours of the affairs of the British Empire might well hesitate, even were he possessed of the necessary experience, to undertake a lucid explanation of the operation of scribing, the theory of hand-railing in double curvature, or the classification of the cutting instruments; and even the novelist and the poet, with their superior facility of expression, would find in such work as this a curiously close correspondence between the word and the thing to which they are frequently unaccustomed. Let our would-be *littérateurs* devote a year or so at the outset of their careers to the study and exposition of a mechanical craft, abiding by the result of this simple trial of their literary skill, and not only would their ranks be usefully reduced in number, but the survivors would gain immeasurably in strength and efficiency. "A man," says Emerson, "should have a farm or a mechanical craft for his culture. We must have a basis for our higher accomplishments, our delicate entertainments of poetry and philosophy, in the work of our hands."

Of all the mechanical crafts which might thus contribute to the culture of the individual man, probably none would be found more agreeable to the philosopher, or to the artist of whatever kind, than that of joinery, which is certainly one of the most interesting and beautiful of the lesser arts; and Emerson might further have added that the man would, quite conceivably, do as much for the craft, as would the craft for the man. Up till the present time the practice of joinery has seldom been seriously attempted by a man who is qualified by education and intellectual ability to give the trade the theoretical initiative and systematisation

that it still needs, and the world the benefit of his experience in book form. Joinery, like most of the useful arts, has so far developed itself mainly as a practical tradition. It was not until after the introduction of geometrical staircases and handrailings in double curvature that, in the seventeenth and eighteenth centuries, any important literature appeared on the subject; and even now, in these days of multifarious text-books of every kind, a really good exposition of its theory and practice yet remains to be written by a man who shall combine the qualifications of the philosopher, the artist, and the practical craftsman.

In his text-book on "Modern Practical Joinery,"* if he has not achieved an unqualified success, Mr. George Ellis has produced probably the best book on the subject that has yet appeared. As its title implies, it is written by, and for, the practical man, rather than the philosopher or the artist; and excepting as to the properties of timber, it neither assumes, nor attempts to impart, any adequate knowledge of the subjects mentioned above as subsidiary to the art of joinery. But it is a work comprehensive—in all essential respects, exhaustive—within its assigned limits; the illustrations are copious and good; and to say, further, that the text is generally lucid and concise, and always intelligible to the careful student, is to say, as we have already implied, that it is a work of considerable literary merit. It is, indeed, so good a book, that what small blemishes there are, are the more to be regretted on that account. The author disclaims any pretensions to literary style, his desire being rather, as he observes with perhaps unconscious irony, "to make himself easily understood"; but we must none the less protest against his occasional lapses into English as "she" ought not even to be "spoke." Such are his uses of the word "purpose" as an adjective—suggested, perhaps, by that last abomination of modern colloquialism, "a purpose-journey"; of the word "wedged" as an equivalent for "wedged-shaped;" of the phrase "vertical to a horizontal plane;" and of another—we

* "Modern Practical Joinery." By George Ellis. London: B. T. Batsford, 1902.

cannot give the exact quotation—in which one plane “converts” two others into a prism, instead of forming a prism with the other two. Such solecisms are the less excusable, because “the language of the workshop,” which Mr. Ellis avowedly and necessarily adopts, is not essentially inferior to that of polite literature and society, but is rather, in its accuracy and significance—as will be seen by a perusal of the author’s excellent glossary—a language from which literature and society would often do well to learn. If the correct uses of the words “vertical” or “wedged” are to be forgotten by the practical joiner, we may well ask, by whom are they to be remembered?

Coming to the subject matter of the book, it is apparent, as we have already observed, that Mr. Ellis writes as the practical man rather than as the philosopher or the artist, and generally, since he is writing for practical men, with admirable results. He is a practical man in the true sense of the word. The operative and constructional methods that he advocates are not always the cheapest nor the quickest, but they are almost invariably the best; and they are often a great deal better, we fear, than are found in the practice, or even dreamed of in the philosophy, of the average joiner. It is consoling, however, in these days of universal jerry-building and veneer, to know, as Mr. Ellis asserts, that they are the methods adopted in the best London workshops; and to read his chapters on the fittings of high-class shops and of public buildings tends to give one a new respect for those often prosaic-looking and inartistic, but evidently substantial structures. We are therefore the more surprised to detect the absence of the philosopher in Mr. Ellis’s occasional condescension to human weakness, or the force of circumstances, as, for instance, when he permits the jointing of a board “in winding,” or the substitution of a circular for a slightly elliptical arc. Such deviations from correct procedure must sometimes be winked at in practice; but they should hardly have received in print the deliberate sanction of a high authority. The last named, though bad as a precedent, is really permissible in the case in question; but the first is of a more serious nature. Mr. Ellis recognises, of course, that it is impossible to produce a plane edge which shall be square throughout its length to the surface of a “winding” board. He says, therefore, in effect—apply your square in the middle; shoot a true edge; let the ends take care of themselves, and the cleats will make it all right when the joint is glued up. But this is not correct. If either of two boards which are to be jointed together is shot in winding, neither cleats nor cramps, omnipotent though in modern joinery they are supposed to be, can produce in the resulting combination at the same time a plane surface and a permanently good joint. A board should only be jointed up “in winding” if it is to be used in a panel or other surface, which will be held rigidly in the position for which it is intended; and if thus used it ought also to be held out of “winding” during the operation of shooting. Some simple contrivance other than that of clamping to a shooting board is easily arranged, and might profitably have been described for this purpose.

In this connexion we may also remark that Mr. Ellis seems to be unconscious that

there are two opinions as to the use of cramps for jointing or other purposes. To do without them—in jointing, to shoot the edges absolutely straight and true, instead of hollow, as, in the case of long joints, recommended by Mr. Ellis, and to rub the glue out by hand; in framing, to fit the work exactly, knock it together dry with a hammer, and use glue only for the wedges—this is doubtless a “counsel of perfection,” but it has been advocated and practised by some of the best authorities, and was surely deserving of notice. The clamp is a useful instrument, but, as we have just seen in Mr. Ellis’s advice as to the jointing of winding boards, it offers temptations to slovenly workmanship, which the most conscientious workman, being merely mortal, is sometimes unable to resist; and tortured woodwork will rise up in judgment upon its author on a day by no means the last.

We must confess, however, that, in this and other respects we are criticising Mr. Ellis’s really excellent book in the spirit rather of the philosopher than of the practical man; and in the same spirit we wish to proceed, not so much for the sake of depreciating our author’s work, which is the best we have yet seen on a very difficult subject, as for the intrinsic interest of the problems that it continually suggests to any intelligent student.

Of these problems, one of the first and most difficult, is that of the classification of the cutting instruments. In Mr. Ellis’s first group he places together those of which he considers that the wedge is an elementary type. He points out, however, that the common wedge, when used for splitting wood in the direction of the grain, is not a cutting instrument at all, its action on the wood taking place as it does, not at the front edge, but at the thick part, or heel of the wedge. “It is,” he says, “to avoid this loss of action by the front edge that all (*sic*) cutting tools are wedged (*sic*), or bevelled, on one side only.” This seems to us in all ways a rather unfortunate statement; for not only is an ordinary knife, to say nothing of a wood-turning chisel, “wedged,” as he says, on both sides—an expression the impropriety of which thus more clearly appears—but even in the case of a joiner’s chisel, which he goes on to discuss and illustrate as a typical example, this fact of its being “wedged or bevelled on one side only” is not the characteristic by which it is really distinguished from the common wedge. This will be easily seen from the accompanying diagram, fig. 1, from which it



Fig. 1.

is clear that the distinction sought for consists, not in the shape of the iron, but in the fact, due to the position of the handle, that the operative pressure is applied along a surface of the wedge, instead of, as in the common wedge, in a direction between the surfaces. The removal of that portion of the iron indicated by the broken lines, which seems to distinguish the chisel from the wedge, is unessential to the action of the tool, and is recommended only as an economy of material, and for the sake of convenience in grinding.

“A Plane-iron or cutter,” Mr. Ellis goes

on to say, “is merely a chisel fixed securely, &c.”; and here again, though with considerable diffidence, we find ourselves at variance with the author. So far from a plane-iron being an adaptation of the chisel, it seems to us that it should not even be classed in the same group of instruments; that it belongs, with scrapers and machine cutters, to the third rather than to the first of Mr. Ellis’s groups of the cutting tools. As far as their forms are concerned, all cutting tools are modifications of the wedge or cone; and they can, therefore, only be classified according to their functions. Thus classified, a plane-iron, we venture to think, should be excluded from that group of tools whose function is that of the wedge, on the following grounds:—A wedge can only act as a wedge when it is moving in a direction internal, or—to cover the case of the chisel—not external, to its bounding surfaces; when, in other words, the pressure applied to the instrument is transmitted from both its surfaces. But a plane-iron, by reason of its fixed relation to the sole of the plane, is compelled to move in a direction external to the bounding surfaces of its wedge-shaped part; and the pressure applied is, therefore, transmitted only by the front surface of the iron. In these respects the function of the plane-iron is more nearly that of the scraper and the machine cutter than of the chisel or the common wedge. We illustrate this view in fig. 2, where (a) represents the

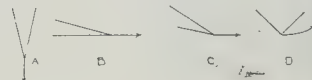
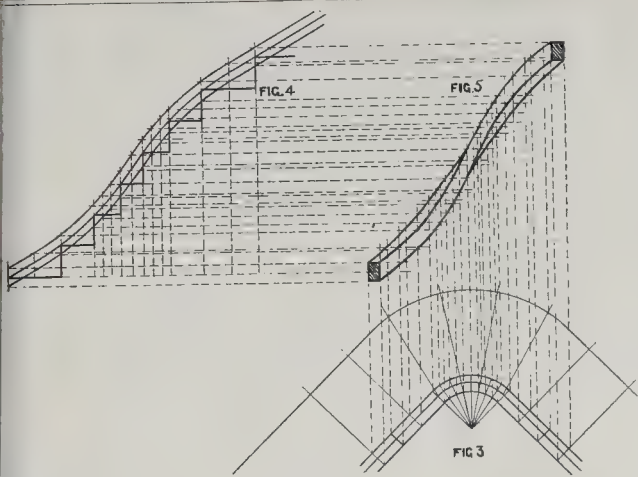


Fig. 2.

motion of the common wedge; (b) that of the chisel; (c) that of the plane-iron; (d) that of the machine cutter. If, on account of the nature of the shavings produced, it is still maintained that the action of the plane is analogous to that of the chisel, this view can only be justified by regarding the instrument as a whole, in which the front surface of the plane-iron and the sole of the plane constitute the two surfaces of the resultant wedge. As a matter of fact we have raised the vexed question as to whether there is any essential difference in the action of a razor held in the upright and in the oblique positions. These remarks, far from solving the question, serve only to show that it needs a more philosophical treatment than it has received in the volume before us.

A branch of the subject in which Mr. Ellis is evidently much interested and very proficient is that which concerns the theory and practice of handrailing for geometrical staircases. He treats a large number of typical cases on the principles of the “square-cut and tangent system;” and considering the difficulty of the subject, and the very slight knowledge of geometry which the student is assumed to possess, his exposition of the solutions given is marvellously clear and good. These solutions, however—though this is probably less the author’s fault than that of the system he adopts—are not always as satisfactory as they might be. It would seem, indeed, that the “square-cut and tangent system,” though it may afford convenient methods of interpretation to the builder’s foreman, is not one upon which the original design should be based, and the architect who wishes to obtain really good



results in handrailing should be warned by perusal of these examples to provide fully detailed drawings of his design in the first instance, and allow no latitude of interpretation whatever to the executive craftsman. The only condition upon which the geometrical staircase can possibly be preferred to the open newel, or even the dogleg type, is that the curvatures of the handrailing should be perfect in execution and design. The abrupt "ramps" and very imperfect "easings," so often observed in second-rate work, are an abomination which should not be tolerated on any pretext whatever.

The difficult case in this class of work is, of course, that in which two straight flights of stairs are to be connected by winders. In the case of circular stairs, or where landings are used, the problem of handrailing is comparatively simple, being solved in the first case by true helical, and in the second, with good management, by true elliptical curves. And here we must remark on passing on the apparent confusion between these two forms of curve which is suggested by fig. 770 of the volume before us, in which lines are drawn which seem to be intended as tangents in different planes to the same ellipse. This figure, whilst it will at once arouse the suspicions of the most casual reader with regard to the methods advocated by Mr. Ellis, serves well to illustrate the difficulties with which, in the case of winders, he has to contend. A wreath has to be described for the connection of two straight rails which are in different directions, and, whether for a half or a quarter space of winders, not in the same plane. An elliptical curve is therefore out of the question; and the true helical form is equally inapplicable, because the pitch of the helix over the winders is necessarily steeper than that of the rails over the straight flights; whereas the tangents to a helix are, of course, of the same pitch as the helix itself. Mr. Ellis solves the difficulty by adopting a helix of the same pitch as the winders, and "easing" the straight rails into the helical wreath; but these "easings," as shown, for instance, in the development of a handrail for a quarter space of winders, on page 261, are too abrupt to be graceful. They are, in fact, just those weak points in the design which make curved handrail-

ings that disappointment to the eye which they usually are; and the whole arrangement, though Mr. Ellis does not make himself responsible for the position of the winders, is curiously wanting in symmetry about that vertical plane which bisects the quadrant. It is true that the elevation of this rail on page 273 looks fairly satisfactory, but it is an elevation of the wreath only, and does not, therefore, give a complete representation of its junctures with the straight rails. To show that the difficulties of this class of problems in double curvature are not by any means insoluble, we produce an alternative design for a handrailing over a quarter space of winders of the same pitch and proportions as that illustrated by Mr. Ellis on page 261, in which the disposition of the two dancing winders is more conveniently adapted to the curvature of the falling line. Fig. 3 is the plan of the handrail, risers, and walking line; fig. 4, the development of the central vertical section of the handrail, and of the nosing line; fig. 5, the elevation of the solid wreath and its junctures with the straight rails. It will be noticed that this design is in all respects exactly symmetrical in the two halves of the quadrant, and that the development of the wreath, whilst it is composed of circular arcs of almost the greatest possible radius, coincides almost exactly with that of the nosing line. The only possible objection to this design that can be urged by the practical craftsman is that the wreath may need to be cut in two pieces, or of thicker stuff than that which is usually necessary; but this will involve an increase of price very small as compared with that of the whole rail, and one which will be well repaid in the greater perfection of the finished structure. Moreover, there is an innovation we should much like to see adopted with respect to well designed handrails for geometrical stairs, which will much more than cancel this slight increase of price—this, namely, that the rails should not be shaped to the hand in the usual manner, but finished to a square or rectangular section, the sharp edges being rounded off at a quadrant of not more than $\frac{1}{4}$ in. radius. The beauty of its curvature should be a sufficient ornament, and the chief feature of a good geometrical handrailing; but its curvature, whether good or bad—and it is the more likely to be bad

on this account—is only rendered indefinite by shaping to the usual section, unless it is re-emphasised by the striking of some sharply-cut moulding, which not only adds greatly to the price of the rail, but is less trustworthy as an index of the curve than the bold outlines afforded by a rectangular section. This adoption of a simpler section would therefore be not only a great economy of labour, but the best possible means of ensuring a good design; and, even in these days when beauty and simplicity—not, alas, pretentious ornamentation!—are sacrificed to convenience and luxury on every occasion, no objection could surely be taken to a rectangular rail on the score of discomfort to the hands.

Anterior, however, to the design of curved handrailing in wood, arises the question as to whether wood is a material which is properly suited for this purpose at all; or for any in which the curvature of a solid filament bears some considerable ratio to the diameters of its cross section; whether, on the contrary, such structures would not be more suitably executed in stone or metal. These, being usually isotropic, whilst wood is a fibrous material, are naturally more suitable to the purpose, because, unlike wood, they are as strong, in a direction normal to the axis, in curved as in rectilinear pieces. To this suggestion it may be objected that the wreaths of a handrail, like the braces of a ship, might be cut out of wood so chosen, from the branches or roots of the tree, that the grain should run in the direction of the required curve; and, we reply, that they seldom or never are, not only on account of the trouble of so selecting the wood, but because it is easier to obtain the necessary projection of the wreath on the surface of a solid plank. In the case of handrailing, however, it may be argued in favour of woodwork, that wood, unlike stone and metal, is a nonconductor of heat, and is therefore more comfortable to the hands. And as far as the appearance of a handrail is concerned it cannot be denied that an ornamental wood is in many cases preferable to metal, whilst the use of stone, of course, necessitates stone stairs with the appropriate architecture of the hall and landings. Moreover, it is doubtless possible for a curved handrail of sufficient strength to be executed throughout in wood, without recourse to the usual illegitimate expedients of metal stays, in which case it is difficult to produce an objection to such a handrail which will be allowed as valid by the practical man, whatever the philosophic critic may think as to the essential misapplication of the material.

In regard to this question of the truthful application of the material, we are glad to notice that Mr. Ellis does not describe at any length, and very seldom advocates, the use of veneer; a means of effect which is, of course, naturally less used in high-class modern joiner's work than in cabinet work of the corresponding quality. The only cases in which he would seem to adopt it are those of surfaces in single curvature; that, for instance, of the wreath piece of a geometrical staircase. In this instance, however, since the string is only reduced to a veneer between the springings of the curve, and there is no economy either of labour or material, the method adopted is not inferior to, but merely other than, that which would be inferred from the result. The intelligent but uninitiated spec-

tator, who is the person chiefly to be considered in such questions as these—for the unintelligent are not worthy and the initiated too few to be regarded—would naturally infer either that the whole string was veneered, or the wreath piece bent in the solid wood, the actual truth being more lovely than one of these guesses, and more ingenious than the other. We should therefore prefer a more obvious and equally workmanlike method—either that of “building up” the wreath-piece in vertical pieces, the joints and changes in the direction of the grain (which Mr. Ellis objects to) being really an ornament of the work; or that of cutting from the solid wood, in which case the unequal shrinkage of which Mr. Ellis naturally complains, would only correspond with that of the wreath itself. It is true that either of these methods very clearly indicates the weak point in the string; but since the weak point exists, and must exist unless the string is bent in its entire thickness, they are to be preferred to the veneer method on that very account.

We have not space to consider here the various other questions which are suggested by this most interesting subject—those, for instance, which relate to the properties of timber or to the relative merits of machine-made and hand-made work; and the question of design, being, of course, in the hands of the architect, hardly belongs to the subject of practical joinery. We will only add that Mr. Ellis has two excellent chapters on timber; that he deals throughout his book, as we are pleased to find, with hand-made rather than with machine-made work; and that, unlike some of his contemporaries, he never pleads guilty to original design. We may conclude, therefore, by wishing every success to this carefully prepared and very instructive volume, which should be useful not only to the practical joiner, but to the architect who wishes thoroughly to understand the best constructional methods of joinery as practised at the present day.

NOTES.

A CASE of some importance to those who own houses in the vicinity of open spaces in the Metropolis has recently been decided in the Chancery Division of the High Court. The Borough Council of Paddington, in pursuance of their powers, transformed an old burial-ground into an open space, and under the Metropolitan Open Spaces Act of 1881 and 1884, Sections 5 and 3 respectively, they were not to erect any building upon this ground. The object of the Statutes was that these spaces should remain open ground for the benefit of the public. The plaintiff was a house-owner adjoining this open space, and he seems to have claimed a right to light over the ground in question before he had obtained it by the Statute of Limitations. What was his particular object in claiming this right is difficult to see, since the Public Authority could not build houses upon this open space. However, in order to prevent the alleged right, the Borough Council erected a hoarding in the usual fashion, so as to obscure the light to the house in question. The plaintiff at once said that they had no right to do this, because the hoarding was a building within the meaning of the Open Spaces Act. It was perfectly obvious, however, that the

judge was right in his view that the word “building” did not apply to such an erection as a hoarding, which was merely to obscure the access of light to a house. The object of the Act was to prevent buildings of a substantial kind being erected which would have the effect of preventing the space being used as an open playground. The decision also was against the plaintiff on the claim of right, because the mere fact that this was to be kept an open space did not include in it a right to the adjoining houses of the easement of light. As we have said, this point seems to be somewhat academic, because, as the Borough Council could not build on the open space, the owners of adjoining houses could not have their right to light interrupted. However, academic though the point may be, it is a clear decision, and it is probably a safeguard to the interests of the public, because it is possible that on an open space, although it may be kept for the use of the public, it may be necessary on occasions to place some building, as a recreation hall or similar structure.

IN THE CASE OF THE ATTORNEY-GENERAL *v.* ASHBOURNE RECREATION GROUND CO. AND SMITH

(*Times*, November 10), the Attorney-General and the Ashbourne Urban District Council were suing the defendant in respect of an alleged breach of one of the Council's by-laws in regard to a new street being not of the required width, and the defendant contended that the High Court had no jurisdiction, since the by-laws were made under Section 157 of the Public Health Act, and Section 251 especially provides that the penalties, imposed by Section 183, for this breach are to be recovered before justices summarily. The court overruled this objection on the ground that here an injunction was sought to protect a right, and that this exception to the general rule ousting jurisdiction applied equally when the Attorney-General was suing in respect of public rights. The court pointed out that this point had been assumed, without argument, in cases involving a deviation from the building line and also in relation to the width of a street; but apparently this is the first time it has become the subject of a direct decision.

A CURIOUS point has been raised in the case of *Mappin Bros. v. Liberty & Co.* (see our Legal columns) as to the ownership of the subsoil of Regent-street. The plaintiffs, Messrs. Mappin Bros., were lessees from the Commissioners of Woods and Forests of business premises in Regent-street, the original lease having been granted in 1820, when the street was in course of construction. The defendants were lessees of premises on each side of Messrs. Mappin's, and had connected these premises, with leave, by means of a subway under the street. Messrs. Mappin now claimed to be lessees of the subsoil of the street *usque ad medium filum*, setting up the presumption of law that a conveyance of land abutting on a street passes the soil up to the middle of the street. The Court, without deciding whether for this purpose a lease had the same effect as a grant, or whether a lease or grant by the Crown had the same effect

as a lease or grant by a private individual, found there was abundant evidence both in the contract for the lease, and also in the provisions of the Act of Parliament under which the Commissioner had acquired the land, to rebut any such presumption, and that the plaintiff's claim failed. It is to be observed the presumption does not apply to land intended to be used as a highway, but not yet dedicated to the public (*Leigh v. Jack*, Ex. Div. 264), and in this case the contract was entered into some few years before the date of the lease, yet the lease only spoke of the road as “now forming,” and the Court held the contract to determine the rights of the parties. There is yet a further point alluded to in the judgment, but not necessary to be decided in the case, viz., that it is doubtful whether any such presumption ever applies to highways in towns in any circumstances. It may now be pointed out that such statutes as the Metropolitan Management Act and the Public Health Act, which vest the streets in the Urban or other Authorities, only apply to the surface of the streets and do not touch this question of the subsoil.

An interesting point was decided by the House of Lords, affirming the Court of Appeal in the case of *Thurston v. Nottingham Permanent Benefit Building Society* (*Times*, November 14) as to the position of an infant member of a building society. The plaintiff (a married woman and an “infant”) having been admitted a member of the defendant Society, applied to the Society for a loan to enable her to purchase some land and to complete some houses in course of construction upon it. The defendant Society advanced 250*l.* in respect of the purchase, which they paid to the vendor on the plaintiff's behalf, and, to secure themselves for this advance and for other sums to be advanced for the building, they took a mortgage for 1,200*l.* on the property. When a total sum of about 1,000*l.* had been advanced, the defendant Society, finding out the plaintiff was a minor, took possession of the property, and the plaintiff subsequently brought her action claiming the property and repudiating the mortgage. It must be borne in mind that there was no allegation that the plaintiff had acted otherwise than *bona fide*. Section 13 of the Building Societies Act, 1874, enables funds to be raised by subscription amongst the members for such loans to members, and Section 38 enables persons under age to become members of such societies and “to give all necessary acquittances.” The Infants' Relief Act, 1874, however, renders absolutely void all contracts by infants for the repayment of money lent. In the result the Court has held that there are two transactions involved in the circumstances of this case, and that as regards the purchase money paid to the vendor, the plaintiff having ratified that contract since she came of age, the Society were entitled to stand in the shoes of the vendor, and to have a lien on the property, but that as regards the mortgage the Infants' Relief Act made this void. There is a proviso to Section 1 of the Infants' Relief Act that it shall not invalidate any contract into which an infant “may by any existing or future statute” enter, but it is to be observed that the present decision

Infants and Building Societies.

to the effect that the Building Societies' Act does not enable infants to borrow money, but only gives such members the other rights which are not controlled by the provisions of the Infants' Relief Act.

Liability for Damage from Electricity. THE Privy Council has given an interesting decision, and one which shows the adaptability of the common law to the exigencies of modern times, in the case of Eastern and South African Telegraph Co. v. Cape Town Tramways Co., and which is reported in the Law Reports for August. The telegraph company sued the tramway company for damages and an injunction caused by interference to their cable messages by reason of the return current through uninsulated rails on the tramway system; and the very old principle of law decided in the case of Rylands v. Fletcher so long ago as 1868 was invoked by the plaintiff telegraph company to support their claim. That principle is that a person who brings on to his land anything which should it escape will cause damage to someone else, is liable, quite apart from any negligence. This matter has already been under the consideration of the Courts in relation to electricity in the case of National Telephone Co. v. Baker (1893); but in that case, although the Court held that the above principle of Rylands v. Fletcher would apply as well to the electric current as to the subject matter in the original case, which was water in a reservoir, the defendant company were held excused, since they were acting under statutory powers conferred by Provisional Order. In the case now before the Privy Council a certain portion of the tramway line was not constructed under statutory powers, and although the Privy Council approved of the finding that the principle of Rylands v. Fletcher had application to such a force as electricity, it was held that the interference with the telegraph cable not being such as could be considered an interference with the ordinary use of property did not make the defendants liable for the damage. In other words, this principle being in the nature of an insurance, and enforceable apart from negligence, it applies only to ordinary conditions, and a man cannot increase the liabilities of his neighbour by putting his own property to special uses. In view of the rapidly increasing user of electricity in crowded centres the importance of this decision cannot be exaggerated, and although decisions of the Privy Council are not absolutely binding on the other Courts of this country they are treated with the greatest respect, and almost invariably followed.

Electric Accumulators. IN a paper to the American Institute of Electrical Engineers Mr. Carl Hering discusses several practical problems connected with the management of accumulators, and arrives at some novel results. Most English electricians think that the principal point about the management of accumulators is to be careful to stop the discharge when the voltage per cell is 1.8. Now the only reason for the existence of this number, apparently, is that it is mentioned in the rules issued by manufacturers, who will only guarantee their cells when these

rules are slavishly followed. In France the usual voltage at which the discharge is stopped is 1.6, and in the official tests for the French Admiralty 1.65. Mr. Hering points out that the proper point at which to stop must depend, amongst other things, on the rate of the discharge. For a very rapid discharge 1.5 volts might not be too low. He might also have mentioned that this voltage depends on the temperature of the cell. The efficiencies of accumulators rise with the temperature, and the differences in summer and winter are appreciable. Their capacity also increases with the temperature, and by artificially heating the electrolyte they can be made to store twice as much energy as at ordinary temperatures. It will be seen that makers ought to mention the temperatures at which their batteries have their listed capacities. For traction work in connexion with motor-cars, as the batteries as a rule work at constant power, and not at constant current, the point of cut-off will be automatically indicated by the current increasing very rapidly. The pressure of the cells at this point having been determined experimentally, the driver will obviously have to be careful never to be too far from a charging station when his voltage is approaching the minimum permissible. We wish to emphasise the fact that this voltage may be something very different from 1.8 volts per cell.

Electric Lighting in Paris. FROM the very full report published last month by M. Laffargue in *L'Industrie Electrique* it appears that electric lighting in Paris has not made much progress during the last two years. This is probably due to the price which the companies charge per unit, which is about double the usual price in London. As the concessions granted to the companies by the Municipal Council will soon have to be renewed, it is probable that they will be forced to lower their prices. All the new power stations are now being built outside Paris, and the energy is being transmitted at high pressure to the substations in the city by means of underground mains. The new mains have been found very satisfactory and the scientific methods adopted of detecting incipient faults in the older mains have made breakdowns very rare. The Edison Company use a very curious system of transmission to their substations. It is similar to an ordinary three-wire direct current system with 2,200 volts between adjacent mains or 4,400 volts between the outers. We think that where there are several substations not too far apart this method is well worth consideration. The application of electricity for power purposes in Paris is very limited. Electric lifts, however, are a notable exception. They have been found much more economical than hydraulic lifts or lifts worked by compressed air. M. Laffargue states that the average price of the current used for the return journey by an electric lift carrying three persons in a six-story flat is a farthing. The price for the water used by an hydraulic lift in similar circumstances he gives as 1.5 penny, and for a compressed air or hydro-electric lift the cost is 0.5 of a penny. He assumes that electric power costs 6d. a unit. Several of the London companies supply it at half this price, and one supplies it at 2d. per unit.

Cable Transport. Two or three years ago we gave some particulars of a novel form of cross-river communication proposed at Newport (Mon.). We understand that preliminaries are now settled, and that the construction of the transporter bridge is already commenced. It may be remembered that the design was one intended for the conveyance of passengers and vehicles in a car suspended from a cable stretched between two lofty towers—one at each side of the River Usk. A recent example of somewhat similar practice is to be found at Ouray, Colorado, where a steel cable line 4,200 ft. long runs up 2,000 ft. to the mouth of a gold mine. The line consists of two stationary cables securely anchored at each end, and along these loaded and empty buckets are conveyed, the weight of the loaded buckets travelling down being sufficient to work the system. Another example of transmission by cable is to be seen at Woking Station on the London and South-Western Railway. The adoption of this transmitter, which is operated by hydraulic power, should certainly facilitate traffic, besides avoiding unnecessary risks to porters and other railway servants. The cables, extending between steel towers 32 ft. 6 in. high, are four in number. On the uppermost one, the transmitter runs to and fro, the next cable is intended to hold the transmitter in position, and the others are for haulage. Attached to the transmitter is a cage capable of carrying about 10 cwt. of luggage which can be moved from one platform to the other in about thirty seconds. The above are merely isolated instances of a general system which may often be adopted with great advantage.

Messrs. Agnews Exhibition. THE eighth of the annual exhibitions at Messrs. Agnews Gallery in Bond-street contains some very important and interesting pictures. These are exhibitions of a few valuable pictures only—in this case twenty, collected in the first-floor gallery. The first in the numbering is a large Turner which is remarkable in a sense which does not seem to be generally realised; it represents a shore-boat approaching a small sailing-vessel most absurdly full of people; and it may be said that it shows a bad sea—(a cooked Turneresque sea, not a genuine one), ridiculous boats, and bad and absurd figures; and yet it is a fine picture. The fine quality consists in the colour and in the spacious airy look of the sky; but it certainly will not bear examining in detail. Gainsborough's small landscape (3) is fine in the brightness and movement of the clouds, but not otherwise a very remarkable example of Gainsborough landscape. The picture of "Yarmouth Harbour" by John Crome, next to it, is interesting as an unusual subject for Crome, besides being a fine work in itself. There is a Bonington landscape (10) fine in its old-fashioned way, and true to the sentiment of the South Coast scenery of England—the scenery of chalk cliffs and downs. Most of the other works are portraits, some of them of considerable importance. Gainsborough's "Hon. Anne Duncombe" is a stately portrait, but it has surely been restored or painted on since it left Gainsborough's hands; it is very unlike his texture. Among the Reynolds in the collection "Lady Ann Fitzpatrick," a little girl crouching into a heap with a bunch

of grapes, is an example of one of his peculiarly individual child pictures; and among several Romneys "Miss Jouenne," seated with a book in her hand, in a creamy-toned dress with a light blue sash, is a splendid portrait both in dignity and colour harmony. "Miss Pollak," by Hoppner, with a brilliantly painted and expressive face and a background of Gainsborough trees, is a very favourable example of this artist nearly at his best; much more so than the group under the title "The Setting Sun;" a poor work. Raeburn and Morland are also represented in the collection.

An exhibition at Mr. Montague Fordham's Gallery of silver-point drawings, mostly of architecture, by Mr. Alfred Fahey—under the not inappropriate title of "Some Precious Stones of Gloucestershire and Wilts"—marks a new departure in architectural illustration. Gloucestershire and Wilts are rich in kindly village architecture, ancient manor houses, churches containing the quiet and often ornate tombs of forgotten worthies. Both country and buildings are as much unspoiled as any counties in England. The writer speaks from experience, as he recently visited nearly all the places in these two counties depicted by Mr. Fahey. Mr. Fahey's illustrations are in the nature of miniatures, drawn directly upon parchment or vellum with a gold or silver point, every line of which is indelible, thus increasing tenfold the difficult task of drawing ornate architecture correctly. Perhaps one of the most pleasing drawings is that of the "Nun's Walk," a magnificent avenue of yew trees on Lord Bathurst's estate, known as Pinbury Park; this is a difficult subject drawn with simple directness. Daneway House, near Sapperton, is, as the name suggests, a delightful subject for the artist—it has a fine outline and is set in the most picturesque surroundings of the Stroud Valley. The south part of Malmesbury Abbey comprises much rich detail; from recollection, we should say that the artist has exaggerated the lowness of its proportions. As an architectural drawing, that of Athelstan's tomb is the best of the series; a clean piece of work, it is free from the minute "business" of some of the others. Besides Mr. Fahey's drawings, there are some charming pieces of furniture by Mr. Barnsley, and a special collection of metal work from Messrs. R. L. B. Rathbone & Co.; noticeable amongst them is a handsome dull copper candelabra for three candles, and an original pair of candlesticks in brass of excellent workmanship. Mr. Fordham has taken an architect, Mr. H. F. Waring, into partnership, in order to be able to concentrate his resources on the decoration of complete rooms or houses.

THE attention and correspondence which is being given at present to the question of the bedrooms in the colleges at Oxford is quite legitimate. At the same time it is a little difficult to see what practical result can come from it. It is, no doubt, somewhat an anomaly that whereas the bedrooms in the lodgings of the undergraduates who are not in college are carefully supervised, and have to be brought up, so far as possible, to modern requirements, the bed-

rooms in colleges should in many cases be little better than cupboards, badly warmed and not very well ventilated. Something may perhaps be done to remedy the latter point, but it is impossible to put fire-places in these old buildings. Of course, there are many bedrooms within the walls of the Oxford colleges which are excellent, but on the other hand there are certainly an equal number which cannot be regarded as up to date. If, however, these smaller and less convenient rooms are not used for their present purposes it would mean the lessening of accommodation for students to a very great extent. There is also this to be borne in mind, that the length of time during the year during which the students are in residence is comparatively short, and therefore the evil results of small and ill-ventilated rooms is not so great as if they were occupied from year's end to year's end. Still it is certainly desirable that steps should be taken to improve the sleeping accommodation in many of the Oxford colleges where reasonable means will overcome the present shortcomings.

THE NEW GALLERY.

THE exhibition now open at the New Gallery is nominally that of the Society of Portrait Painters only; but the Central Hall is occupied by a representative collection of the works of a talented sculptor, Mr. Stirling Lee, which to our thinking constitutes the most interesting portion of the exhibition. However, as the portraits form the largest portion of the exhibition, and its special object, we will consider them first.

We have never understood what was the precise object of the Society of Portrait Painters; it does not at all events appear to include the furtherance or recommendation of any special aim or principle in portrait-painting, for the works exhibited represent the most diverse schools and styles, from the mere impressionist portrait sketch to the hard and minutely finished portrait which may, for all one knows, be a photographically correct likeness of the original, but does not present much of any other kind of interest. Of this class of portrait there are not a few examples, many uninteresting; some, as works of art, absolutely bad and commonplace. Between these two extremes there are, however, some fine and powerful works to be found.

In the West Room, where the numbers begin, are some portraits by Mr. G. F. Watts, (who is an honorary member), but we presume painted for the exhibition, one of them being indeed a fine and well-known portrait of Dr. Joachim as the great violinist appeared in his younger days. The portrait of the Countess Somers (25) is a sumptuous piece of colour, but the head of the sitter is the least interesting portion of the picture, being somewhat stiff in pose and conventional in colour and texture. Much more interesting is the half-length of Mrs. Josephine Butler (28), beautiful in colour and design, and most expressive as regards the countenance.

The best works in the collection are in the same room. Among these is certainly Mr. J. H. Lorimer's picture, called simply "Portrait" (15) of an old lady seated in an armchair with a book and spectacles on her knee, a portrait forcible in its individuality of expression and style. Mr. Austen Brown's full-length "Portrait of a Lady" (20) in walking-dress, is another work distinct in style and character. Two portraits by Mr. J. J. Shannon, "Lady Ulrica Duncombe" (24), and "Mr. Garé Melchers" (33), are fine examples of the broad style of handling which this artist has now taken up, and which forms a marked contrast to the rather over-finished style of his earlier work. Mr. Ellis Roberts, one of whose principal works is in this room, "Miss Angove" (19), appears to be adopting the manner of eighteenth-century portraiture; the composition and manner of this work, especially in the treatment of the trees and landscape and the relation of the figure to them, plainly recall Gainsborough, though the figure is somewhat hardly painted. In the

same artist's works, Nos. 71 and 79 in the north room, the same adoption of the old style of portrait is obvious, perhaps a little too much so; it borders on an affectation of the manner of Reynolds, but hardly recalls the greater qualities of the older painter. Both the name and the style of Mr. Gabriel Nicolet suggest a French origin, though he has a London address in the catalogue; in fact, in his portrait No. 46 in the North Room he has given quite a French aspect to an English lady. His style is undoubtedly pretty, but rather weak; his "Lady Martin" (31) suggests that he takes Benjamin-Constant as his model. Two portraits of men, by Mr. James Guthrie and Mr. Robert Brough respectively (26 and 33) are noticeable for a certain simple masculine vigour of style and execution; simple presentments of the sitters, in an unaffected style and with no attempt at special effect of colour or composition. In "Mother and Child" (3), and in the treatment of the nude infant especially, Mr. C. H. Shannon seems to have been taking a leaf out of Mr. Watts's book, though the colour is much colder. His sketch portrait of Mr. Van Wisselingh is a clever and striking piece of work. Among other things of special interest in the West room are Mr. Lavery's bust portrait of Lady Ian Hamilton (2), little more than a sketch, but of great charm and freedom of style, and the same artist's small full-length of "A Girl in White" (36).

In the North Room Mr. J. J. Shannon has a charming portrait of a little boy (56). Among experiments in special treatment we find in this gallery Mr. Mancini's *pointilliste* portrait of Mr. Harold Ponsonby, a painting all spots and glitter, but from which a certain intelligible effect is produced, unlike his other work in the South Room, "Portrait of the Artist's Father" (116), which may be described as "illegible," and most unattractive into the bargain. Mr. Brough's "Mrs. Laurence Currie and Children" (78) seems also to be a kind of experiment in exceedingly broad and flat painting, vigorous enough but too crude in modelling and colour, and suggesting rather the idea of an unfinished work.

The south room contains some small works, drawings, of considerable interest, especially Mr. Goodman's portrait of Sir Alma-Tadema in his studio. There are some very poor things in this room. Among the brighter examples are Mr. Lavery's slightly executed portrait (103) of a little boy in a white blouse holding a palette and brushes, and Sir G. Reid's highly-finished portrait of the late Sir Bartle Frere in an official costume; the head is brought out in a very strong light somewhat after the manner carried rather too far by the late Frank Holl; there is just a suspicion of theatrical effect in it. In "The Rev. Daniel McLean" (108) Mr. Lorimer has given us the type of the Scottish Kirk in all its dour earnestness; a powerfully executed and highly characteristic work. Mr. Gabriel Nicolet's half-length of a boy in a red jersey (115), on his way to the shore with a net, is perhaps the best work of his in the exhibition, successful both in regard to the figure and the landscape.

As already remarked, the collection of Mr. Stirling Lee's work in the Central Hall is really the most interesting part of the exhibition. It includes several important works which we remember in other exhibitions. "Echo," "The First Death"; "Cain"; "The Dawn of Womanhood"; and "The Kiss of Dawn," a large circular bas-relief of very fine character. The marble statue of "Narcissus" we do not remember; it is not new, as it is lent by the owner for the exhibition; it is a very beautiful work. We have here also the small models (and one full size one) of the whole series of bas-reliefs of the development of Justice, modelled for the series of square external panels at St. George's Hall, Liverpool (for many years left blank); and a very fine and interesting series it is. The two panels of similar character, representing "Liverpool, a fishing village," and "Liverpool Builds Ships of Commerce," are, we hope only the commencement of a series to be carried to the same length as the "Justice" series. Among the other exhibits by the same sculptor is "Part of a Carved Oak Gallery," No. 15 Stratton-street, a series of child figures executed *à jour*, the subject being "Children in the Garden of Joy"; a bold and vigorous piece of work recalling the feeling of Renaissance art.

The idea of supplementing these portrait exhibitions by a special collection of sculpture

in the central hall is a very good one, and we hope it may be taken as a precedent to be followed on future occasions.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

MR. ASTON WEBB, A.R.A., the President, took the chair at the usual fortnightly meeting of the Royal Institute of British Architects on Monday night at the Rooms of the Institute, No. 9, Conduit-street, Regent-street, W.

All Hallows Church, Lombard-street.

The minutes of the last meeting having been confirmed,

Mr. W. J. Locke, Secretary, announced that the following resolution was passed at the Council meeting that afternoon with reference to the proposed demolition of All Hallows Church, Lombard-street:—"That the Royal Institute of British Architects views with regret the proposed demolition of another of Sir C. Wren's churches, viz. All Hallows, Lombard-street, which has a peculiarly successful interior, and desires to express the hope that means may be found to preserve the building intact. But if circumstances prevent this, that the church should, if possible, be re-erected upon a suitable urban site, stone by stone, and in any case that the fittings should be suitably rehoused in a building of the same character, where the whole of them could be brought together so as to preserve the unity of their design." The resolution would be sent in the form of a letter to the Ecclesiastical Commissioners.

Gift to the Library.

Mr. F. C. Penrose presented, on behalf of Dr. V. Waldstein, Volume I. of the "Argive Museum" to the library. This work is issued by the authority and under the auspices of the Archaeological Institute of America and the American School of Classical Studies at Athens, who share the financial responsibility of it. A second volume is to follow in about a month's time.

The President said he was sure it would be the desire of the members to pass a hearty vote of thanks to Dr. Waldstein (who was with them that evening) for the most interesting contribution to the library. When he told them that it was the result of ten years of work by Dr. Waldstein they could form some estimation of the value of its contents.

The motion was heartily agreed to.

The Ionic Volute.

Mr. Penrose then read a paper on the "Origin and Construction of the Ionic Volute," of which the following is an abstract:—

In opening his subject the author stated that several methods had been proposed for the construction of the Ionic volute by means of finding centres for quadrants of circles which may give some approximation to the appearance of the true figure of the Greek originals, none of them very successful. That of Goldman seemed to be the best, but it failed altogether to give the proper proportional expansion of the spaces between the lines, nor did the four jumps in each convolution at all represent the beauty of the continuous gradation of Greek originals. The origin of the volute, sought for in Assyria, Egypt, and elsewhere, the author derived from Greece itself, as the scheme he was about to explain enabled the exact figure of any true Greek example to be reproduced. In archaic Greek work, and particularly in the decorations of the Mycenaean period, one constantly found the form of scroll in which every convolution of the spiral followed the first at equal intervals. This decorative scroll had no doubt been formed mechanically, as could easily be done by unwinding a string from a cylinder, forming a figure known as the involute of the circle. The question presented itself, How could a spiral having the character of the ammonite be produced? If the operator drew upon wood—or some other suitable material—the involute scroll, such as he had been accustomed to, and by shallow carving or otherwise raised the edges a little so as to form a helix and allow a string to be wound round those edges, and then unwound over a flat surface having a marker at the extremity of the string, he would produce the expanding spiral he was in search of. It did not give correctly the figure of the ammonite,* but it had all the requisites

of proportional expansion and perfect variation of curvature at every point, and coincided perfectly with Greek volutes.

The author gave two examples from Ephesus—the first from the archaic Temple of Diana. In all later examples known to the author the two central convolutions of the spiral, or nearly so, were interrupted and concealed by the circle which formed the eye of the volute. In this case, however, the curve which would be evolved from the helix was allowed to extend from the central origin of the volute up to its junction with the abacus. By drawing a straight line through the central origin to the circumference on both sides, a calculation could be made to find a helix on the involute principle, and this, when worked out, would be found to agree not only with given points on the circumference, but to correspond with the inner convolutions also, and could therefore be extended to the whole of the volute. This correspondence clearly showed that the method of the involute spiral was that which was used by the architect employed by Croesus.

The volute of the later temple at Ephesus, the second example, had almost the same curvature, the only difference being in the surface moulding and the circular eye which occupied its centre. In the majority of the examples known to the author the eye of the volute was a separate piece from the main mass of the capital, and was formed by some kind of boss of marble or metal inserted into a circular hole prepared for it, centred very nearly on the place of the pivot of the helix, and always of sufficient diameter to receive it. Such an arrangement would have had obvious convenience for fixing the helix.

The volutes in all the examples in Asia Minor were probably described by means of helices similar to that mentioned above. But the Athenians demanded greater variety than that spiral so used could supply, and gave to their volutes additional expansion in the exterior convolution; still, however, working so by means of the involute form, but differently treated. This applies to the Propylaea, to the three orders of different size in the Erechtheion, and to the temple of Niké. It was also used in the temple on the Illyssus, recorded by Stuart, and in the provincial temple at Bassæ. With the exception of this variation in the exterior convolution in Athenian structures, the same general scheme seems to have been employed in all true Greek examples, and the only liberty of choice given to the designers lay in the proportioning of the width of the volute to the upper diameter of the column, and in that of the interval between the convolutions of the generating helix, in the size of the eye compared with that of the volute. This would have some effect upon the number of convolutions to be used, which vary in the cases the author had examined from four (that is, measured from the origin) at Priene, to two and a quarter in the case of the Erechtheion. The intervals of the helix would determine all other variations. The variations in the above-mentioned elements, as found in certain examples, were shown by the author in a table of calculations. The two different descriptions of volute he termed the Asiatic and the Attic.

The author next gave a description of the helix for describing the Greek volute, and detailed the method of its employment both in the Asiatic form and the Attic variation, illustrating by various diagrams and giving a table of calculated measurements. Mr. Penrose proved the accuracy of his method by showing that examples of volutes on the east portico of the Erechtheion and at the Propylaea, worked out in the way he had described and from data given by the table, were found to be in exact agreement with the records made by Stuart of the Erechtheion, and by Mr. T. J. Willson of the Propylaea.

Before concluding, the author gave an interesting description, illustrated by diagrams, of the helix (one from which a string may be unwound so as to produce the volute) employed by him in drawing the models exhibited, and suggested the adoption of a similar contrivance where a Greek volute had to be carved.

A Fragment of the Parthenon Frieze.

Dr. A. S. Murray, F.S.A., then read a short paper on "A Fragment of the Parthenon Frieze," of which the following is an abstract:—

Before dealing with the subject of the

lately recovered fragment of the Parthenon frieze, Dr. Murray mentioned another important find in the same neighbourhood. A year or more ago he received from a clergyman a copy of a Greek inscription on a piece of marble in a rockery in Essex. It turned out to be an inscription which had been missing since about 1771, in which year it was published in the "Archæologia of the Society of Antiquaries." The story was that Stuart, when in Athens preparing the drawings for his famous book, had picked up this inscribed piece of marble, and given it with some fragments of bas-reliefs to a ship captain to take to Smyrna, where he intended to get it on his way home. When, however, Stuart next saw the marble, it was in the hands of a Mr. Jones, of Finchley, who had received the inscription and the fragments of bas-reliefs from a captain in the Navy. How long the inscription remained at Finchley is not known, but just about then there was a well-known antiquary, Thos. Astle, much interested in ancient alphabets, and presumably the sort of person who would like to possess the beautifully inscribed stone. At all events, it was on an estate in Essex, once belonging to Thos. Astle, that the inscription had lately been recognised. The inscription is of no little historical interest, being part of a monument erected in Athens in honour of volunteers from Cleonæ who had fought on the side of the Athenians (457 B.C.) in the battle of Tanagra against the Lacedæmonians and Eubœans. Stuart states that he had found the inscription near what he calls the ruins of the Stoa Poecile, or Painted Porch. Some additional fragments have since been picked up in Athens. When the copy was sent Dr. Murray he noted that an important part of the inscription was still missing. Since then, however, a son of the present owner of the estate had found that part in digging round the rockery. Both pieces have now been moved into the house. The larger piece has a bleached appearance from long exposure to Essex weather, but the fragment lately dug up looks as if it might have been brought from Athens the other day. Two or three months ago the gardener, in digging beside the old rockery, came upon what has turned out to be a fragment of the Parthenon frieze. It was first identified as such by a young medical student, Mr. Aliston Glover, who had visited Athens and was familiar with the style of the sculpture. He called upon Dr. Murray with a photograph, which enabled them, together with the exact dimensions, to determine at once the slab in the Museum from which it had been broken off. Though found under the earth the fragment must have been long exposed to severe English weather. Down the face of the sculptured horseman the rain has driven furrows, which take away some of its charms. This fragment does not appear in any drawings made previous to Lord Elgin's time. It had fallen before then, most likely during the gunpowder explosion within the Parthenon in the seventeenth century. The want of any play between the slabs, owing to the excessively fine joints of the frieze, was sure to be a source of mischief should the building be shaken or subside in its foundations. This, no doubt, is the reason why so many of the corners of the frieze are wanting—possibly there may be some more of them in English gardens.

Considering the facts that Mr. Jones, of Finchley, possessed several fragments of bas-relief, as well as the inscription, and that Stuart had sent home some such fragments with it, Dr. Murray was inclined to think that this fragment of the frieze had reached Essex along with the Greek inscription, and had been sent home with it by Stuart. Thos. Astle was in his time a trustee of the British Museum. But that, Dr. Murray said, was in the pre-Elgin days, when the Towneley marbles were regarded by Dilettanti as the perfection of ancient sculpture. A fragment of the Parthenon frieze would have counted for very little then.

Dr. Murray showed a photograph of the slab to which the Essex fragment belonged, which represents a part of the cavalcade of young Athenians who rode in the Panathænic procession through the streets of Athens every fifth year. A photograph with the fragment added in its proper position, was also shown. In conclusion, Dr. Murray drew attention to some specially interesting details of this portion of the frieze, and to the skillful devices employed by the sculptor to avoid monotonous repetition and arrest the attention of the spectators.

* Formed on the principle of the equilateral spiral, which is drawn by the heliograph, an instrument exhibited by Mr. Penrose at the Great Exhibition of 1851.

* Illustrated in Dr. Murray's Paper, *Journal R.I.B.A.*, January 11, 1902.

Mr. H. H. Statham said he was glad to propose a vote of thanks to Mr. Penrose for his learned paper, but he thought they would almost have to wait until they had the whole paper before them in print, and the tables he had promised them, in order to follow it out. It was a very difficult thing to follow it in the first reading, but if, as he understood, Mr. Penrose had got for them a method of drawing a volute by continuous line instead of a succession of centres, then those who wished to draw volutes would have great reason to thank him. He remembered in his student days trying the different systems (four he believed there were) given in "Normand's Parallels," in which one took different centres for successive parts of the volute. It appeared to him, however, that they could never manage that way, without producing a broken-backed effect in the curves, and he could hardly believe that the Greek volute, with its pure continuous curves, could have been developed in that way. While he could not say he was quite able to follow up all Mr. Penrose's arguments, yet he understood that he recommended a system of unwinding from a central figure so as to get a continuous line, and it certainly appeared to him that was likely to be a much truer way of arriving at the volute than by having a succession of centres. At all events, he was sure they would give a hearty vote of thanks to Mr. Penrose for having dealt with such an important subject, and giving a paper which he thought would be even more valuable when printed and studied.

Dr. Waldstein expressed his cordial congratulation to Dr. Murray for the important and brilliant discovery which had been made, and congratulated the society that Dr. Murray had selected that occasion for making it public. They could all measure the importance of the find—not, as the chemist would say, quantitatively, but qualitatively, and although it was but a small fragment of one human figure with part of the head of a horse, relatively considered it was of the greatest importance. The supreme position which in all periods of art the Parthenon had held made this small fragment a more important and gratifying discovery to the museum and to the nation, than a discovery of vast buildings with shiploads of inferior decorative work. While congratulating Dr. Murray and the Museum on this important find, he would like to emphasise what he had said, that no doubt throughout this country in country houses and gardens there must be fragments of splendid works of Greek art, unknown to the possessors, which might increase and supplement the valuable possessions of the nation. Before sitting down he would like to express a further personal gratification, and would ask forgiveness if he went a little further afield into human psychology, and said it looked as if human beings were limited in their power of admiration and interest; as if there was a certain limit to their power of appreciation, and that if they drew on the one side they had to neglect a counter side. They could not apparently have two things in their head at the same time, and so he was always afraid of a certain neglect of studies and interests which may arise at one moment, because another subject for the time being claimed their just admiration. This applied to the studies which Dr. Murray and himself had at heart, viz., the study of Greek art and Greek archaeology. They were all gratified and filled with enthusiasm at the important discoveries which had recently been made with regard to prehistoric Greek archaeology, but it was right that they should remember that as regarded Greek antiquity, one of the chief claims of their interest in the earlier Greek civilisation was the fact that it lived by the Parthenon. He felt that the more at the present moment, because as a teacher in a university he found that psychological tendencies manifested themselves in various and most eccentric forms, and he had heard a pupil say there was nothing new to be found about the Parthenon. Well, Dr. Murray had shown that there was something new to be found, and that there was a field for study, not only now, but far into the future.

Professor Beresford Pite thought the Institute had special reason to congratulate itself on having a communication such as they had had that evening from Mr. Penrose. He thought the circumstance must be well nigh unique to find a savant fifty years after embarking on a subject which he demonstrated at the Exhibition of 1851, in that year of grace, 1902, returning with equal enthusiasm, if not with

increased enthusiasm to the eternal subject—of the one fountain of intellectual skill that existed on that acropolis. It was interesting to them as a body that the little excursion that evening had been not only conducted by Mr. Penrose, with his references to the whole series of Ionic capitals, but they were accompanied by Dr. Murray with that quaint humour which they invariably found seasoned his very learned communications, and with his exploration of the rockery in the Essex garden, and of the part of the frieze broken off by the careless gardener, only to be rediscovered and to form a charming addition to our national treasures. He was ignorant of the destination of the discovered portion, but he supposed it would be placed in the museum. With regard to Mr. Penrose's communication, he would like to express the hope that when they considered it in print they would find the subject not as complex as it appeared to be. Mr. Penrose let slip a remark—purposely, of course—that what was possible to a good Greek workman was possible to a good British workman, and what was possible to a British workman should be possible to a British architect. So when they sat down to consider that problem, with diagrams and tables before them, he hoped they would be able to get any volute which might be necessary. Dr. Murray had certainly succeeded with the skilled workmen he had trained in doing so. After all, those wonderful capitals were made by masons, and the old theory which used to be advanced in the past when Mr. Penrose had to champion the whole body of Greek art against the Gothic revival, that the Greek curves must have been drawn by freehand by some architect's pencil, had been exploded, and rightly so, and the theory to the opposite intent, that the architect's pencil had no business at all to enter into the construction of beautiful forms, and that they have to be formed from the mere wrist work of the mason's mallet and chisel, was also inapplicable to such a statement as Mr. Penrose had put before them. He thought they saw now the scientific basis upon which the simple string and reel acted, and the natural action of the reel and string served to produce this charming form, which was perpetuated, and would be perpetuated, in spite of Ruskin's criticism. It was very singular how much interest centred on a single form, and the persistence of this combination of horizontal curves upon the top of the column seemed to express what one might describe as the necessary connexion of idea in the capital. The mind seemed to desire some horizontal treatment before the weight of the entablature is carved on the column itself, and it was much more satisfactory and restful to the mind that rather than free and loose and accidental when in a carved capital. They found almost sensuous love of freedom in the delicate curves of the Corinthian column, but the Corinthian did not give the same satisfaction as those shown by Mr. Penrose, for the first time satisfactorily, he ventured to say, that night.

Mr. T. Blashill said that, although he could not throw further light on the subject, he would like to be permitted to recall an occasion forty-five years ago when Mr. Penrose in the Architectural Museum—in those days called the cockpit—gave an equally careful study, and an equally interesting lecture upon the cycloid curve. Since then Mr. Penrose had done a second life's work. While talking of rockeries, he recollected five or six years ago he brought there a piece of Egyptian carving. It was a hawk beautifully carved which was found by men working under his directions in a backyard in Brompton.

Mr. R. Phené Spiers remarked that in his student days in Paris they used to set out the curve on large scale in accordance with one of the systems in Normand's parallels, and as they were not always satisfied with the proportions, altered it by raising the outer curve in the way Mr. Penrose had referred to. On the one or two occasions he had had to draw it, he had adopted the same system, but he would have been glad to have found a more accurate one. Mr. Penrose had referred to searches in Assyria, Egypt, and elsewhere for the origin of the volute, and there were in the Palace of Xerxes Ionic capitals which were set vertically. The Persians might, after a campaign in Greece, have taken away some of the Greek capitals, and the artist, not understanding how they were used or what their purpose was, copied them and set them up

on end to decorate some of their columns. He did not think, therefore, that in Persia was to be found the origin of the capital, but he would like to know if any examination was made to see if there were any resemblance between the curves in the capitals of the Palace of Persopolis and those in the earlier Greek work.

The Chairman said they would all join the speakers in congratulating themselves upon having Mr. Penrose and Dr. Murray there that evening. They were both two of their oldest friends, and two of the friends they valued most. That Mr. Penrose should be able again to give them a paper on the Ionic volute must strike all of them, as modern architects, with a sense of feebleness and a sense of despair in their own work. That for over 2,000 years one small detail of Greek work should still excite the interest and the wonder of architects, must make them feel how far, how immeasurably distant, they were from the art which was carried out in those times. Another thing which he thought must also strike them was that the Greeks, in order to obtain the highest effect in their buildings, attained it to some extent by the application of scientific methods to building, and many of those refinements which added so much to the artistic quality of the building appeared to have been worked out upon scientific methods, and he thought that ought to show all architects in the present day that the artistic results in their buildings could not be gained so easily as they sometimes thought, but that they must call in to their assistance science, to refine and ennoble their work.

With regard to Dr. Murray's paper, he was sure they must all rejoice at the discovery of the smallest fragment of the frieze, and their satisfaction would be complete if Dr. Murray was able to tell them that that fragment was to be added to the large portions which were already in the British Museum. There could be no possible doubt that that was the only place where it could find a proper resting place, as to other gardens they all knew gardens in which were rockeries, and which had classical remains—generally, he was afraid, spurious; but as this Essex garden had turned out to have real significance, they hoped all those owners of classical rockeries would look about them with similar results. He asked them to pass a hearty vote of thanks to Mr. Penrose and Dr. Murray.

The vote having been heartily carried,

Mr. Penrose, in reply, said with regard to the observation made as to the volute being drawn by freehand drawing, it was impossible that, in so many different places and with so many different artists, that exactly the same form should have been arrived at by freehand drawing.

Dr. Murray also acknowledged the vote of thanks, and said that as to the destination of the fragment of the frieze, he believed it would come to the Museum, but he would rather not say whereabouts in Essex it was.

The Next Meeting.

The Chairman announced that a business meeting would be held on December 1 for the election of candidates. The Practice Standing Committee would be asked to make a communication to the meeting on the "Dilapidations" pamphlet shortly to be issued.

SOCIETY OF DESIGNERS.

On Tuesday evening Mr. Philip H. Newman (Vice-President) gave a lecture at Clifford's Inn, Fleet-street, E.C., before this Society, on "Paganry and Art, with Special Reference to the Element of Design."

Mr. Geo. C. Haité (President) was in the chair, and remarked that the present was an opportune time for such a lecture, in view of the experience they had lately had of street decoration.

Mr. Newman, in the course of a lengthy and most interesting address, said that paganry had always been linked with the expression by the people of natural, political, and civil fervour; and in alluding to art he meant that art was the manifestation and symbolisation of the highest ideals; the art which had created for us the greatest monuments of antiquity, and which had had a humanising influence on national temperament—art, in fine, which had contributed to civilisation as well as to joy in life. In all ages there was an underlying instinct for paganry, and the love of paganry was not extinct now, but had survived in the instincts of the people after thou-

sands of years. It was as much alive to-day as in the past, however contemptuously we may smile at a circus procession or a Lord Mayor's Show; for culture had never entirely superseded instinct in this matter. Mr. Newman proceeded to deal with the pageantry of the sixteenth and seventeenth centuries; with the processions, masques, and entertainments which were a necessary part of Royal progress in those periods, and pointed out how such pageants were associated with the greatest of artists. Reference, indeed, to all periods shows that artists have done much to comply with the demand for pageantry. As to the elements of pageantry they were simply splendour, continuance, and expectancy, but the sweetest of these was expectancy. The instinct of the people must be recognised and provided for, and it was the duty of the artists to see that the pageants were in good taste and of the noblest aim. Mr. Newman touched at some length on the relations of music and literature to pageantry, and also the interest of pageantry in the paintings of Lord Leighton and Sir John Millais, and particularly mentioned the "Angelus" of Millais to illustrate his point. Coming to pageants of the present time, he alluded to the Coronation procession, and held up to ridicule the street decorations. It was said there was no time in which to design; here and there was an instance of an artistic handling of things, but for the rest he supposed they must excuse it. They must, he supposed, excuse the miles of red cloth, and that arch which was half a birdcage and half a seed shop. They did, indeed, run a narrow escape of having had a handsome bridge, but it was an exception, for they found in London on the occasion of a great pageant a County Council provided with funds for everything except for making the streets worthy of the processions.

The Chairman in opening the general discussion ridiculed the Canadian arch erected for the Coronation procession, and suggested that in future they would find various big manufacturers erecting arches to advertise their products. He could decorate a room to make one sad or gay, and if he could do it in a room he could do it in a street. Too much dependence was placed upon the electric light for decorative purposes, and it had failed. He was convinced that instinct in art was generally right, and that people would know and appreciate when they saw the right thing.

Mr. Jackson thought the lecturer had applied an extended sense to the word pageantry which those present had not followed up, and he felt that to apply the word pageantry to all forms of art was a little metaphysical. With reference to Westminster Bridge, which the lecturer had alluded to as narrowly escaping artistic decoration, he would point out that this was the work not of the County Council but of the art students of South Kensington.

Mr. F. C. Tilney also considered that the lecturer had extended the scope of pageantry and art too widely, and failed to see evidence of pageantry in the "Angelus." With regard to the recent street decorations, he spoke with enthusiasm of the scheme of the Lombard street bankers in reproducing their old signs.

Mr. Newman said that pageantry and art had been associated from the very earliest times, and the dominant principle in ancient art was undoubtedly pageantry, and however subtle the trace may lie in such a work as Millais's "Angelus," he ventured to say it was still there, if it was not seen generally. But that pageantry existed in art in the earliest times he did not think any one who knew anything about Egyptian art, and Assyrian art, and Greek art, to mention alone the Parthenon frieze, would dispute for an instant. If any one did so dispute it, he could not contend with them, because they would be looking at art from totally different standpoints.

A vote of thanks to the lecturer concluded the proceedings.

POLICE BUILDINGS, SUNDERLAND.—The monthly meeting of the Sunderland Town Council was held on the 12th inst. Alderman Fairless moved the adoption of the Watch Committee's report, which recommended that the amended plans for the new police buildings, submitted by Messrs. W. & T. R. Milburn and Messrs. Wills & Anderson, be agreed to; that these firms be appointed architects for the scheme, and that Mr. J. E. Miller be appointed quantity surveyor, the quantities to be completed within three months from the date on which he received the plans. Mr. H. C. Lindsay seconded. The report was adopted.

ARCHITECTURAL SOCIETIES.

NORTHERN ARCHITECTURAL ASSOCIATION.—The opening meeting of the winter session of the Northern Architectural Association was held on the 12th inst. at 36, Northumberland-street, Newcastle. The President (Mr. Frank Caws) occupied the chair, and delivered his inaugural address. In the course of his remarks he said that their profession in this north-eastern district had not progressed at a rate at all commensurate with the great march of local industrial improvement. They heard in these days not infrequently allusions to the so-called "new architecture" by the "new architect," but they found those were mere expressions; they looked in vain for the realities. New trivialities, new vulgarities, new monstrosities, new strainings and overstrainings after originality offended their taste and pained their sense of fitness and propriety at every turn in their walks through our streets; but they looked in vain for any substantial proof or promise of real architectural improvement. It was a sad thought, if a true one, that the old-world architects were, and ever must, remain the record-breakers of the profession. To have that fact borne in continually on the mind by the evidence of the mighty and majestic works of the oldest masters was depressing and deadening in such a degree to the young architect whose brother was, say, a chemist or an electrician, full of keen expectation of surpassing tomorrow the marvels of yesterday, that it was, perhaps, no wonder if he did occasionally "chuck" his profession from a feeling that it was hopeless. There were young architects, and old ones too, who had never realised the difference between the imitations of progress which seemed to environ their own profession and the great scope of certain other professions which were apparently invested by a boundless sea of accessible new attainment. These architects might live and work content that the thing that hath been was the thing that shall be. Judging, however, by the fanatically ridiculous struggles for "something new" which many modern architects were making, they were by no means at rest within their professional limitations, and seemed crazed with the craving for they knew not what. It could not be denied that, with all its restlessness and pettiness and vain theatricality, our most modern architecture was a more or less faithful reflex of the character of our age and generation, and certainly if they might forecast the future from the past, one of the outlets for the development of "new" architecture (whether improved on or not was quite another matter) was in the adaptation of new designs to the spirit and taste and fashion of the day. While deference to the fashion of his time is obligatory on the architect who did not desire to become unpopular, yet there was a great distinction between the deference which was servile and that which was conciliatory; and no architect in following fashion should fail to use his own trained taste and judgment in accentuating what he knew was good and in minimising what he knew was bad in the type which he was affecting. Whether they liked it or not, undoubtedly the new architecture, such as it was, was being developed by the fashion of our day, and they must make the best they could of it. They had at their command new materials and methods and appliances, and if they made themselves thoroughly acquainted with their nature and possibilities, and quite proficient in their application, they would necessarily—though slowly and to a large extent unconsciously—be contributing to the formation of that truly new architecture which was destined to gladden the eyes of future generations. The Northern Architectural Association was not able to supply souls to those of them who had not got any, but it helped students and members to become masters of the instruments, so to speak, of their profession. The President proceeded to mention the advantages derived from membership of the Association, and commended the classes carried on at the Durham College of Science. If that Association, in its first function as a professional tribunal and in its second function as an architect's social centre, had achieved some measure of success, still more had it succeeded in fulfilling its third function as an educational agency. Proceeding, he remarked that the study of old works, both in books and buildings, not only informed the student of

facts, but created, as it were, both a mental soil and a mental atmosphere, rich enough and rare enough to produce new and beautiful growths which could not have taken root and found sustenance in the stormy and thorny ground of the uncultivated mind. Every beautiful building, whether old or new, was an educator. The sense of fitness and propriety generally accompanied, if it did not help to constitute, the sense of beauty, and the more they were driven by force of circumstances to regard fitness as the chief aim of all their designs, the more pleasing and satisfactory would be their outcome. He thought their profession had suffered from attaching too much importance to exterior elevational design and too little to internal design. From the very nature of the case, and especially from the play of light and shade, the interior of a building was usually much more interesting and much more capable of artistic and poetic treatment than the exterior, and it seemed a pity that architects should leave to the professional decorator so much of the internal treatment as should more properly be regarded as the chief artistic opportunity of the architect himself. Concluding, he said no matter what materials were placed at their disposal, they would never be able to do justice either to them or to themselves unless they made themselves thoroughly conversant with those great physical principles, which applied to all materials under the sun, and which application of which every structural material was made subservient to the architect's dream. Those principles were strict, straight, stern, and strong, and formed a backbone to any structural scheme to which the architect properly applied them. While they should lean hard on those principles, their imagination must not be neglected, for art as well as science claimed devotion. It might be that few succeeded throughout their professional career in preserving that true balance between science and art, between faithfulness to truth and the worship of beauty, which was characteristic of the genuine architect. To maintain that balance was a great struggle for even the strongest intellect and will; but it was the struggle to which their profession called them, and if they succeeded in it the greater was the glory that the strife was hard.—The Hon. Secretary (Mr. A. B. Plummer) read the award of the assessors (Messrs. F. Caws and R. Burns Dick) in connexion with the offer of prizes by the ex-President (Mr. W. Glover) for the best sets of testimonies of study drawings prepared for the R.I.B.A. Intermediate examination. The prizes were awarded to Mr. C. I. Greenhow, Newcastle, and Mr. W. A. Chamberlain, Tynemouth.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The Associate Section of this Association held their annual dinner at No. 129, Princes-street, on the 12th inst., when a party numbering over fifty assembled. Mr. A. Greig, architect, occupied the chair. In addition to the usual loyal toast, the following toasts were, among others, pledged, "The Architectural Profession," "The Arts and Crafts," "Our Brethren Abroad," and "The Surveyors." Mr. Greig, in the course of his reply to the toast of the profession, moved that a vote of congratulation be sent from those present, as representing the architectural students of Edinburgh, to Sir R. Rowand Anderson on the occasion of the honour recently conferred upon him by his Majesty the King. Mr. Greig pointed out that Dr. Anderson had been in recent years, and still remained, the leading spirit of a movement for the advancement of the education of the architectural student in Edinburgh. Mr. John Wilson seconded the motion.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The first ordinary monthly meeting for this session of the Sheffield Society of Architects and Surveyors was held in the Literary and Philosophical Society's Lecture Hall on the 13th inst., Mr. P. Marshall presiding. The President, in an inaugural address, referred to the proposed new building by-laws; the Corporation's schemes for artisans' dwellings at Wincobank and High Storr; and stated that the architects of the city looked forward with some curiosity and interest to their development, and the profit which the Corporation would make out of them.—Professor Anderson then gave an address on "Recent Discoveries in the Roman Forum." He said the discoveries of 1899, 1900, and 1901 had attracted universal interest. "They carry us back," he remarked, "to the infancy

of the city and appeal directly to our imagination. To see the Black Stone which was supposed to mark the empty tomb of Romulus, to stand by the little shrine of Juturna, mark the water of her spring trickling into the marble tank, and to see beside it the fragments of the statues of the Great Twin Brethren and their horses who came there to drink after the battle of Lake Regillus, brings us back to the days when we read of the Kings of Rome and learned Macaulay's Lays, and were told that the legends were mere fables, and had no connexion with history. The rough, rounded cone which marks the place where Caesar's body was burnt calls up association of another kind, and we think of Mark Antony and Shakespeare. Further on the church of Santa Maria Antiqua stands roofless, but with frescoes still fresh and much as they were when Pope Paul I. had them painted in the eighth century, to honour the saints who were then popular, many of whom are now forgotten. These are the most sensational finds, and have been described and illustrated in the daily papers. As yet, however, only a few preliminary accounts have been published, and it will be several years before a full and scientific record can appear. The mass of matter is enormous, and much careful piecing together and classification must precede publication." His object, Professor Anderson explained, was to give a very hurried sketch of the extent and nature of the work done, and to bring together the results in such a way that more detailed accounts might be intelligible. He had a number of snap-shots which he took in 1899 and 1901 which showed the progress of the work. With the aid of photographs and plans he hoped to make the nature of the newly-found monuments plain. At the same time, some of the most interesting objects had been held over by the Italian Government for publication, and it was not possible to buy photographs of them. The excavations might be divided under two heads—first, those on new ground; and, second, those where digging had been carried to a lower level on sites already cleared. The new patches attacked were the site of the Basilica Emilia on the north and the site of the church of Santa Maria Liberatrice, now demolished, on the south. The former was purchased with money provided by a generous Englishman, and the latter was bought by the Government from the nuns who owned the church. The excavations on the north had not been productive of any startling discoveries, chiefly owing to the fact that the place had been used as a quarry for building St. Peter's, but they were of great value from an archaeological point of view as enabling students to form a truer estimate of the limits of the Forum, and as providing a starting-point for further excavations in the direction of the great imperial Fora to the north. The excavations on the south had been sensational. The ground between the Forum and the Palatine had been cleared, and the shrine of Juturna and the tank built in later times to receive the waters of the spring, together with an old well with a marble top and a system of leaden piping, had been laid bare. The church of Santa Maria Antiqua had been thoroughly explored and freed from the rubbish of nearly a thousand years, and the framework of the temple of the deified Augustus which adjoins it shown in all its nakedness. The excavations on the ground already cleared by former workers had shown the existence of several, in some places at least five, strata below that where the work was broken off. "This," said the lecturer, "was largely due to the fact that Commendatore Boni is an engineer by profession, and does not hesitate to undertake work which his predecessors would have looked upon as either too sacrilegious or too hazardous to attempt. He made tunnels and underpinned structures which could not be removed, and, seizing on every blank space, drove shafts down to the virgin soil. He laid bare the whole of the complex drainage system, and incidentally discovered in the mud that blocked the older channels an immense number of objects of the greatest possible value, as affording a basis for dating the surrounding area. In one place a hoard of 397 gold coins in mint condition was discovered. He also laid bare the earlier roads of the Forum, and showed that the Via Sacra originally followed a different line. In connection with this work he found the famous Black Stone and determined the extent and direction of the Comitium. During the excavation a good deal of

constructive work was carried on. Columns were placed on the bases to which they belonged, and architectural fragments were collected and pieced together, making a study of the remains possible. Walls were patched so as to withstand the weather, and generally speaking the Forum was transformed into a show place where one can roam with a guide book and understand the remains without the assistance of an archaeologist. This policy has been much criticised, and many were shocked at the Director's scant respect for mediæval ruins and his readiness to reconstruct what he found, but nothing succeeds like success, and there could be no doubt about the success of Signor Boni. It might be interesting, added Professor Anderson, to remark that Signor Boni was befriended by Mr. Ruskin when he was young, and spoke with the greatest gratitude of the encouragement and inspiration that he received from him.—The lecture was illustrated by lantern slides, exhibited by Mr. J. Atkinson, of University College.—On the motion of the President, seconded by Mr. H. L. Paterson, a vote of thanks was accorded to Professor Anderson for his lecture.

MANCHESTER SOCIETY OF ARCHITECTS.—At the sessional papers meeting of this Society, held in the Boardroom of the Manchester Chamber of Commerce on the 13th inst., sixteen sets of drawings were on view, submitted by students in the competitions organised by the Society. The President, Mr. A. Darbyshire, read out the list of prize-winners as follows:—Sketches in connexion with the Society's summer visits to old buildings: the prize, Mr. Frank Dyer; second prize, Mr. H. B. Laycock. Measured drawings of old work: First prize, Mr. R. J. Vernon; second prize, Mr. G. S. Salomons. Essay on the Renaissance in England: prize, Mr. Spencer H. Oldham. Monthly classes of design (the subject being a row of eight small houses): first prize, Mr. Harold Hill; second prize, Mr. Frank Osler.

—Afterwards Mr. Halsey Ricardo read an interesting paper on "The Revival of Gothic Architecture," and afterwards illustrated the lecture by lantern views of buildings of the earlier period of revival, and also from designs by Pugin, Street, Butterfield, and Burges. Mr. Ricardo said mediæval architecture was the expression of a popular enthusiasm for building which went hand in hand with the piety of the people. It was popular and it was sincere. The architecture of the Renaissance was individualistic; it was not popular; it was infidel and insincere. Architecture became dependent upon great patrons, who supported it from without, when it had previously been inspired from within, and with this change all the arts became an inexplicable cult for the rich and the leisured; the craftsman only co-operated, in ignorance and without heart. Of the architect leaders of the Gothic revival Mr. Ricardo named Pugin, Street, Burges, and Butterfield. Before Pugin's time, broadly speaking, such Gothic architecture as was being produced was Gothic in seeming only. That the author of the Waverley Novels should inhabit a Gothic structure at Abbeysford was but natural and proper; nay, it was almost incumbent upon him, as well as consonant with his taste, and Mr. Blore, his architect, was ready to fall in with so amiable a whim. So various territorial magnates considered that it was due to their ancestry that they should be living in Middle Age castles, and therefore they transformed their Georgian dwellings into battlemented, machicolated imitations of the defences of the barons when war raged throughout the land. But with Pugin a deeper note was struck. For him the Middle Ages contained the true Gospel, the Roman Catholic religion, the true faith. He set himself to reproduce the conditions of past time, old methods of life, old methods of construction. He saw well enough that to effect this properly he must reproduce the mediæval workman, and so far as he was able, he established workshops and schools in which to train his men. To us now, with our extended sources of information, the learning of Pugin did not seem so colossal as it appeared to those of his own day, whilst the substitutes and imitations of the real effects that he was trying to reproduce abated in us something of our esteem for his sincerity. But through his work breathed a spirit of lofty piety that kindled and purified what he did. The work of an ardent, beautiful soul it stood—a possession to us, the record of the ferment and the passion of the mid-century, and made

valuable by the quantity of noble feeling it contained. Street was also passionately in earnest, but on him was more thrust the weight of modern conditions. The churches he built were for Reformed congregations, and though he and his school of thought tried to some considerable degree to ignore these reforms, yet there was much that had to be accepted. In William Burges they had another temperament, and in the main cast of it far more mediæval, and "there is a kind of sunny laugh in the buildings that grew up under his hand." Burges carries us back to the days of the "Decameron," and puts one amongst Boccaccio's audience. One was startled to find how vivid and real the dream is. Burges told us of doughty deeds and perils 'scaped, of damsels under enchantment, of wizards overthrown; we had "Ivanhoe" and "The Talisman" over again in terms of stone and painting. His last name in connexion with the Gothic revival was that of Butterfield, and it was his special and lasting merit that he was more than a revivalist architect. He studied the mediæval buildings with a closer and deeper analysis than Pugin, and with a greater reverence than Street, and set himself to build for the necessities and ritual of the present day, using the Gothic vocabulary as his mode of expression. The canons of taste, Mr. Ricardo said, in conclusion, were now clamouring for simplicity, showing how tired we had got of the trapping and upholstery of past styles, and how insufficient they were to hold our interest after their novelty had worn off. In this simplicity lay our hope that we might touch the heart of things, take our problems loyally and frankly, and try to work them out in common sense, using our knowledge of construction to further our powers of design, not to cramp them by enabling us to raise buildings of impossible appearance, and our knowledge of what had been done in past time to be our guiding spirit in respect to the aims, the methods, and the piety of the master builders—our forefathers.

LIVERPOOL ARCHITECTURAL SOCIETY.—A meeting of the members of this Society was held in the Law Library, Cook-street, on the 17th inst., when Mr. Otis D. Black read a paper on "A Holiday in Normandy." At the conclusion a vote of thanks was accorded Mr. Black. During the discussion which followed, suggestions were made that the Society should establish a travelling studentship and organise sketching parties. Mr. H. L. Beckwith, F.S.I., presided.

ARCHÆOLOGICAL SOCIETIES.

ROYAL ARCHÆOLOGICAL INSTITUTE.—At the general meeting of this Institute on the 5th inst., Sir Henry Howorth, President, in the chair, Mr. W. H. Knowles, F.S.A., read a paper on "Blanchland Abbey, Northumberland." The Premonstratensian abbey of St. Mary, Blanchland, lies in a secluded spot near the source of the river Derwent, which here divides the counties of Northumberland and Durham. The situation is yet a remote one, and must have been so to an unusual degree at the time of its foundation. The nearest railway stations are Hexham and Shortley Bridge, and are ten miles distant. The foundation was established at the instance of Walter de Bolben in 1165 for an abbot and ten brethren. The only other house of the order in Northumberland was Alnwick, a more important and a wealthier establishment. It was granted a few churches, all in the county of Northumberland, and was repeatedly plundered by the Scots; and a picturesque story is told of how the marauders, after they had failed to locate the house, were guided by the sound of the bells which the monks rang for joy at their supposed escape. In 1327 Edward III. made a visit on the occasion of his march from Durham against the Scots, who had burned the abbey. The remote location of the abbey (no other source of hospitality) caused it to be exempt from the dissolution of the lesser religious houses in 1536, and it survived till the great monasteries fell in 1539. Its value was returned at 40*l.* a year. No work as early as the foundation remains, nor is there any indication of a previous church. Indeed, the general custom of the Premonstratensian tends to preclude the supposition that the latter existed. There was a close parallel between the Premonstratensian canons and the Cistercian monks. Both were reformers, and established themselves in protest against the laxity of their order, the Augustinian canons in the one case

d the Benedictine monks in the other; nce the sites of their houses were generally w, and they did not absorb existing parish urches, as was common with the parent ders. The earliest work is in the choir; and of the first decade of the thirteenth century. is plain, bold, and characteristic of north- y work. So far as the remains show, the church consisted of a long aisleless choir d nave, without the intervention of a dividing h; a north transept, with an eastern aisle; d a tower at the north end of the north nsept. The tower formed the entrance to e church, and is of small dimensions, but eedingly massive construction, and was, no ight, intended to be used for defensive ropses, as were many church towers Northumberland and Cumberland. The ister garth is on the south-west side of e church, but only the western range of the ustral buildings remain, and the gatehouse ll further west. The whole has suffered ch from rebuilding, and the domestic ildings have been repeatedly altered and upied by the Radcliffes, Forsters, and rd Crewes. To the latter (a former Bishop Durham) the present fragment of the urch owes its existence. He, in 1752, ained the eastern portion, and then roided Blanchland with a habitable church, hich continues to this day as the parish urch. The western range of the cloister is w adapted to the purposes of an inn, under e sign of "The Lord Crewe Arms."—Mr. illip M. Johnston read a paper upon e late twelfth century paintings recently covered in the Church of All Saints, Claver- y, Shropshire. The church, which lies about en miles eastward of Bridgnorth, owes its enation or rebuilding to Earl Roger de ontgomery, who was Constable of the Castle r Bridgnorth. He commanded the mercenaries e Conqueror's army at Senlac, and was warded with large estates in Shropshire and er counties. It is recorded that he and his ountess built a church in Quatford in honour ur Lord Jesus Christ and St. Mary Magdalen d all the Saints of God, and that they enowed their foundation of six canons with rtain lands and churches—Claverley Church ong others—the Vicar of Claverley being ointed Dean of the Chapter. Some traces e eleventh century church are to be seen walls and stringcourses in the interior of e nave. It was an aisleless building, probably rminating in an apse. An aisle on the north e nave and a tower on its south side were ided at about 1140 and 1170 respectively, hile the south aisle, the choir, and its chapels d other features belong to various dates om the thirteenth to the fifteenth centuries. e paintings which formed the subject of is paper were brought to light during the storation in the early part of the present ear. They are of unique interest on account eir exceptionally early date (c. 1170), and e principal subject represented. This is ething more nor less than an incident in the attle of Senlac. Parts of the same scheme of aintings occur on the internal walls of the nder and round the pointed arch by which it pens to the nave; but the most prominent orion is a strip, about 40 ft. long by 5 ft. road, above the north arch of the nave. On his are depicted thirteen horses and their ders, engaged for the most part *vis-à-vis* a pairs, some armed with swords, but the reater part with lances. Their horses are oloured red, yellow, pink, and white with reen dappling. The costumes of the figures resent a general resemblance to those of the ayeux tapestry, and, allowing for the interval f time between the two works, they are e remarkably alike in treatment. The knights wear masled armour, similar to that which pears, with other varieties, in the tapestry. Their mail shirts are combined with leg- overings as far as to the knee, and leggings of similar character appear below. Over their armure they have surcoats of the kind that ame into fashion in the latter part of the eelfth century, and they mostly wear the lat-topped helmet with barred and grated vizor hat we find on the seals of Richard I. Another ark of date appears in the kite-shaped shields of the modified form in use in the second half of the twelfth century; while the horse- rappings and saddles of quilted leather all point to the same period. At intervals between the combatants are conventional trees, curiously eminiscent of those in the tapestry. In the centre of this strip a knight is shown mborsing his opponent, the latter being repre-

sented as a gigantic figure tumbling on his head, with his legs in the air. This incident, evidently intended as the *motif* of the painting, suggested to the Vicar of Claverley (Rev. T. W. Harvey) a clue to the meaning of the whole, viz., that the painting is a pictorial representa- tion of the personal encounter recorded in the *Roman de Rou* between Roger de Mont- gomery and a gigantic Englishman, captain of 100 men. If this be the true explanation of this remarkable painting it possesses an interest that can only be described as unique. To account for its existence upon the walls of this church it must be remembered that Earl Roger was the builder of the church and the founder of the Chapter of Canons associated with it; and also that by the ruling caste and their clergy the Norman Conquest had been invested with a semi-religious halo; it had not only been solemnly blessed by the Pope, but had received the sanction of success. The other paintings in the spandrels of the arcade and elsewhere are of a more ordinary character—incidents in the lives of saints, the torments of hell and figures of the Seraphim, &c. The borderings throughout are of a very elaborate character, red, yellow, and pink being the colours principally used. Mr. Johnston, who exhibited full size cartoons of the principal subject, coloured to represent the original, described the steps that had been taken for the preservation of the

	Quantity tendered for.	Delivered alongside jetty.		Delivered alongside jetty, discharged, and unloaded into stores.	
		Barking.	Crossness.	Barking.	Crossness.
		Per ton.	Per ton.	Per ton.	Per ton.
		s. d.	s. d.	s. d.	s. d.
W. Fletcher	8,000	12 11	12 11	14 6	14 6
Henri Pelgrims	22,800	13 5	13 5	14 11	14 11
Formby's Cement Works Co., Ltd.	2,000	14 5	14 5	—	—
	3,000	—	—	—	—
G. Albrecht	22,800	14 5	14 5	15 11	15 11
L. Sommerfeld	22,800	14 8	14 8	16 2	16 2
C. Christopherson & Co.	5,000	—	15 6	—	—
	8,000	—	14 6	—	16 0
The Associated Portland Cement Manu- facturers (1900), Ltd.	22,800	15 2	15 2	16 8	16 8
	14,800	15 6	—	17 0	—
L. Sommerfeld	22,800	16 6	16 6	18 0	18 0
J. Kets & Son	5,700	23 0	23 0	—	—

paintings, and mentioned that he was prepar- ing a careful copy, to be mounted upon a roller and deposited in some accessible place for reference.—Mr. W. H. St. John Hope, Mr. Keyser, and Mr. Emanuel Green took part in the discussion that followed.

THE LONDON COUNTY COUNCIL.
THE usual weekly meeting of this Council was held on Tuesday afternoon in the County Hall, Spring-gardens, Sir J. McDougall, Chair- man, presiding.
LOANS.—On the recommendation of the Finance Committee, it was agreed to lend the Woolwich Borough Council £3,200, for site for new offices; Stepney Borough Council, £7,050, for electric lighting and meters; Ken- sington Borough Council, £6,600, for paving works and 1,900, for underground conve- niences; Shoreditch Borough Council, £5,790, for the purposes of the Baths and Wash-houses Act; Hammersmith Guardians, £2,000, for poor-law purposes; and Woolwich Borough Council, £2,300, for works at public baths.
The Docks.—Mr. Cornwall, in reply to a question by Mr. Wiles, stated that a commu- nication had been received from the Board of Trade, as follows:—"Dear Sir,—I am desired by Mr. Balfour to state that the Secretary of the Board of Trade has laid before him your letter of the 11th inst., enclosing the Report of the Rivers Committee of the London County Council. As regards the request that he should receive a deputation from the Council to urge the great necessity of legislation being pro- moted in the next Session of Parliament for the reform of the administration of the Port of London, I am desired to say that Mr. Balfour proposes to introduce a Bill on the subject next session, and that, in these circumstances, he does not think it necessary to trouble a depu- tation to wait upon him." He thought that was a very satisfactory reply.

Fulham Improvement.—The Improvements Committee submitted an estimate of £120,226, in respect of the widening of Fulham Palace- road, High-street, Fulham, and Church-street. The improvement is being undertaken with a view to tramways being constructed by the Council along the thoroughfares in question, and the Committee pointed out that the early completion of the street improvement would greatly facilitate the operations of the High- ways Committee in connexion with the tram- ways. The net cost of the improvements, after deducting recoupment, is estimated at £92,602, one third of which will be contributed by the Fulham Borough Council, while one-third will be paid out of the Council's tramways account, and the remaining third out of the county rate. The recommendation of the Committee was adopted, and it was also agreed to expend £4,810, on the widening of Queen-street, Ham- mersmith, in connexion with the same im- provement.
Foreign Tenders.—The Main Drainage Com- mittee reported as follows:—
"On October 14 the Council referred to us nine tenders for the supply and delivery of lime required for the chemical treatment of sewage at the Barking and Crossness outfall works. The total quantity, for the supply of which tenders were invited by advertisement, amounts to 22,800 tons, viz., 14,800 tons for Barking and 8,000 tons for Crossness, and the quotations submitted are as follows:—

	Quantity tendered for.	Delivered alongside jetty.		Delivered alongside jetty, discharged, and unloaded into stores.	
		Barking.	Crossness.	Barking.	Crossness.
		Per ton.	Per ton.	Per ton.	Per ton.
		s. d.	s. d.	s. d.	s. d.
W. Fletcher	8,000	12 11	12 11	14 6	14 6
Henri Pelgrims	22,800	13 5	13 5	14 11	14 11
Formby's Cement Works Co., Ltd.	2,000	14 5	14 5	—	—
	3,000	—	—	—	—
G. Albrecht	22,800	14 5	14 5	15 11	15 11
L. Sommerfeld	22,800	14 8	14 8	16 2	16 2
C. Christopherson & Co.	5,000	—	15 6	—	—
	8,000	—	14 6	—	16 0
The Associated Portland Cement Manu- facturers (1900), Ltd.	22,800	15 2	15 2	16 8	16 8
	14,800	15 6	—	17 0	—
L. Sommerfeld	22,800	16 6	16 6	18 0	18 0
J. Kets & Son	5,700	23 0	23 0	—	—

It will be observed that the lowest tenderer, Mr. Fletcher, submits a quotation for the supply of 8,000 tons only, and that he is prepared to make deliveries at the Barking or Crossness outfall works at the option of the Council. The quantity tendered for by him is, however, the same as that actually re- quired at Crossness, and we are therefore of opinion that his tender should be accepted for that station only. As regards obtaining a supply for the Barking outfall, we do not see our way to advise the Council to accept the tender of Mr. Pelgrims, and it will be seen that the next lowest tenders, viz., Formby's Cement Works Company, Limited, only quote for a small quantity equivalent to a barge load per week, and do not offer to discharge the lime into store. We are therefore obliged to pass on to the next lowest tender, viz., that of Mr. Albrecht, and, after having carefully considered all the cir- cumstances, we think that his offer should be accepted. The cost of the material is covered by the pro- vision made in the estimates for the current financial year in respect of chemicals required at both stations, and we recommend—(a) That the tender of Mr. W. Fletcher for the supply and delivery into stores at the Crossness outfall of 8,000 tons of lime at 14s. 6d. per ton be accepted; that the solicitor be instructed to prepare the contract; and that the seal of the Council be affixed to the contract when ready. (b) That the tender of Mr. G. Albrecht for the supply and delivery into stores at the Barking outfall of 14,800 tons of lime at 15s. 11d. per ton be accepted; that the solicitor be instructed to prepare the contract; and that the seal of the Council be affixed to the contract when ready." Mr. Gosling moved that the recommenda- tion be referred back, and argued that the Committee ought to be satisfied with the con- ditions of labour obtaining in the works of foreign manufacturers. That, he contended, was not really done at present. Mr. Cousins, in seconding the amendment, said it was curious that over and over again they had to rise up in the Council to protect the interests of British trade, when the Radical majority had pretended to be the friend of labour, by securing that trade-union rates should obtain in all contracts in which they were concerned. Yet having enforced these rates

which meant an increased price of labour to British firms, they gave contracts to foreign firms, who, by paying lower rates of wages, were able to cut out the British manufacturer.

Mr. Ward said the Belgian line had proved very satisfactory, and he considered they ought to stick to their free trade principles.

Sir F. L. Robinson thought they had to consider the effect their policy might have upon the districts where lime was manufactured. By sending away contracts they might beggar people and cause them to come upon the rates.

Colonel Rotton remarked that they were all free-traders in theory, but practically the Council was a protectionist body. It protected the workman against the employer, but now they proposed to handicap the employer and also the employee by putting the former under such conditions that he was obliged to charge a little more than the foreigner.

Mr. Torrance hoped the Council would stick to the principle of accepting the lowest tender, irrespective of whether it was British or foreign.

Mr. Goodman pointed out that both parties signed exactly the same agreement as to wages and hours of labour. He was afraid that if they refused the present tender, they would not get fresh firms to tender.

Upon a division the amendment was negatived by 53 votes to 44, and the recommendation agreed to.

The View from Richmond Hill.—On the report of the Parks Committee,

Mr. Sankey inquired as to the negotiations between the Council and Sir Whittaker Ellis, and as to his promise not to build on his land so as to spoil the Marble Hall estate secured by the Council.

Mr. Piggo, Chairman of the Committee, said he was sorry Sir Whittaker Ellis did not take the matter so seriously as the Committee felt he should. He wrote a letter recently in which he referred to the Committee's communication as "amusing." However, it could only be said at the present time that it was a matter of negotiation.

Tramway Proposals Abandoned.—The Council agreed to a recommendation by the Highways Committee that, in consequence of the consent of the local authorities not being obtainable, the Council should not apply for powers to carry out certain tramway extensions affecting Edgware-road, Shepherd's Bush-road, New Cross-road, and Tooting-broadway.

Improvements.—On the recommendation of the Improvements Committee it was agreed:—

"That the working drawings, specification, and estimate of the cost (£5,800) of the paving and other works in connexion with the widening of Brixton-road, between Cranmer-road and Primrose-road, be approved and referred to the Works Committee, with a view to the work being carried out without the intervention of a contractor.

That a payment be made to the Council of the Metropolitan Borough of St. Stephen of a sum of 5,000, on account of the contribution (£3,260) promised by the Council on March 26, 1901, towards the cost of widening Narrow-street between the Barley Mow public-house and Three Colts-street, and of Three Colts-street at No. 107.

That a payment be made to the Council of the Metropolitan Borough of Chelsea of a sum of 3,500, on account of the contribution (£4,400) promised by the Council on August 1, 1899, towards the cost of the widening of Cheyne-walk."

Theatres, &c.—The following applications were agreed to:—

The Cabin, Nos. 352 and 353, Strand, W.C., submitted by Mr. J. Murray.

Arranging seating at Hackney Public Baths, Lower Clapton-road, submitted by Mr. N. Scorgie for the Borough Council of Hackney.

Alterations of King's Theatre, Hammersmith, submitted by Mr. W. G. R. Sprague.

Dressing-room accommodation, London Hippodrome, submitted by Mr. F. Matcham for Moss's Empire, Ltd.

The Council adjourned soon after seven o'clock.

THE STORS CASTLE ESTATE, ROXBURGHSHIRE.—The War Office are about to erect a large military camp, with barracks and other buildings, on the Stors Castle estate, the ancient border home of the Elliots, in Teviotdale, and extending over some 10,000 acres. Negotiations are also opened for the additional purchase of about 15,000 acres in that district, belonging to the Duke of Buccleuch, and comprising Teviothead and Linhope farms. The whole district is a typical portion of the Lowland hills country, with its "burns," low hills, and "hopes" or homesteads; southwards lies Liddesdale, enshrined by Scott in "Guy Mannering."

METROPOLITAN ASYLUMS BOARD.

The fortnightly meeting of this Board was held on Saturday, at the Board's Offices, Thames Embankment, Sir R. M. Hensley presiding.

The plans prepared by the Engineer for the erection of new pier-head buildings and for the widening of the pier at Long Reach were adopted and ordered to be forwarded to the Local Government Board for their sanction and seal. The Engineer estimated the cost at 2,755*l*.

Tenders having been invited by the Works Committee for the erection of the proposed new isolation hospital at Leavesden Asylum, the committee now recommended—and the Board agreed—the acceptance of the tender of G. Wiggs & Co., of Watford, in 2,189*l*. The other tenders were as follows:—

Chas. Brightman, Watford, 2,200*l*.; F. Dupont & Co., Watford, 2,234*l*.; General Builders, Watford, 2,234*l*.; E. H. Cripps, Kennington-road, 2,249*l*. 5*s*. 10*d*.; G. & J. Waterman, Watford, 2,250*l*.; Honan & Son, Tring, 2,253*l*.; Thos. Cole, Barnsbury, 2,283*l*.; Tyler & White, Watford, 2,283*l*. 2*s*. 6*d*.; Clark Bros., Watford, 2,291*l*.; Robert L. Tonge, Watford, 2,300*l*.; Henry Brown, Watford, 2,323*l*.; Miskin & Sons, St. Albans, 2,300*l*.; Kellett & Sons, Ltd., Willesden, 2,360*l*. 7*s*. 11*d*.; Edwin Wall, Tooting, 2,388*l*.; Gardner & Hazell, Islington, 2,390*l*.; Henry Martin, Northampton, 2,447*l*.; A. Fairhead, Walthamton, 2,470*l*. 4*s*. 3*d*.; J. & M. Patrick, Wandsworth, 2,531*l*.; J. C. Bowyer, Upper Norwood, 2,570*l*.; and Thos. Boyce, Bloomsbury, 3,089*l*.

The Works Committee presented a long report on certain defects in the South Eastern Hospital, and the proposals for remedying the same. Messrs. T. W. Aldwinckle & Son, in their report to the Board in November last year, stated that the alterations they desired to see effected with a view to remedying the grave inadequacy of the administrative and staff accommodation, were as follows:—

"(i) The present temporary wards should be made into permanent buildings by filling in the spaces, now constructed of timber and corrugated iron, with brickwork, and by carrying out other minor alterations; (ii) the present wooden isolation building should be removed and a permanent brick structure erected; (iii) the present isolation ward (No. 20) and mortuary should be pulled down, and an additional block for the accommodation of the nursing staff erected on the site; (iv) the administrative block should be either remodelled or rebuilt, so as to provide (a) better accommodation for the steward's stores and offices; (b) a larger kitchen, scullery, and larder; (c) a larger dispensary and stores; and (d) accommodation for the female domestic staff, thus doing away with the necessity, which at present exists, for their having to sleep in the small rooms over the ward kitchens; (v) the receiving rooms and visitors' rooms should be pulled down and rebuilt, and a waiting-room for relatives of dispensary patients should be provided. In their Report of August last Messrs. Aldwinckle & Son set out at length their proposals (a) for converting the twelve present temporary wards on the block plan into permanent ones; (b) for demolishing the existing timber-built isolation wards Nos. 20 and 21, and erecting in their stead two permanent two-story blocks containing accommodation for twenty-four patients; (c) for the erection of a new home for the assistant nurses; (d) for remodelling the administrative block, and for extending and rearranging the medical superintendent's house; and (e) for the rearrangement and enlargement of the receiving-rooms. Messrs. Aldwinckle's approximate estimate for carrying out the above work was 20,000*l*. The Committee continued:—In considering the above proposals we are confronted with an initial difficulty. We are of opinion that, both as regards its situation in the centre of one of the most densely-populated districts in the metropolis, and its position in relation to the other hospitals of the Board, the South Eastern Hospital is the one acute fever hospital whose capacity and usefulness for isolation purposes the managers cannot afford to decrease, and we consider it highly improbable that either they or the Local Government Board would countenance a scheme for the reconstruction of this hospital, which, whilst it would involve the expenditure of a relatively large sum of money, would reduce the already inadequate accommodation thereto. It will be remembered that the site of this hospital is very restricted, there being no part thereof on which a new building of any magnitude could possibly be erected. The only means, therefore, of increasing the number of beds appeared to us to be by converting some of the existing wards into two-story buildings. Messrs. Aldwinckle were accordingly instructed to submit an alternative scheme which, while retaining and embodying the main features of the scheme suggested by the Hospitals Committee, would increase the number

of beds at the hospital, and at the same time provide for a corresponding increase in the number of the nursing staff which the provision of the additional beds would entail. From the further report (October 13, 1902) which has since been received from Messrs. Aldwinckle, it will be seen that by demolishing the four outside or corner wards, viz. Nos. 1, 7, 9 and 13, containing accommodation for ninety-six beds, and erecting in their stead four new two-story pavilions, each to accommodate fifty patients, and by making the necessary provision, in the manner set forth in their report for the additional nurses and ward-maids which the increased accommodation will necessitate, it will be possible instead of decreasing the accommodation for patients by seven beds to increase the same to 104 beds, for an additional expenditure of 30,000*l*. over and above that proposed by the architects in their report of August 26 last, or 60,000*l*. in all. We have given due consideration to the alternative schemes submitted by the architects, and while we unhesitatingly give preference to the more recent scheme detailed in their report of October 13, we are not prepared to advise the managers to adopt such scheme in its entirety, as we are of opinion that the time has not yet arrived when the re-modelling of the remaining eight one-story pavilions (which is estimated by the architects to cost 20,000*l*) should be carried out. We accordingly recommend that the managers be prepared by Messrs. T. W. Aldwinckle & Son for the remodelling of an administrative block, the erection of new staff quarters, receiving-rooms and isolation wards, and four new two-story pavilions at the South Eastern Hospital, at an estimated cost of 70,000*l*, be approved, and the plans relating thereto forwarded to the Local Government Board for their formal sanction under seal."

On the motion of Mr. Helby the recommendation was adopted.

Correspondence.

THE PUBLIC HEALTH ACTS.

Sir,—In your impression of September 2 last you were good enough to publish a letter of myself upon this subject, and, since that date, the Liverpool Architectural Society has arranged for a discussion shortly to take place on the Liverpool Building By-laws, to be opened by Mr. William Goldstraw, the Liverpool Corporation Building Surveyor, and under the chairmanship of Mr. Councillor W. H. Willink. As you are no doubt aware, several letters have recently appeared in the *Times* denouncing the bearing of the Public Health Acts upon wooden construction for labourers' dwellings in country districts, and, in one way and another, there seems to be at last some response to the long-continued efforts of your own journal, and of others, to arouse public opinion regarding "the necessity for the reconstruction and consolidation of the Public Health Acts," to quote the title of Mr. Wells's recent paper.

If any of your readers would favour me with instances of absurdities and hardships which the Building By-laws, not only in Liverpool but elsewhere, I should be very glad to receive them for use, if possible, at the forthcoming discussion. If in brief tabulated form it would be convenient, such as the following:—

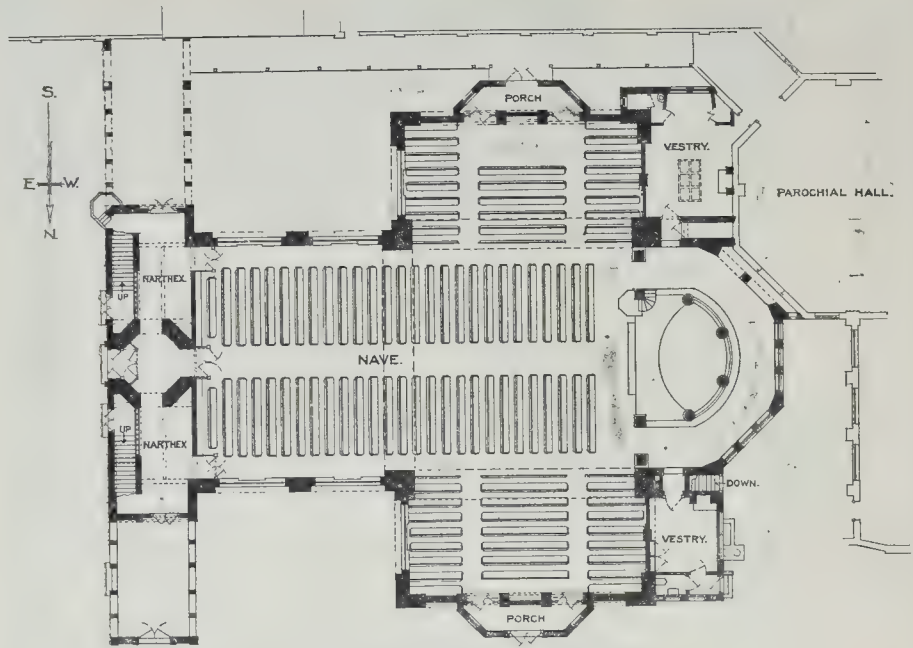
Liverpool. By-law LV (4). Such plans and sections shall be neatly drawn in ink upon drawing paper or tracing cloth, and shall be properly coloured and figured.

Although no quality of drawing paper nor kind of ink is defined, the Corporation Building Surveyor refuses electric light-produced drawings, and requires them drawn by hand; but other departments of the Corporation accept the former kind of drawings, and the Corporation, as I am informed, uses the electric-light machine for producing its own drawings. The unnecessary expense thus thrown upon building-owners is obvious.

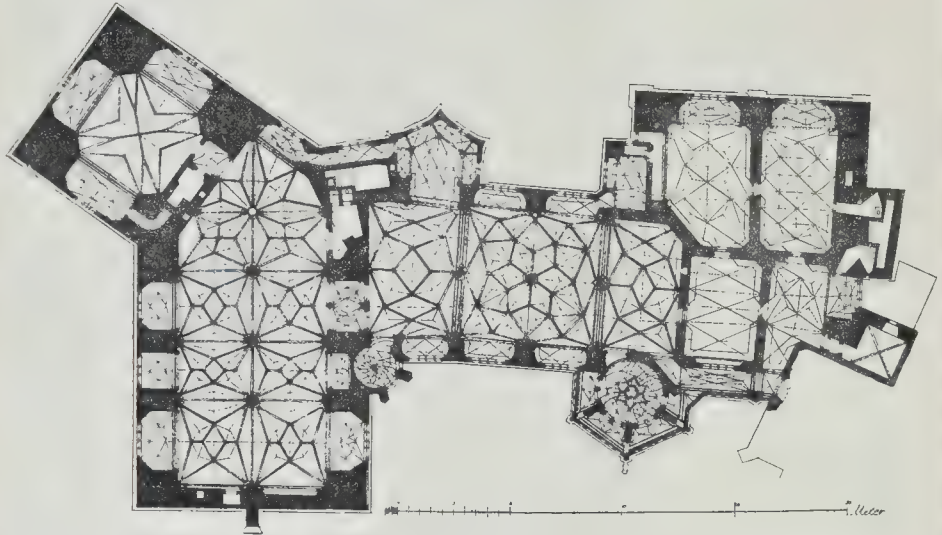
Liverpool. By-law LXXXIV. (VIII).

Water pipes, small architectural dressings, and sliding doors or gates may project 3 in. and no more in any street having an available width of not more than 30 ft.; and in any street having an available width of more than

The object of the by-law is, presumably, to avoid obstruction to the footway. Improved construction is not considered, and water pipes which project more than 4 in. have been condemned for removal, although 13 ft. above the footwalk and above a cornice (sanctioned by



Christ Church, Brixton. Plan.



The Schloss-Hof, Meissen. Plan of First Floor.

Illustrations.

CHRIST CHURCH, NORTH BRINGTON.
 THE drawing illustrated herewith is from a perspective view exhibited in this year's Royal Academy. The church is now nearly completed, and will be consecrated in the course of next month.

A detailed description of the building appeared in this journal on the occasion of the visit of the Architectural Association in February last; but it may be repeated that accommodation is provided for 1,200 worshippers, and that Mr. A. A. Webber, of London, is the builder, and the total cost is about 17,000l.

BERESFORD PITE.

DISTRICT OFFICES, HAMILTON.

THIS building has lately been erected for the County Council of Lanark, to meet the needs of the Middle Ward of the county. The site is adjoining the old County Buildings and court-houses, with which the new offices are designed to correspond, but in the new work the details are treated throughout more freely.

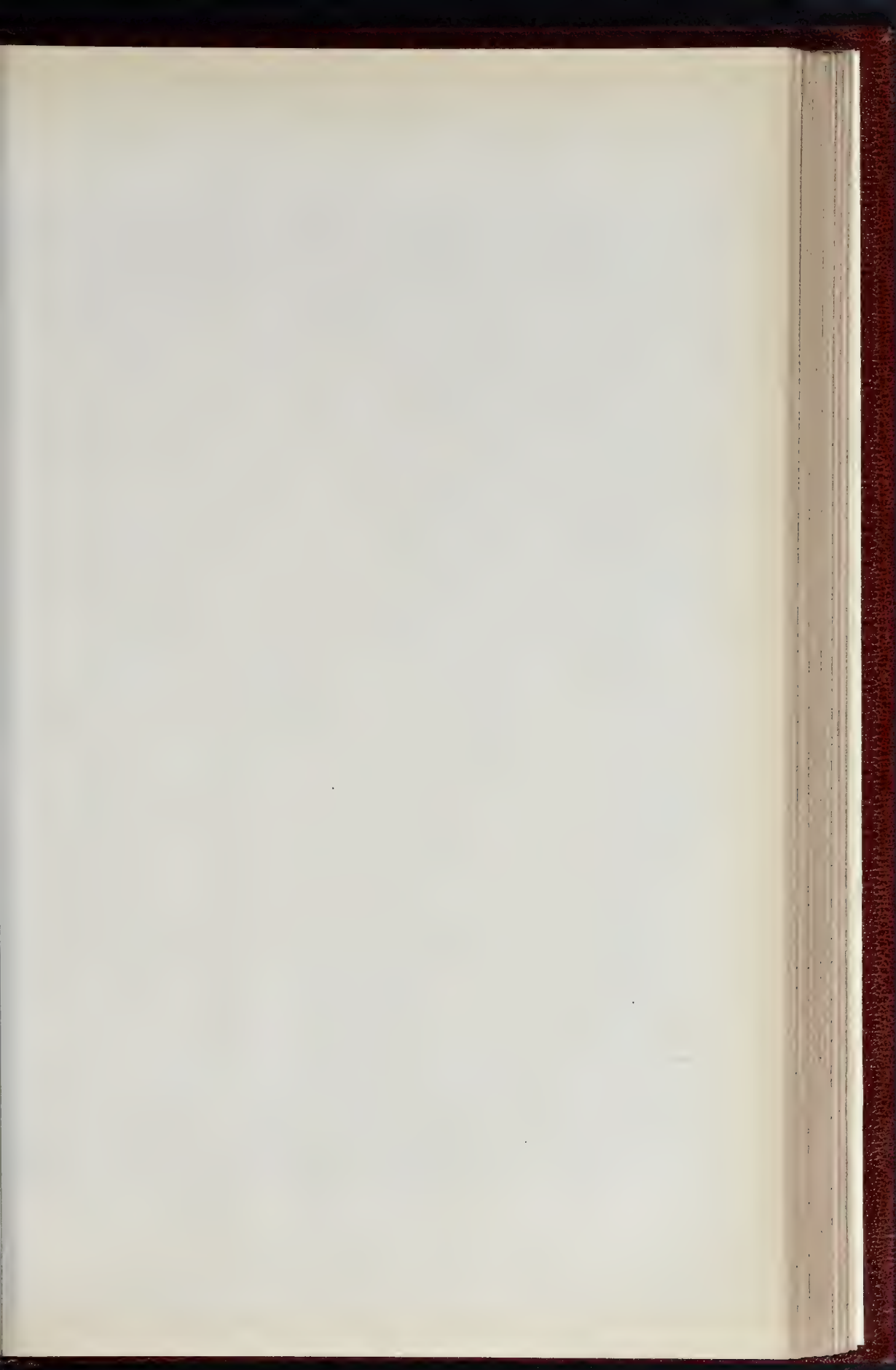
The walls of this building are faced with a cream-coloured sandstone from Auchinheath quarry. The interior finishings are executed in oak, and the furniture throughout the several apartments has been executed to the designs of the architect, Mr. Alexander Cullen, of Hamilton.

A drawing of the main staircase is added.

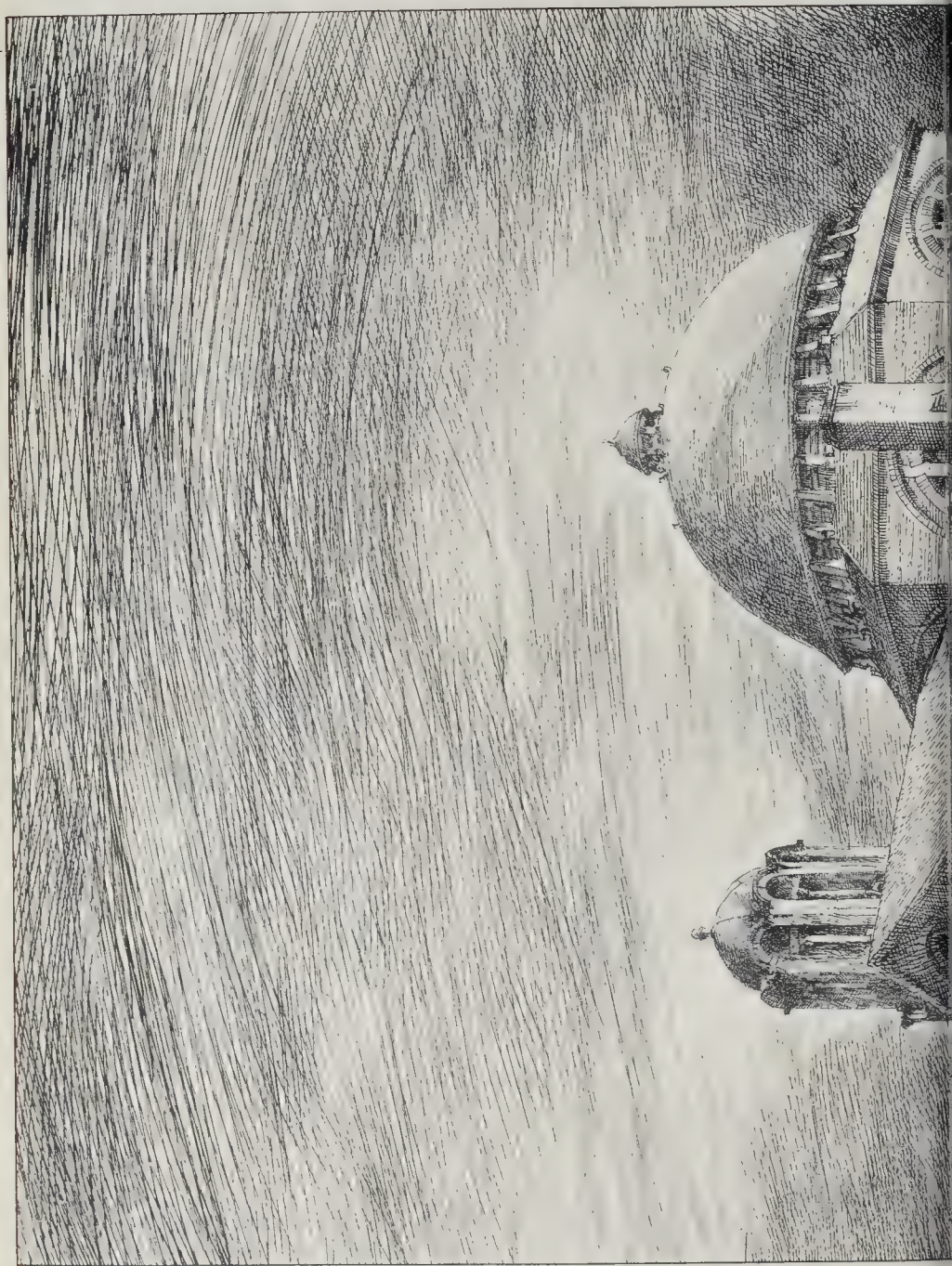
The walls of the stair and balustrade are built entirely of stone; the friezes on the ceiling are of plaster.

The total cost of the building was 24,000l.

The contractors were:—Mason, Messrs. Robert Aitkinhead & Sons, Blantyre; joiners, Messrs. Geo. Ferguson & Sons, Glasgow; plumbers, Messrs. Wm. Mitchell, Hamilton; slater, Mr. John Bertram, Strathaven; plasterer, Mr. John McKenzie, Glasgow; tiles, Mr. Thomas Main, Glasgow; painter, Mr. Alex. Kemp, Motherwell; heating, Messrs. Jas. Cormack & Sons, Glasgow; electric lighting and telephones, Messrs. McAulay, Clark, & McLaren, Glasgow; furniture, Messrs. Montgomery Bros. & McLennan, Glasgow. Mr. John Tulloch acted as clerk of works.

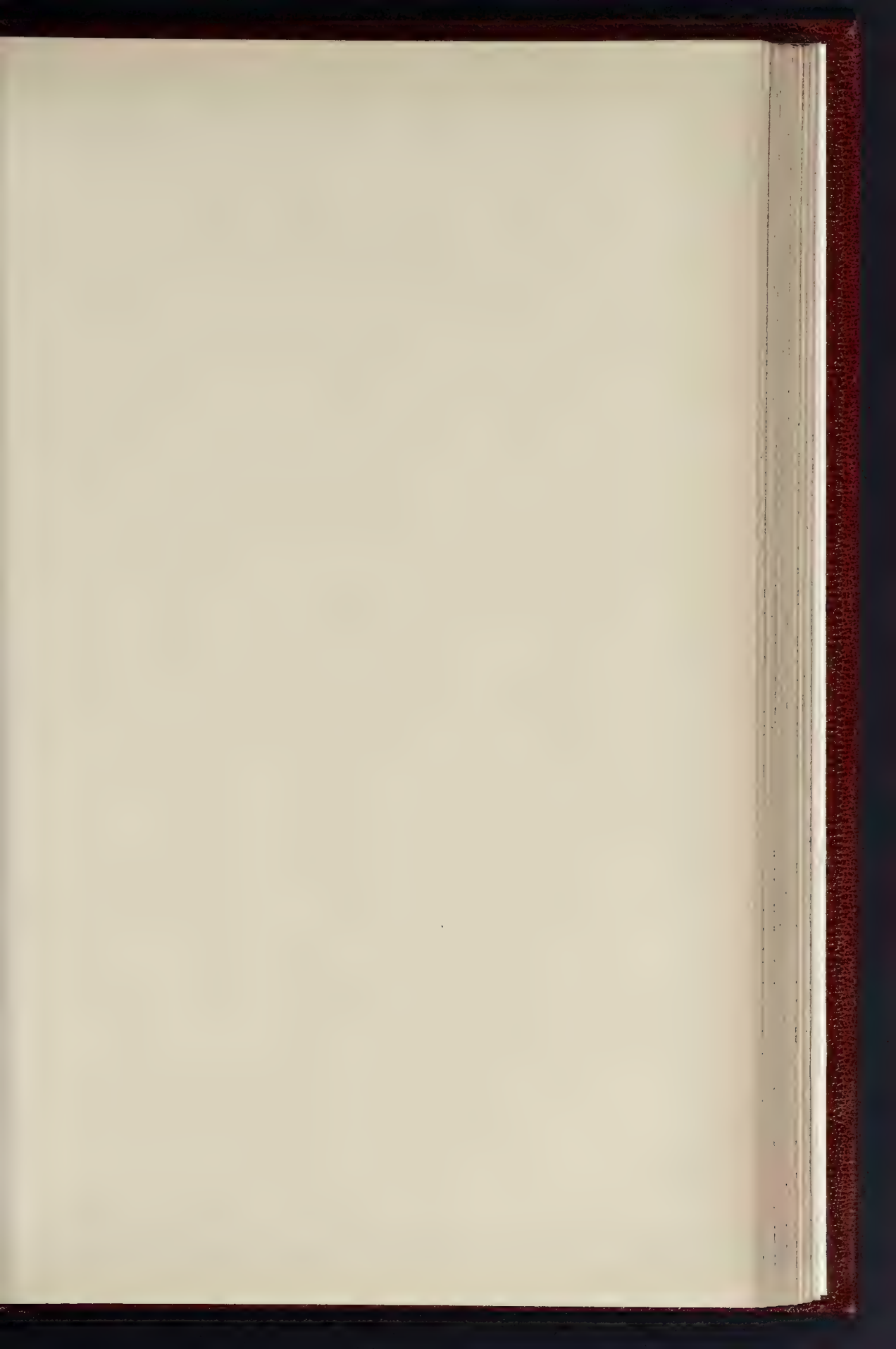


THE BUILDER, NOVEMBER 22, 1902.



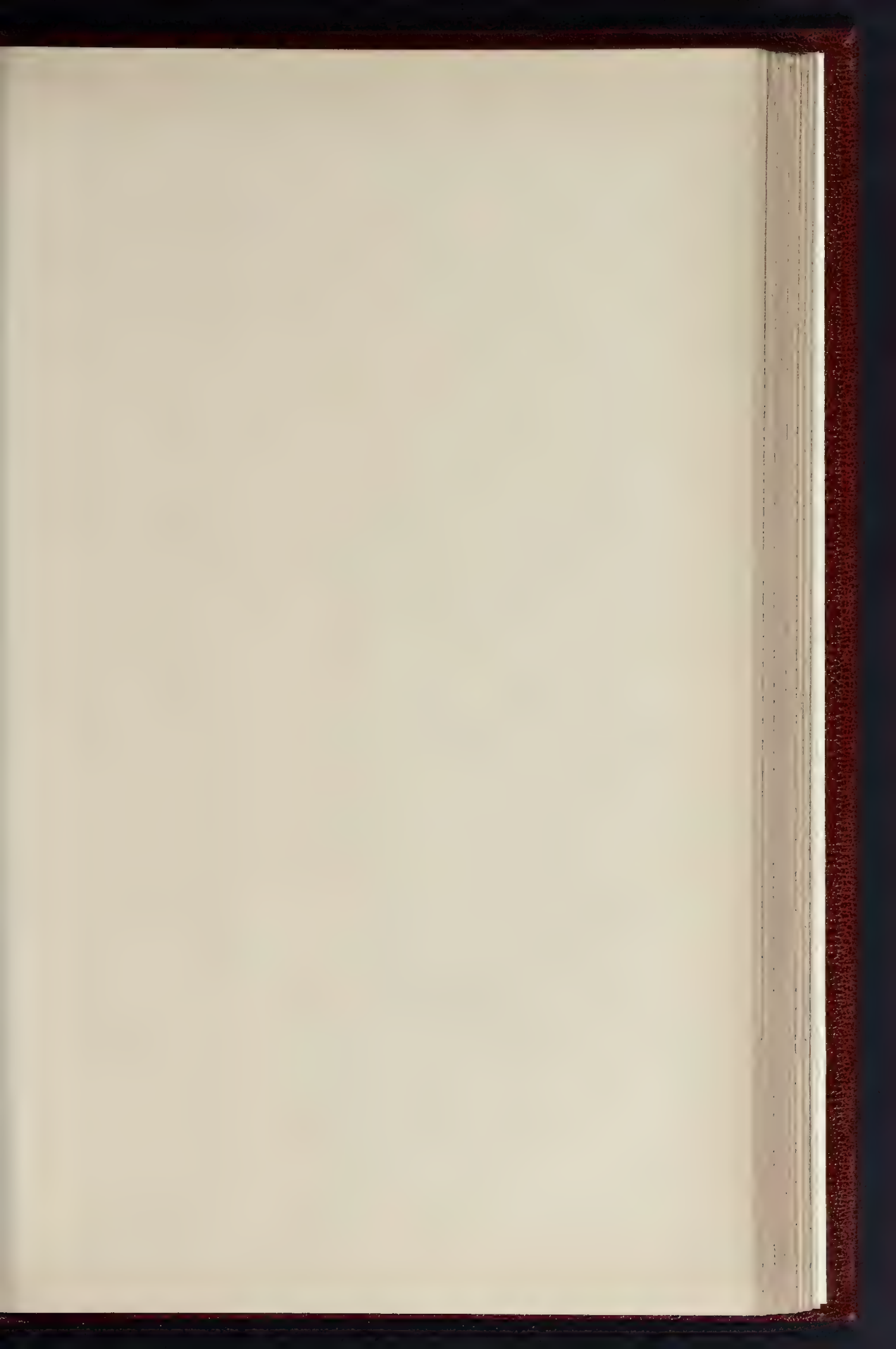


CHRIST CHURCH, BRIXTON : VIEW OF CHANCEL.—PROFESSOR BERESFORD PITE, F.R.I.B.A., ARCHITECT



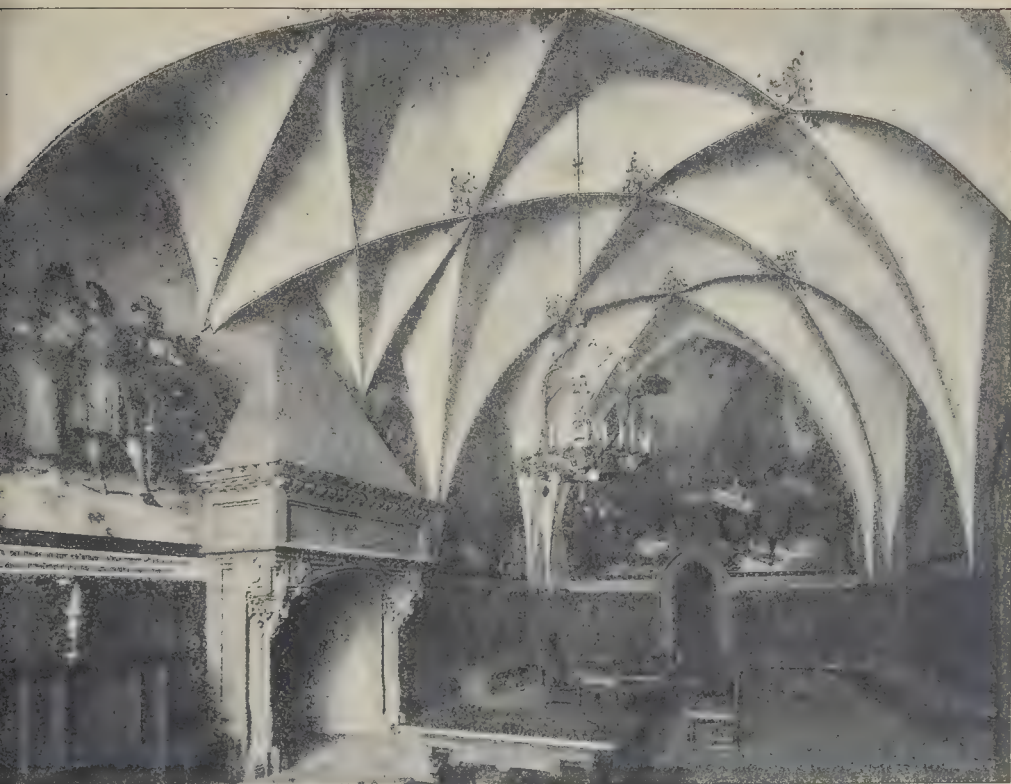


"THE MOUNT," COOKHAM — MR. THEOPHILUS ALLEN, A.R.I.B.A., ARCHITECT





THE SCHLOSS HOF MEISSEN, SAXONY

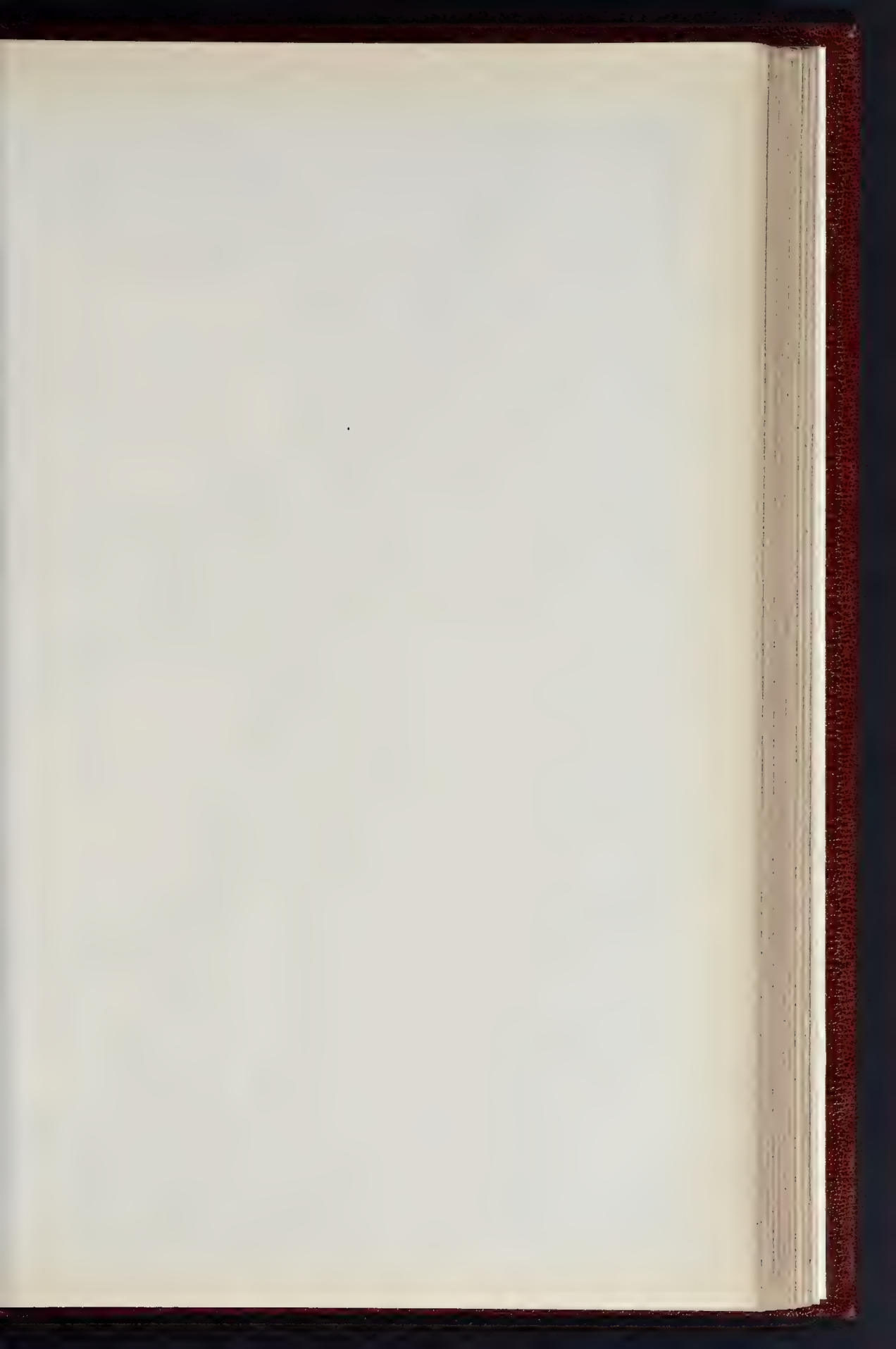


INTERIORS IN THE SCHLOSS-HOF, MEISSEN, SAXONY

MONMOUTH COLLEGE

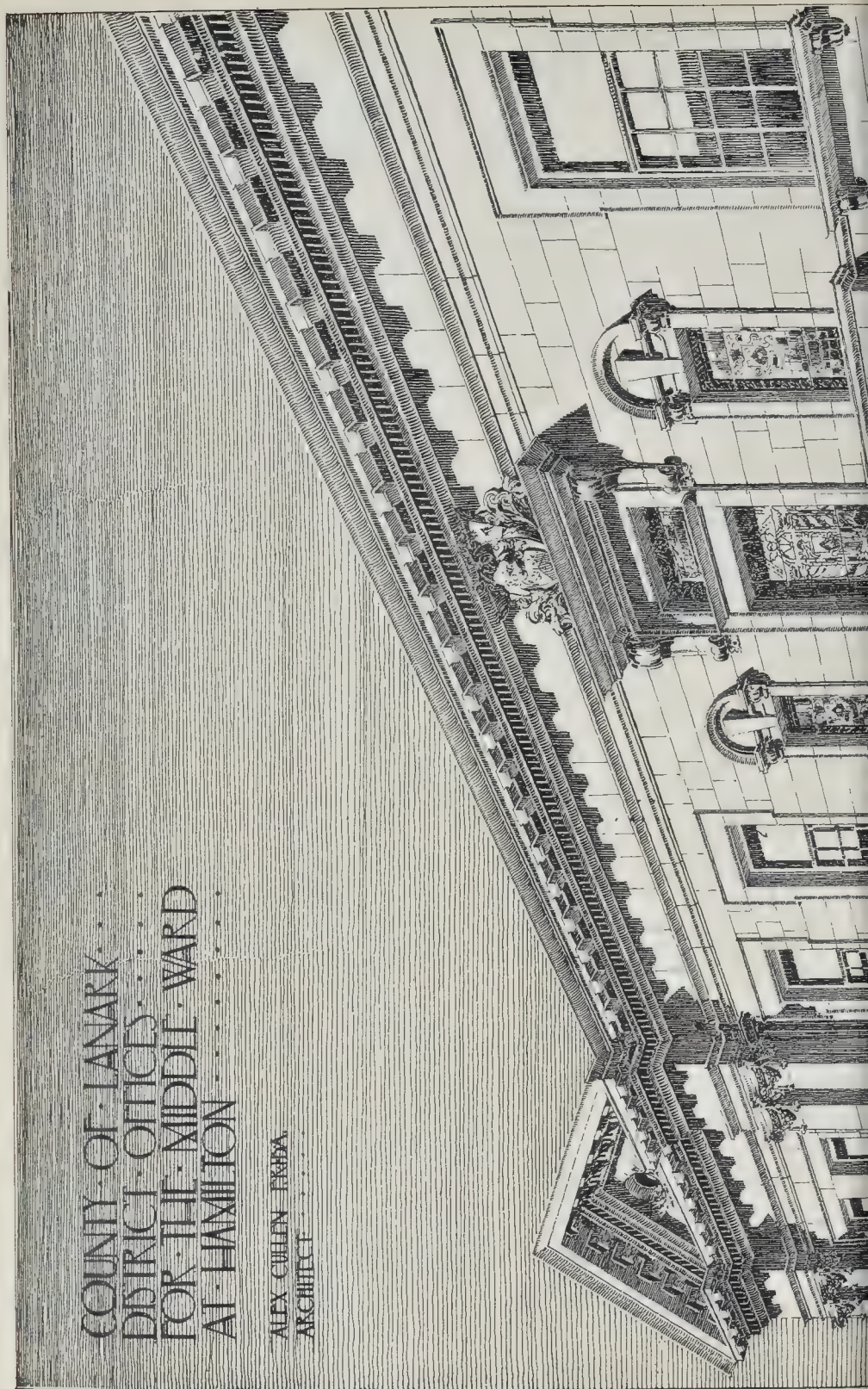


Monmouth College
1885



COUNTY OF LANARK . . .
DISTRICT OFFICES
FOR THE MIDDLE WARD
AT HAMILTON

ALEX. CULLEN FRASER,
ARCHITECT



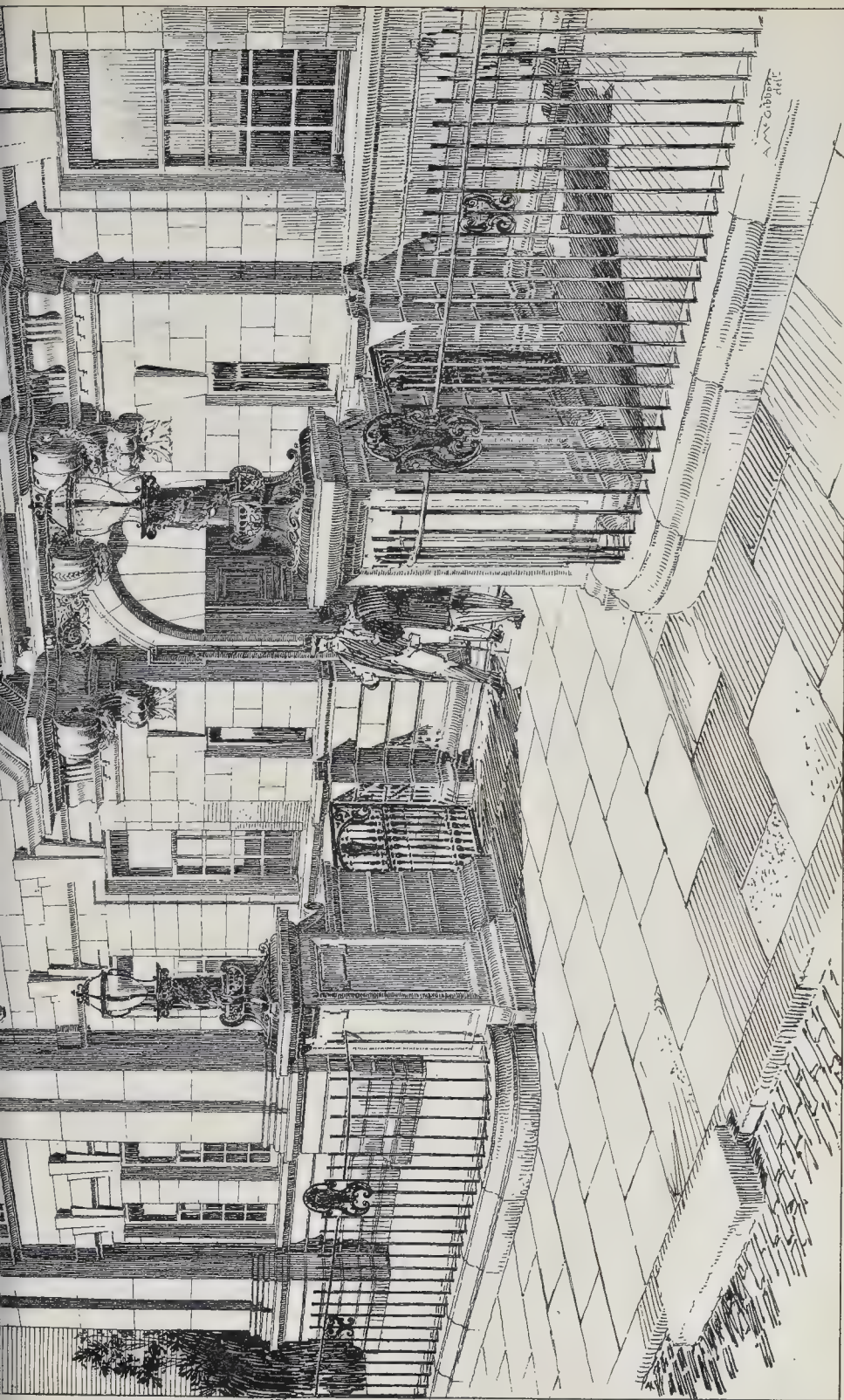
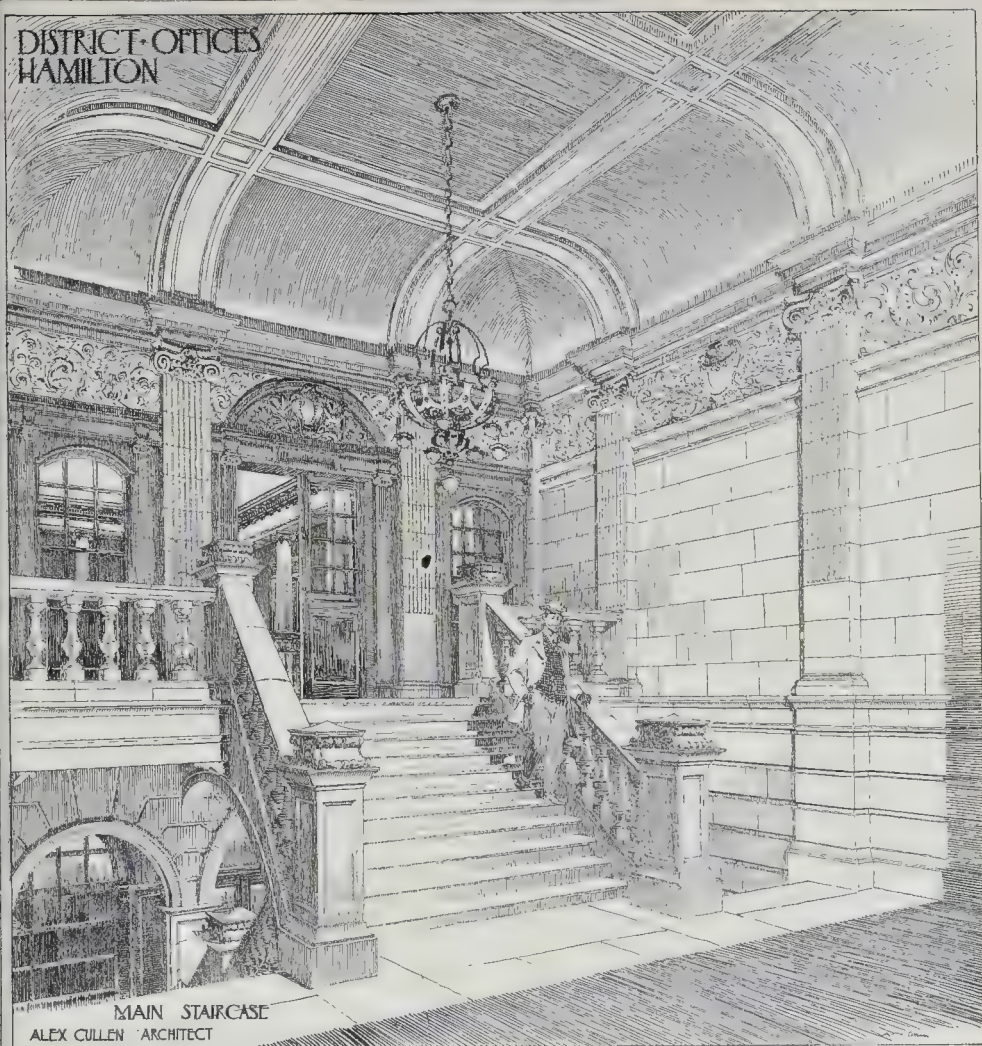


PHOTO LITHO SWAGUE & CO. L^Y 4.85 EAST HANING STREET, FETTER LANE, E.C.

DISTRICT OFFICES
HAMILTON

MAIN STAIRCASE

ALEX CULLEN ARCHT

"THE MOUNT," COOKHAM.

This illustration has been reproduced from a water-colour sketch by Mr. T. A. Allen, which was exhibited at the Royal Academy, and represents the south front of the house erected from the designs of Messrs. Theophilus Allen & Son, architects, of London.

Messrs. Allen sent us a plan of the house, but unfortunately it arrived too late for publication.

HOUSE, WEST CLIFF-ROAD,
BOURNEMOUTH.

This house is treated in a simple manner in local red bricks, relieved with Portland stone, the upper part being executed in plaster-work.

The roof is slated with green Westmoreland slates. The building was executed by Messrs. Sydney Brown & Sons from designs by Mr. Thomas Ballantyne.

THE SCHLOSS-HOF, MEISSEN.

MEISSEN, in former times the most important town of Saxony, lies on the Elbe, about fifteen miles from Dresden, and possesses at the present day some 15,000 inhabitants. The town was founded by Henry the Fowler in the tenth century, and for centuries, up to the time of the Reformation in fact, was a centre of education and culture, religious, political,

and military. It was here that Böttger, in 1710, was seeking for the secret of gold composition, and found instead the process of porcelain-making, after which Meissen became the seat of the manufactory of the famous "Dresden china"; and till within the last forty years the works were carried on in the halls and saloons of the Castle itself. The old town lies on and around a rocky height, crowned by the Cathedral, the Castle, and the various appertaining buildings. The position thus secured was undoubtedly of the first importance in former times for purposes of defence, and, artistically considered in these latter days, it could hardly be more effective in its picturesque outline of spire and roof, seen either from the bridge below or from the opposite height.

The Castle was originally intended for a Royal residence in the chief town of Saxony, then represented by Meissen. While still building, Dresden was selected as a more convenient spot for the capital, thus leading to the comparative neglect and obscurity in which this remarkable work so long remained, for it was never used as a permanent Royal residence, but served as a resting-place for the princes on their journeys hither and thither, or as a retreat for their wives and widows. It was built at the command of the two brothers, Dukes of Saxony, who were reigning together over the land at the

end of the fifteenth century, by one Arnold, of Westphalia. The Castle was to have been the joint residence of the brothers Ernest and Albert, at whose command it was erected. They were remarkable personages of their time, wealthy and powerful, and in need of a residence befitting their condition; but the early death of Duke Ernest, and the preference of his brother for Dresden as his residence, seemed to alter the fate of the Castle, which, nevertheless, was carried out as directed. It was here that the porcelain factory was established for a century and a half after the discovery of the process by Böttger.

The building consists of three stories, the first and second being vaulted, and the third roofed with timber. The exterior is plain—the rigid horizontal lines only interrupted by the gabled windows of the roof. The south-west façade is broken by a stair tower (shown in the plate), which, in itself, presents most interesting features, and is one of the most important works of the kind in Germany. The stairs wind round a hollow cylinder, and are borne by three pillars. The vaulting is star-shaped.

The Castle interior is extremely interesting, and presents a great contrast to the simple lines of the exterior. The great feature within is the vaulting. It will be observed that hardly any hint of the inner construction is

to be found on the exterior. Many of the rooms are of great size; some so curious in shape and so elaborately vaulted as to produce an almost *bizarre* effect. The principal room on the first floor, the "Court-room," is upwards of 100 ft. by 43 ft. The Kirchsaal, or "Royal Common-room," measures some 80 ft. by 37 ft., the window niches in it forming small rooms in themselves. The vaulting here springs from three centre pillars. On the first floor the vaulting is mostly ribbed. On the second rib: are absent, plain brick groining taking their place; as shown in the two interiors illustrated.

The necessities arising from the formation of the rocky foundation and from principles of defence were imposed on Arnold for the general direction and plan of his edifice, and with the difficulties thus presented he had to grapple; hence the peculiar form of the plan.

The china factory was removed in 1866 to new and suitable premises without the town, after which a thorough restoration of the Castle was taken in hand, which, however, was not completed for a good many years after. The interior has been appropriately furnished and decorated, the various frescoes representing scenes from the history of the Castle and its owners. It is now used occasionally by the King of Saxony in the hunting season.

Of the two interiors illustrated in the plate, the upper one is the "Kurfürsten-zimmer," or Princes' chamber, and shows the ribbed vaulting in the upper story, before referred to. The room in the lower story, showing the heavy vaulting-ribs, is now distinguished as the "Wapen-saal," but whether this was really its original purpose we cannot say.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Fulham—Buildings on the east side of Townmead-road, Fulham (Messrs. MacFarlane, Lang, & Co.).—Consent.

Hammersmith—An iron concrete, and glass shelter in front of the new King's Theatre, Hammersmith-road, Hammersmith (Mr. W. G. R. Sprague for Mr. J. B. Mulholland).—Consent.

Chelsea—A porch at the entrance to No. 32, Lowndes-street, Chelsea (Mr. E. B. l'Anson for Messrs. Prescott, Dimsdale, Cave, Tugwell, & Co. Ltd.).—Consent.

Greenwich—A building with a one-story shop in front, upon the site of Nos. 18 and 20, The Vale, Blackheath (Messrs. J. D. Mathews & Son for Mr. H. Burnside).—Consent.

Marylebone, East—A projecting stone porch at the entrance to Nos. 6 and 7, Bulstrode-street, Marylebone (Mr. F. M. Elgou for Mr. J. A. Michell).—Consent.

Norwood—That the application of Messrs. Lamb, Son & Prance, for an extension of the period within which the erection of buildings on the west side of Norwood-road, Norwood, to abut also upon York-road, Ullswater-street, and Harpenden-street, was required to be completed, be granted.—Consent.

Westminster—A portico in front of Block 1, Rutland-court, High-road, Knightsbridge (Mr. D. Joseph for Mr. H. Lovatt).—Consent.

Hackney, North—A one-story office building in the garden at the rear of No. 1, Cumberland-terrace, Seven Sisters-road, Finsbury Park, to abut upon Finsbury Park-road (Mr. R. Wortley).—Refused.

Hammersmith—Houses with shops on the north side of Uxbridge-road, to abut upon Blomfield-road (Mr. P. G. May for Mr. G. F. Jones).—Refused.

Hampstead—Iron and glass shelters in front of the porches at Nos. 50, 62, 64, and 70, Belsize Park-gardens, and No. 6, Belsize-grove, Hampstead (Mr. T. J. Anderson for Mr. T. H. Pankhurst).—Refused.

Kennington, South—A studio at the rear of No. 178, Cromwell-road, South Kennington, to abut upon Marles-road (Mr. A. Parnsott for Mr. R. Sauber).—Refused.

Levensham—Hats on the east side of Sydenham Park-road, Lewisham, northward of Sydenham Park (Mr. H. G. Leslie for Mr. E. Larkings).—Refused.

Paddington, South—A wood and glass show case in front of No. 1304, Edgware-road, Paddington (Mr. G. E. Tombs for Mr. A. E. Mavrogordato).—Refused.

Width of Way.

Chelsea—An addition at the rear of No. 14, Hans-place, Chelsea, with the external walls and the boundary or fence between such external walls and the roadway of Pavilion-road at less than the prescribed distance from the centre of the roadway

of that street (Messrs. Walton & Lee for Mr. J. T. Smith).—Consent.

Islington, West—A new building on the site of Nos. 8, 10, 12, and 14, Crinan-street, York-road, King's Cross (Mr. C. W. Reeves for Messrs. R. Porter & Co. Ltd.).—Consent.

Fulham—A house on the south-east side of Protheroe-road, Fulham (Mr. W. D. Thompson for Mr. Hedgson).—Refused.

Width of Way and Lines of Frontage.

Norwood—A one-story addition at the rear of No. 87, High-street, West Norwood, to abut upon Change-alley (Mr. H. Bignold for Mr. W. H. Starke).—Consent.

Kennington—One-story shops upon the forecourts of Nos. 101 to 111 (odd numbers only) inclusive, Wandsworth-road, Kennington (Messrs. J. A. J. Woodward & Sons for Mr. E. Levy).—Refused.

Finsbury, East—A factory building on the site of Nos. 1 and 3, Domingo-street, and Nos. 1 and 2, Menel-street, Old-street, Finsbury (Mr. R. J. Lovell for Messrs. Haakins Bros.).—Refused.

Kensington, South—An addition at the side of the projecting porch at No. 34, Thurloe-square, Kensington, abutting upon Thurloe-place (Messrs. Jones Bros. for Mr. R. E. Clifford).—Refused.

Space at Rear.

St. George, Hanover-square—An additional story at the rear of a building on the north side of Farm-street, St. George, Hanover-square (Mr. J. W. Bradlev for Council of the City of Westminster).—Refused.

Line of Frontage and Space at Rear.

Wandsworth—A building, to be used as a beer-house, on portions of the site of Nos. 8 and 10, High-street, Tooting, to abut upon Selkirk-road (Mr. D. Watney for Messrs. Attlee).—Consent.

Line of Frontage and Construction.

Fulham—The retention of a shed at the side of No. 37, Cloncurry-street, Fulham, abutting upon Woodlawn-road (Mr. H. J. Nutt).—Refused.

Formation of Streets.

Norwood—That an order be issued to Messrs. J. T. Bresse & Sons sanctioning the formation of laying out of new streets for carriage traffic to lead out of Herne Hill-road and Poplar-walk, Herne Hill, and in connexion therewith the widening of Poplar-walk and the adaptation for carriage traffic of a portion of that street (for Mr. R. A. Sanders).—Agreed.

Wandsworth—That an order be issued to Mr. H. B. Measures refusing to sanction the formation or laying out of new streets for carriage traffic out of the east side of Hill-side-road, Streatham Hill (for the Artisans, Labourers, and General Dwellings Co. Ltd.).—Agreed.

Means of Escape at Top of High Buildings.

City—Means of escape in case of fire on the fifth and sixth stories of a building on the north side of East-street, Finsbury-circus, for the persons dwelling or employed therein (Mr. G. D. Martin for the London Properties Development Corporation).—Consent.

Cubical Extent.

Islington, West—A new building on the site of Nos. 8, 10, 12, and 14, Crinan-street, York-road, King's Cross, divided into two blocks, each to exceed in extent 150,000, but not 150,000 cubic feet, and to be used only for the purposes of a bottling-store (Mr. C. W. Reeves for Messrs. R. Porter & Co. Ltd.).—Refused.

Alteration to Building.

Strand—An addition on the site of Nos. 23 to 26, Cursitor-street (not exceeding 250,000 cubic feet in extent) to Windsor House, Bream's Buildings, and Nos. 20 to 22, Cursitor-street, and the formation of a passageway at the ground-floor level of Nos. 20 to 22, Cursitor-street (Mr. R. C. Fry for Mr. H. Cox).—Consent.

* The recommendations marked † are contrary to the views of the Local Authorities.

BOOKS RECEIVED.

THE DESIGN OF SIMPLE ROOF-TRUSSES IN WOOD AND STEEL, By Malverd A. Howe, C.E. (Chapman & Hall)

FORMAL GARDENS IN ENGLAND AND SCOTLAND, By H. Inigo Triggs. Parts II. and III. (B. T. Batsford.)

REDRESS BY ARBITRATION, By H. Foulkes Lynch. Fourth Edition. (Edinburgh Wilson.)

CARE AND MANAGEMENT OF STATIONARY STEAM-ENGINES, By Charles Hurst. (Crosby Lockwood & Son)

NATURAL AND ARTIFICIAL TREATMENT OF SEWAGE, By Lieut.-Col. Alfred Jones, V.C., and H. Alfred Roebling, M.Inst.C.E. (E. & F. N. Spon.)

THE "PRACTICAL ENGINEER" ELECTRICAL POCKET BOOK, 1903. (Technical Publishing Co.)

THE "PRACTICAL ENGINEER" POCKET BOOK, 1903. (Technical Publishing Co.)

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

20.—PAINTS—WHITE AND BLACK PIGMENTS.

COLOURED oil paints commonly contain:

1. A *body colour* or *base*, which is a pigment possessing great opacity or "body" when mixed with oil and spread in a thin layer upon a suitable surface. The chief body colours are white lead, zinc oxide, and barium sulphate.

2. A *staining colour*, which is a pigment possessing great colouring power but little body or opacity. Prussian blue, chrome yellow, and chrome green are examples of staining colours.

3. An *oil* which dries to a transparent, solid, tenacious, elastic skin, and which binds together the finely divided particles of the pigments. The paint oil most extensively used is linseed oil, and a portion of the oil is usually "boiled" with driers by the process described in the last chapter. A chemical reaction takes place between the oil and the base colour.

4. A "*thinner*" or solvent, which is a volatile oil employed to increase the fluidity of the mixture of oil and pigment and to render it more easy to apply to the surface to be painted. Most of the solvent subsequently evaporates from the painted surface into the atmosphere. The principal solvent is turpentine spirit, sometimes called "oil of turpentine," but most commonly known as "turps." Other "thinners" sometimes used are coal-tar naphtha, shale naphtha, petroleum spirit, methylated spirit, and benzol.

Some pigments possess both good colouring power and great opacity, and are, therefore, used in lieu of the mixture of body colour and staining colour commonly employed. Red lead, red iron oxide, and Brunswick green are pigments which possess both good colour and great opacity.

Distemper is a water paint made by mixing a body colour (usually whiting) into a paste with water and some adhesive agent, such as size, glue, albumen, or casein. A staining colour, to give any desired tint, is usually added. W. A. Hall has patented (1896) a washable distemper, made with talc, whiting, slaked lime, and casein. The value of a mixture of casein and slaked lime as a cement has long been known. Casein is obtained from curdled skim milk.

Enamel Paints usually consist of ordinary pigments mixed with resinous matter dissolved in petroleum spirit or "turps" and a little linseed oil. For some enamel paints the resinous matter is dissolved in methylated spirit.

White Lead (flake white) is a mixture of lead carbonate and hydrated lead oxide, and its composition, although slightly variable, approximates more or less closely to that represented by the formula $2 Pb CO_3, Pb H_2 O_2$. About 70 per cent. is, therefore, lead carbonate, and 30 per cent. hydrated oxide of lead. If the proportion of hydrated oxide be materially higher than 30 per cent. the opacity of the paint in which the white lead is used will be considerably diminished, while if it be materially lower the consistency and working quality of the paint will be prejudicially affected. It is believed that the hydrated lead oxide enters into chemical reaction with the linseed oil to form a lead soap (lead linoleate) and glycerine. The glycerine probably gives elasticity to the coat of paint. Mulder has shown that when linseed oil alone is exposed to the air it solidifies owing to oxidation, and no glycerine is found in the product of oxidation. When, however, a soap is formed by the action of linseed oil on lead oxide, or any other metallic oxide, glycerine is known to be one of the products of the reaction.

White lead has an injurious effect upon the health of those who constantly handle it, and is speedily turned brown or black by exposure to air containing sulphuretted hydrogen; but it works well with oils, mixes well with most other pigments, is perfectly white in colour, and is a very durable pigment. It must not, however, be mixed with any pigment containing unoxidised sulphur, because in course of time such pigment is likely to cause the white lead to become discoloured owing to the formation of black sulphide of lead. White

was used by the Romans, and is to this day the best of all the white body colours for oil paints.

Impurities.—The accidental impurities occasionally present in small proportion in white lead owing to faulty manufacture, or to impurities in the metallic lead employed are:—

1. Silver, which gives the white lead a brownish hue.
2. Red oxide of lead, which gives the white lead a reddish hue.
3. Yellow oxide of lead, which gives the white lead a yellowish hue.
4. Metallic lead, which gives the white lead a greyish hue.

Lead acetate.—White lead is very frequently adulterated with barium sulphate. Less common adulterants are lead sulphate, calcium sulphate, china clay, and calcium carbonate.

Manufacture.—Several methods of producing white lead are in use, but the best white lead is still made by the old Dutch process. Bars, sheets, gratings, or coils of cast metallic lead, as pure as possible, are suspended in earthenware jars containing at the bottom a small quantity of acetic acid. A large number of jars thus charged are packed upon the floor of a shed and surrounded with spent tan or stable manure. The layer of jars is covered with loose planks, and a second layer of jars similarly charged and imbedded in spent tan or manure is placed over them. By repeating this process a stack is at length obtained which completely fills the brick shed. The chamber is then closed for several weeks. The beds of spent tan or manure slowly ferment and become warm, and the metallic lead is simultaneously attacked by acetic acid, carbon dioxide (a product of fermentation), atmospheric oxygen, and water-vapour. After the lapse of from six to twelve weeks it is found that all, or nearly all, the lead has been converted into carbonate and hydrated oxide. The white lead thus produced is then passed between rollers to crush it to a coarse powder and enable any pieces of metallic lead which may remain to be removed. It is subsequently ground with water in mills to a fine powder and then dried.

German Process.—The metallic lead is placed on shelves in a chamber through which currents of steam, acetic acid vapour, and gaseous carbon dioxide are blown either alternately or simultaneously.

Other Processes.—Several other processes which produce white lead of inferior quality are, or have been, used. One process consists in passing a current of carbon dioxide through a solution of lead subacetate, whereby a basic carbonate is precipitated. The "Kremnitz process" consists in passing carbon dioxide into a chamber filled with trays containing a mixture of litharge and lead acetate made into a paste with water.

Lead Sulphate is less soluble and less poisonous than white lead, but is also less satisfactory as a pigment. It is less readily tarnished by exposure to sulphuretted hydrogen, but the commercial product possesses neither the body nor perfect whiteness of white lead. Lead sulphate usually forms the basis of so-called "non-poisonous white lead." Freeman's "non-poisonous" white lead is lead sulphate ground with small proportions of zinc white and barium sulphate, whereby the properties of the lead sulphate as a pigment are much improved.

Zinc White or Chinese White is zinc oxide (ZnO). It is a bulky white powder, sometimes possessing a faint bluish hue. Zinc sulphide is also white, so that zinc oxide became partially converted into zinc sulphide by exposure to sulphuretted hydrogen or other sulphur compounds, the colour of the paint does not change. Zinc oxide may, therefore, be mixed with staining colours containing sulphur without risk of subsequent change of colour. Zinc white, when used as a base colour in an oil paint, is a bad drier, and should, therefore, be used with oil rendered as highly siccativous as possible by treatment with borate of manganese as a drier. Zinc white is comparatively costly, and does not work very well under the brush. It is largely used as a water-colour under the name of Chinese white. It is insoluble in water, alcohol, oil, or turpentine, but soluble in hydrochloric, nitric, or sulphuric acid.

Adulterants.—The commonest adulterants for zinc white are barium sulphate, calcium carbonate, china clay, and calcium sulphate.

Zinc Sulphide (ZnS) is a white compound not very largely used by itself as a pigment, but in

admixture with barium sulphate it is present in *Orr's White*, *Griffith's White*, or *Lithophone*. When a solution of barium sulphide is mixed with a solution of zinc sulphate, a precipitate consisting of a mixture of insoluble zinc sulphide with insoluble barium sulphate is obtained.

Barium Sulphate (Ba SO_4) is known by many different names, such as *barylex*, *barylex-white*, *heavy-spar*, and *blanc fixe*. It is a white insoluble compound found in a fairly pure condition in many parts of the world, and is also prepared artificially. Sometimes the natural deposit has a creamy tint, owing to the presence of about one per cent. of iron oxide. The natural material is rendered suitable for use as a pigment by grinding and washing. If the iron has to be removed the material is washed with acid, and then with water, before drying. Artificially prepared barium sulphate is known as *blanc fixe*, and is obtained by adding sulphuric acid or a soluble sulphate to a solution of a barium salt. The artificial product is more finely divided than the natural material, and is superior in body and in the purity of its whiteness.

Barium sulphate is inferior in body to white lead, but superior to zinc white. It mixes fairly well with oil, but not so well with water. It is not affected by sulphuretted hydrogen or dilute acids, and has no action upon other pigments. Exposure to strong sunlight does not affect it. Barium sulphate is therefore superior to white lead as a base colour for paint liable to be exposed to sulphuretted hydrogen.

Barium sulphate is so cheap that it is not commonly adulterated, but it is very largely used as an adulterant in more costly pigments, and especially in white lead. Mixtures of barium sulphate and white lead make very good base colours, and the chief objection to the admixture of barium sulphate in quantity not exceeding 30 per cent. is that the price charged for the barylex is usually much in excess of its market value. The sum paid for white lead is no criterion of its purity, for white lead sold at a high price is sometimes more largely adulterated than that sold at a lower price. Barium sulphate is much heavier than chalk, gypsum, or china-clay, and also mixes better with oil; it is therefore usually selected as the most suitable adulterant for white lead or zinc white. The following table shows the approximate specific gravities of white lead, red lead, and zinc white, and of some of the commonest adulterants:—

	Approximate Specific Gravity.	Per cent. Oil required to make Stiff Paste.
Red lead.....	8.5	8
White lead.....	6.5	7
Zinc oxide	5.6	22
Barium sulphate .	4.6	7
Whiting	2.3	20
Gypsum	2.3	—
China-clay	2.2	—

Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) consists of hydrated calcium sulphate. It is a cheap and permanent pigment, and is not affected by sulphuretted hydrogen. It is not a good oil pigment, but mixes well with water. It is used in the manufacture of wall papers.

Satin white is a mixture of calcium sulphate and aluminium hydroxide prepared by adding slaked lime in the form of a paste to a solution of aluminium sulphate, and boiling the mixture by steam heat. It is a good water colour, but lacking in body as an oil colour.

Whiting (whitening—Paris white—Spanish white) is chalk which has been ground with water and washed to free it from particles of flint and other impurities. When mixed with linseed oil it changes from white to a dirty grey colour. *Putty* used by glaziers and painters usually consists of whiting kneaded with about 18 per cent. of linseed oil. When mixed with water, size, and colouring matter, whiting is largely used as *distemper*.

China-clay or kaolin is a natural hydrated silicate of aluminium found in Cornwall and many other districts. It is very inferior as a pigment for oil paints, but can be used for distemper. The best qualities are pure white, but some varieties have a yellowish tint.

Lamp black is impure carbon prepared by burning oils or fats in lamps or furnaces with a limited supply of air. The lamp black is produced in the form of a stream of smoke or soot, which is led into suitable condensing chambers. That portion of the black which settles out first is heavier than the portion

which collects in the chambers most distant from the lamps or furnaces. The heavy portion is sold as lamp black and contains a larger proportion of impurities than the lighter portion. The lighter portion is sometimes called *vegetable black*. Lamp black usually contains traces of tarry or oily compounds, which give the pigment a brownish hue when used as a paint, and which tend to prevent the paint from drying properly. According to Mr. George Hurst, the lamp black commonly sold as an oil-paste contains 27 per cent. of oil, while that sold as a turpentine-paste contains 55 per cent. of turps.

Vegetable black (charcoal black—vine black) should be produced by heating non-resinous wood in vessels from which air is almost entirely excluded, but which have a means of exit for the vapours and gases which are expelled. The charcoal thus prepared should be ground, washed with hot water, and thoroughly dried before being ground with oil. Vegetable black may be produced from the stones of stone-fruits, cocoa-nut shell, vine wood, or any material of a like nature. Cocoa-nut yields the densest and most velvety black, while that from vine-shoots has a bluish tint and is less dense.

Carbon black is largely produced in the United States by the imperfect combustion of natural gas.

Bone black is made by charring bones in suitable furnaces. Bone black contains about 75 per cent. of mineral matter, consisting mainly of phosphate and carbonate of lime. Bone black is inferior in colour to lamp or vegetable black as it has a greyish hue, but it works better in oil. Referring to the blacks used by artists, Professor Church states that bone black or ivory black is the best carbon pigment for oil paints, but that vine black is preferable as a water colour, because bone black has a decolourising action upon organic pigments in the presence of moisture.

Ivory black should be produced by charring ivory. It much resembles bone black in its properties and composition, but is of a somewhat finer grade. Bone black is often sold as ivory black.

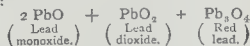
Animal black is obtained by charring horn or other waste animal matter. Bone black is sometimes called animal black. Animal black is very variable in composition, and is chiefly used for decolourising sugar and other organic solutions.

Indian ink is very fine lamp-black mixed with some form of gelatine, and is generally scented with musk or camphor. In China, where the ink is most largely manufactured, the black is produced by the imperfect combustion of vegetable oils, and the gelatine employed to bind together the particles of carbon is a mixture of fish glue and parchment size. When the black contains considerable traces of tarry matter, the ink appears brownish-black when brushed over a white surface. Indian ink is of no use as a pigment in oil paint, but is much used as a water-colour. Fairly good Indian ink is now manufactured in Europe.

21.—COLOURED PIGMENTS.

Reds.

RED lead or minium is a red oxide of lead prepared by exposing litharge (PbO) to a dull red heat in a current of air. Red lead is usually regarded as a compound of lead monoxide and lead dioxide, thus:



When red lead is treated with dilute nitric acid the monoxide is dissolved, while the dioxide is left undissolved as a brown powder.

Red lead is often used as a "drier" for linseed oil. When ground with 8 or 9 per cent. of linseed oil it forms a stiff paste which dries quickly, and which is largely used as a lute for joints in all kinds of pipes. It possesses great opacity, and is very durable, but is readily discoloured by sulphuretted hydrogen. It mixes well with all pigments, but when mixed with pigments containing unoxidised sulphur is liable to become discoloured owing to the formation of blacklead sulphide. Red lead is very largely used for protecting iron, and as a priming coat upon wood. It is occasionally adulterated with red oxide of iron or red brick-dust.

Orange Lead has the same chemical composition as red lead, but is lighter in colour, and

has a lower specific gravity. It is produced by heating white lead for many hours at a dull red heat. It resembles red lead in its properties.

Red Oxide of Iron is the colouring constituent of red ochre, Indian red, and several other natural red earths. Comparatively pure red ferric oxide, artificially prepared, is met with in commerce as rouge, Venetian red, or colcothar. Many red paints sold under fancy names contain ferric oxide as the principal ingredient. Red oxide is known as sesquioxide of iron or ferric oxide. A green ferrous oxide which has a great affinity for oxygen, and speedily changes into red oxide when exposed to air, is also known, as well as a black oxide. The black oxide is of no importance as a pigment. The chemical formulae for the three oxides are:—

Green oxide of iron or ferrous oxide = FeO .
Red oxide of iron or ferric oxide = Fe_2O_3 .
Black oxide of iron or magnetic oxide = Fe_3O_4 .

Ferric oxide is a perfectly permanent pigment under normal conditions, and may safely be mixed with any other pigments. It does not mix with oil so well as does red lead, but it is, nevertheless, a most valuable pigment.

Light red or burnt ochre is burnt yellow ochre. Yellow ochre is a natural earth of very variable composition, but the constituent to which it owes its colour is hydrated ferric oxide. Yellow ochre commonly contains fully 50 per cent. of clay, sand, chalk, barium sulphate, or other impurities. When yellow ochre is heated the water of hydration is expelled, and the ochre changes to a bright red colour.

Venetian red, rouge, or colcothar is commonly manufactured by heating green ferrous sulphate. The crystalline substance is first gently heated until all the water of crystallisation has been expelled, and then strongly heated until all the sulphuric acid has been driven off and ferric oxide in the form of a bright red powder remains as a residue. The name "Venetian red" is, however, applied indiscriminately to any bright-red ferric oxide, without regard to its source or method of production.

Indian red is, nominally, a natural red hematite obtained from India, which contains about 95 per cent. of ferric oxide. The natural product is ground with water, washed, and dried.

Red chalk is a natural chalk containing ferric oxide, which is found in Norfolk and elsewhere. When heated to a high temperature it changes from red to a dull olive green, owing to a chemical reaction taking place between the lime and ferric oxide, and the consequent formation of calcium ferrite.

By-Product Red Oxide.—Red oxide of iron is largely manufactured from the waste acid liquors containing iron in solution which are produced in works where iron is galvanised, and in certain metallurgical works. The iron is usually in the form of a solution of either chloride or sulphate of iron. A sufficient quantity of lime is added to neutralise the acid and precipitate the iron as hydrated ferrous and ferric oxide. As sulphate of lime is not freely soluble in water a considerable quantity of this substance is precipitated with the iron, if the iron were present as sulphate of iron. The hydrated oxide is collected by filtration and then washed, dried, and strongly heated to convert it into the red anhydrous oxide. Red oxide produced in this way forms a very good pigment. It is sometimes adulterated with barium sulphate or whiting to produce a pigment of a lighter shade.

Vermilion is sulphide of mercury (HgS). It is found as a mineral called *cinnabar*, but this natural product is seldom sufficiently bright in colour to be suitable for use as a pigment, although the vermillion used by the medieval artists is believed to have been prepared from the natural mineral.

Vermilion is a bright red pigment, but a black sulphide of mercury, having precisely the same chemical composition as vermillion, is obtained when sulphuretted hydrogen is passed into a solution of a mercury salt.

Many methods by which vermillion may be prepared are known. One method consists in grinding together metallic mercury and finely-divided sulphur in the presence of water. The black sulphide thus obtained is converted into the red sulphide by grinding it for several hours with a strong solution of caustic potash maintained at a temperature of 45 deg. C.

Vermilion is a permanent oil-colour pig-

ment, but when used as a water-colour strong sunlight tends to convert it into the black sulphide. Air containing sulphuretted hydrogen does not discolour it. The specific gravity of vermillion is about 9.0, and it is, therefore, the heaviest of the common pigments.

Vermilion may be adulterated with red lead, red oxide of iron, or red brickdust. The presence of any of these may be detected by exposing a few grains of the pigment to a dull red heat in a porcelain crucible. Vermilion burns in the air with a pale blue flame and leaves practically no residue. When heated in small glass tube vermillion first turns brown or black and then volatilises and subsequently sublimes as a red deposit in the cool end of the tube. The fumes evolved from vermillion while being heated should not be inhaled, for mercury and most mercury compounds are poisonous. Red ferric oxide, red brickdust, or red lead, would not be volatilised or changed by exposure to a dull red heat. An imitation vermillion, called antimony vermillion or anti-vermillion, is made by warming antimony trichloride with sodium thiosulphate.

Carmine is prepared from cochineal. Cochineal is the wingless female of the species of insect classed as *coccus cacti*. The dried insects are imported chiefly from Tenerife and Mexico. The colouring matter is extracted from the cochineal by boiling it with water, and subsequently adding a little alum and cream of tartar. This cochineal liquor is allowed to stand for several days or weeks, and a deep crimson-red powder is deposited and is collected on a filter, washed, dried, and sold under the name of carmine. It always contains fat and other impurities.

Lakes.—A "lake" is any soluble organic colouring matter rendered insoluble by precipitation and combination with alumina or any other suitable metallic hydroxide. The natural dyes mostly used for lakes are extracts of logwood, cochineal, madder, and Persian berries. The principal oxide for converting these soluble dyes into insoluble lakes is the almost colourless oxide of aluminium, but insoluble lakes may also be produced by precipitation with oxide of iron, chromium, or tin. Many lakes are now made with coal-tar colours, but none of the natural or artificial organic colours appear to be perfectly permanent, and many of them fade rapidly upon exposure to strong sunlight.

Carmine Lake.—The whole of the colouring matter from the cochineal liquor does not separate out as carmine, and in order to recover that which remains in solution the liquor (after removal of the precipitated carmine) is treated with freshly precipitated aluminium hydroxide, which combines with the colouring matter and forms an insoluble red compound known as "carmine lake."

Crimson Lake is a combination of carmine and aluminium hydroxide, and therefore contains less colouring matter than carmine alone. The colour soon fades when used as a paint and exposed to sunlight.

Scarlet Lake is crimson lake mixed with a little vermillion.

Greens.

Scheele's Green is arsenite of copper.

Verdigris is basic acetate of copper.

Emerald Green or Paris Green is aceto-arsenite of copper.

The foregoing three green pigments are intensely poisonous, and are not now largely used.

Zinc Green is a mixture or combination of the oxides of zinc and cobalt, prepared by heating a mixture of the nitrates of zinc and cobalt. It is permanent, but possesses little body or opacity.

Cobalt Green is another name for zinc green. **Chrome Green (Viridian or Guignet's Green)** consists essentially of hydrated sesquioxide of chromium. This is the best of all the green pigments. It mixes well with oil or water, is not affected by sunlight or sulphuretted hydrogen, and has no action upon other pigments.

Arnaudou's Chrome Green is chromium phosphate.

Spurious Chrome Green is commonly manufactured by mixing Prussian blue with sufficient chrome yellow or other yellow pigment to give it the required green appearance.

Malachite is green copper carbonate. It is a mineral found in many parts of the world. To render it suitable for use as a pigment it merely requires careful grinding.

Brunswick Green is usually a mixture of Prussian blue, chrome yellow, and barium sulphate. The proportions are varied to produce

the different shades of green—a dark green, containing a larger proportion of Prussian blue than a light green. Brunswick greens are sufficiently permanent for decorative purposes, for which they are very largely used, but should not be used by artists as they slowly change colour on exposure to light and air.

Blues.

Ultramarine may be either a natural or an artificial product. Natural ultramarine is very expensive, and is therefore used only by artists. Natural ultramarine is found as a mineral called "lapis lazuli" in Persia, Siberia, China, and other places. It consists mainly of hydrated silicate of aluminium, but also contains sulphate of lime and soda. The precise composition of the sulphur compound which imparts the characteristic blue colour to ultramarine is unknown.

Artificial ultramarine is a pigment largely used by paper-makers, soapmakers, and calico-printers. It is cheap, and is made by heating a mixture of china clay, silica, sodium sulphate, sodium carbonate, charcoal, sulphur, and rosin. By varying the proportions of the ingredients, or slightly changing the composition of the mixture, ultramarines of different shades of blue are manufactured.

Ultramarine is decolourised by exposure to acid fumes, but is not affected by strong light or a normal atmosphere. It should not be mixed with white lead, as the ultramarine contains unoxidised sulphur, which is liable to react with the white lead and produce black lead sulphide.

Cobalt Blue is usually a combination of cobalt oxide with alumina, and is produced by heating these two substances together. Sometimes, however, cobalt blue consists of a combination of phosphate of cobalt with alumina, or a combination of the oxides of cobalt, aluminium and arsenic. Cobalt blue is a permanent colour, and works well with oil or water.

Prussian Blue is made by adding ferrous sulphate solution to a solution of potassium ferrocyanide. Commercial Prussian blue has a very complex composition. It is usually represented by the formula $\text{Fe}_3(\text{CN})_{12}$, but this formula merely represents empirically one of two or three complex iron cyanides always present in the commercial product.

Prussian blue mixes well with oil or water, and is permanent, but although it has strong colouring power it is comparatively transparent when used as a paint, and is therefore only suitable for use as a staining colour for pigments possessing much greater opacity, such as white lead. Prussian blue is turned red or brown by lime, soda, or alkaline silicates, and must not, therefore, be used on freshly-plastered walls. When used as a water-colour and exposed to sunlight, Prussian blue often fades appreciably, but recovers its intensity of colour when placed in darkness for a short period. The reason of this phenomenon is unknown.

Brunswick Blue is a mixture of Prussian blue with barium sulphate.

Indigo is an organic colouring matter which is slowly decolourised by exposure to light. It may be obtained from certain plants by macerating and boiling them with water, or it may be manufactured artificially by chemical processes.

Yellows.

Yellow ochre is a natural earth of very variable composition. The yellow colour is due to the presence of hydrated ferric oxide. When the combined water is expelled by heat the residue consists of red anhydrous oxide. The different shades of different samples of yellow ochre are due to variations in the proportions of the two ferric hydrates ($\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$ and $\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$) and of the anhydrous oxide (Fe_2O_3) present, and also to variations in the proportions and composition of the compounds other than those of iron, which are always present in large quantity. Yellow ochre is a permanent colour, and mixes well with all vehicles.

King's yellow is arsenious sulphide (As_2S_3). It is not permanent.

Chrome yellow is lead chromate. It is not permanent as a water colour, but as an oil colour is sufficiently permanent for house decoration.

Lemon chrome is usually a mixture of chrome yellow with barium sulphate. Sometimes barium chromate is called lemon chrome.

Cadmium yellow is cadmium sulphide. It is permanent, and mixes well with oil or water. **Naples yellow** commonly consists of a mixture of cadmium yellow and zinc white.

Browns.

Umber is a natural brown earth very similar in composition to the ochres, but in addition to ferric hydrate contains a considerable proportion of oxide of manganese, to which it owes its brown colour. When raw umber is heated, the combined water is expelled, and the umber requires a reddish hue, it is then known as *burnt umber*. The umbers are excellent pigments in every way for either oil or water tints.

Raw Sienna is a yellow ochre containing a large proportion of ferric hydrate.

Burnt Sienna is produced by heating raw umber until most of the combined water is expelled. It is a very transparent orange-red colour.

Van Dyke brown is a name applied to several different pigments, but most commonly to mixtures of hydrated and anhydrous ferric oxide with lamp black.

Sepia is a dark-brown pigment used only as water colour. It is obtained from the ink bag of several species of the cuttle-fish, but mostly from that known as *Sepia officinalis*. It is not perfectly permanent when exposed to light.

The foregoing are a few of the pigments most extensively used by decorators and artists. It would, of course, be impossible to compile a complete list of all the pigments and mixtures of pigments used for painting in the limited space at disposal. For house decoration lower and less permanent pigments may be used than those required for artist's work, but both descriptions of work satisfactory results can only be obtained by careful and intelligent selection of both oils and pigments.

OBITUARY.

MR. W. H. BARLOW.—Mr. William Henry Barlow, F.R.S., who died last week at the age of 90, one of the oldest members of the Institution of Civil Engineers, to which he was admitted in the year 1845. He filled the office of President during the session 1879-80, and was one of those who did much to raise railway engineering to the position of exact science. Mr. Barlow inherited a taste for mathematics from his father, himself a Fellow of the Royal Society, and formerly Professor of Mathematics at the Royal Military Academy, Woolwich. His professional training was received at the Engineering Department of H.M. Dockyard, Woolwich, and at the age of twenty he was sent to Constantinople by Messrs. Maudslay & Field to attend the erection of buildings and machinery for the Turkish Government. Ten years later he entered the service of the Midland Railway (then the Midland Counties Railway) as resident engineer, becoming consulting engineer in the year 1857. During his term of office Mr. Barlow constructed various branch lines for the railway, and was responsible for the extension of the main line into London. His name is well known as the designer of the St. Pancras station, which has a roof span of 240 ft., and of all incidents at the new terminus, except the hotel and engine house, which were designed and built by the late Gilbert Scott. He was joint engineer with Sir John Hawkshaw for the Clifton Suspension Bridge; he was appointed conjointly with Mr. Henry and Colonel Yolland to investigate the failure of the Tay Bridge in 1879, and was engineer of the new Tay Bridge 1880-87. From 1881-88, Barlow was a civil member of the Ordnance Committee, and in 1881 he was consulted with Sir John Fowler and the late T. E. Harrison with regard to the designs for the Forth Bridge. His technical works relate, among other subjects, to the construction of lighthouses, diurnal electric tides and tides, and the resistance of flexure in beams.

GENERAL BUILDING NEWS.

PROPOSED NEW CHURCH, WIDNES.—Mr. G. G. Murray, the architect to the Diocese of Liverpool, having reported, after an examination, that the church of St. Mary's, Widnes, was becoming ruinous and owing to it having been built upon alluvial waste, the parishioners have decided to erect a new church at a cost which may reach £10,000.

EDWARD'S CHURCH, BARNESLEY.—The church, which, with adjacent vicarage, has been built at Kingstone-place, Barnesley, was opened on the 11th inst. It has been built from the design (chosen in open competition) of Mr. G. S. Packer, of the firm of Messrs. Packer, of Manchester, and was completed in the year 5, 1900. The accommodation is for 100 persons. The design is Early English in style. The principal dimensions are—Nave, 70 ft. by 30 ft. wide; north and side aisles, total 46 ft.; height of nave from floor to the wall 34 ft.; to the ceiling, 44 ft.; to the ridge, 50 ft. The chancel is 40 ft. long and 20 ft. wide; to ceiling, 34 ft.; and the floor is of mosaic.

The nave is divided from the aisles by granite columns in four bays. Organ chamber, two vestries, and two classrooms under the chancel and tower capable of seating 100 people are provided. The seating is of pitch pine, and the choir stalls of oak. A central tower, which is over the chancel, is 25 ft. square and reaches a total height of 94 ft. There is a stone pulpit supported on serpentine marble columns, with carved capitals, and the steps to the pulpit are of white marble. The font is octagonal on plan, and each face has moulded panels and carved emblems. The bowl is made of one piece of alabaster, supported on eight serpentine marble columns with carved capitals; the whole mounted on a platform of polished marble. The reredos is composed of polished English alabaster and marble from Connemara and Castellino. The choir and clergy stalls are of oak. Room is afforded for thirty-five chorists, exclusive of the clergy. The vestry screen is also of oak. The screen at the west end of the chancel is a pitch pine, divided into several panels by slender shafts with turned caps. The panels themselves are filled with a gold-coloured glass. The lectern is by J. Wippell & Co., of Exeter and London. The vicarage is also from Mr. Packer's designs. The following are the names of the contractors.—Mr. A. Moore, brick and stone work; Mr. Wed. Wilson, carpenter and joiner's work; Messrs. Fleming, slating and plastering; Mr. S. Rushforth, plumbing, glazing, and gas-fitting; Messrs. T. L. Stephenson & Son, painting and decorations; Messrs. W. Oxley & Sons, foundation-stone; Messrs. Norbury, Patterson, & Co., Liverpool, pulpit and font; Messrs. Harry Hems & Sons, Exeter, reredos and choir stalls; Messrs. Craven, Dunnell & Co., Larkfield, mosaic work; Messrs. Newton Chambers, Sheffield, heating; Messrs. A. Grindrod & Co., Sheffield, ventilation; Messrs. Swaine, Bourne, & Son, Birmingham, lead lights; Messrs. T. Thomason & Co., Manchester, gas standards, &c.

CATHOLIC CHURCH, PORTRAINE ASYLUM, IRELAND.—On the 13th inst. the new Catholic Church attached to the Portrairie Asylum was dedicated. Access is from the back, where a series of covered ways connecting the various blocks in the main section of the asylum converge at the porches of the new church. The new building is situated to the right of the main entrance to the asylum, and to the left is the new Protestant church. Both buildings abut on the main corridor of the asylum. There are separate entrances to the new Catholic church for men and for women, and the usual accommodation is provided for epileptics. The architect was Mr. G. C. Ashlin. The building consists of nave and aisles, chancel, two side chapels, projections for confessionals, and organ gallery in sacristy. The internal dimensions are—Nave, 88 ft. by 28 ft.; aisles, 88 ft. by 17 ft.; chancel, 15 ft. by 26 ft.; side chapels, 11 ft. by 16 ft. The height of nave is 44 ft. and of aisles 18 ft. The nave arcade carrying the clearstory consists of five pointed arches, resting on circular columns, having moulded caps and bases and polished red granite shafts. There are similar arches of smaller dimensions between the chancel and side chapels. The nave is lighted by a three-light window over the organ gallery, and by two single light windows in each bay, having tracery heads; the chancel by a five-light tracery window in the gable, and four single-light windows in the clearstory, and the aisles by three single-light windows, with tracery heads in each bay. The floors are laid with pitch-pine wood blocks under the benches, and tiles in the chancel and side chapels. The roofs are covered with green slates. The walls are of brick with dressings of granite both outside and inside, executed on the ground by the general contractors for the asylum, Messrs. Colten Bros., of Dublin and Portadown. The cost of the building, exclusive of heating, electric lighting, and church furniture, has been about £4,500. The style is late Decorated. The high altar is chiefly of Caen stone. It has a high reredos and canopy over Tabernacle with ornamentation. The benches are of pitch-pine and are hinged to the floor. The Communion railing is of iron and brass, with oak capping. The pulpit and credence tables are of oak. The contractors for the several fittings were Messrs. Pearse for the High Altar, Messrs. Kelly & Son for the benches, Messrs. Fagan & Son for the communion railing, Messrs. White & Son for the organ case, Messrs. Scott & Son for the pulpit and credence tables, all of Dublin. From the apex of each pointed arch in the nave arcade a number of ornamental electric arc lamps are suspended, and through double rows of iron grating fixed along the central passage from the porch to the High Altar.

PUBLIC WASH-HOUSES, PERTH.—Public wash-houses are to be erected at the corner of Canal-street and Charles-street, Perth. They will have a frontage to Canal-street of 91 ft. and to Charles-street of 106 ft., the entrance being from the former. The whole accommodation will be on the street level. Adjoining the entrance hall is the office, from which tickets will be given out to each washer as she enters. From the inner or waiting hall, which adjoins the entrance hall, access to the wash-house proper and the waiting-room is obtained by separate doorways. The wash-house is 81 ft. long and 67 ft. wide, and contains forty-eight stalls. Entering at one side of the wash-house is the blanket washing-room, 30 ft. long and 20 ft. wide,

with a group of drying-horses at one end and a range of washing-tubs at the other, provided with hot and cold water. Next to the waiting-room, and also entered off the wash-house, is the mangling and folding room, provided with tables and mangles. The boiler-house on the side next Charles-street will be replete with economiser, hot-water heater, &c. The chimney stack will be 70 ft. in height. The front walls facing Canal-street and Charles-street will be built with dressed freestone, and the interior surfaces of the walls of the wash-houses will be lined with enamelled tiles. The plans have been prepared by Mr. Robert M'Killip, Burgh Surveyor, with the assistance of Mr. Rufus and Mr. Albert Pullar.

REOPENING OF THE ROYAL HOTEL, PLYMOUTH.—This building has just been reopened after alterations and improvements at a cost of about £30,000. Altogether there are nearly eighty bedrooms in the hotel, thirty-six having been added by the new extension. Three electric lifts provide easy and expeditious means of communicating with all the floors. The alterations to the hotel have been carried out by Mr. A. N. Coles, contractor, from the designs of Messrs. Owen & Ward, architects, Birmingham. Messrs. Archibald Smith & Stevens, Manchester and London, supplied the electric fittings; Messrs. L. & Shand, Westwell-street, the electric light fittings; Crossley & Co., Manchester, the gas engines; Griffin Iron Foundry, the cooking ranges and hot-plate service; and Randle & Prosser, Plymouth, executed the exterior painting; and De Jong, London, the interior painting and papering.

THE ASSEMBLY BUILDINGS, BELFAST.—The work at the new Assembly buildings of the Presbyterian Church in Ireland at Fisherwick-place is progressing. Messrs. Young & Mackenzie and Mr. Robert Curry are the architects and builder respectively. The walls are being built of a local stone obtained from a quarry near Newtownards. The buildings will contain millioned windows and Tudor arches, but the feature will be the large assembly hall, 105 ft. long by 60 ft. wide, of horseshoe shape, and overlooked by two galleries. A large ground passage from Fisherwick-place will constitute the principal entrance, a second means of ingress being provided in Howard-street. At the rear a series of ware-houses will be built. A number of offices will also be added to the Howard-street side, but they are planned on a principle which will admit of their readily being converted into portions of the main building. A tower forms part of the design, surmounted by a crown modelled on the style of St. Giles's, Edinburgh. Departments devoted to Church work will occupy the portion facing Fisherwick-place, whilst provision has been made for rooms for the Central Presbyterian Association on the first floor on the Howard-street side. The remainder of the first-floor accommodation is devoted to a large board-room, to be utilised by the Foreign Mission Society, Girls' Friendly Society, and other organisations in connexion with the Church. From the main passage the top of the building will be reached by means of a lift, and the whole premises are heated and ventilated on the Plenum system. Amongst the other departments may be mentioned the Minor Hall, forming a leading feature in the architecture, and capable of accommodating 500 persons, and a technical school for lectures and discussions.—*Irish News.*

WORKHOUSE CHAPEL, DEWSBURY.—At the Dewsbury Union Workhouse, Stancliffe, on the 7th inst., the foundation stone was laid of the chapel which is being built in commemoration of the Coronation of King Edward VII. The design of the building has been prepared by Mr. G. A. Fox, architect, Dewsbury. The contemplated cost is about £5,000. The contractors are Mr. George Whitehead, Dewsbury, mason; Messrs. John Richardson & Sons, Kilpin Hill, joiners; Messrs. Jonas Thornton & Sons, Heckmondwike, slaters; Mr. Frank Newsome, Dewsbury, plumber; Mr. S. Crawshaw, Batley, plasterer; and Mr. Forrit, Dewsbury, painter.

LECTURE HALL, BELFAST.—This hall, which has been erected by the Meggin Memorial congregation, was opened on the 9th inst. The building is situated at the rear of the church in Chamberlain-street, off the Newtownards-road, is 85 ft. long by about 34 ft. wide, and built in red brick. The entrance doors to the building, of which there are two, are constructed in harmony with the windows. The one nearest the church opens into a wide hall, off which are situated a small classroom, a minister's room, and a lavatory. On the left is the general classroom, designed to seat 300 people. The second front door, which is the entrance to the lecture hall above, opens into a hall, which has a door on the right side, giving an additional means of communication with the general classroom. Off this hall is situated a cloak-room and a kitchen. The stair leading up to the lecture hall is approached from this hall, and is formed of pitch pine. At the bar end of the lecture hall is a platform, capable of accommodating fifty people. Situated between the two entrance doors and facing the platform is a gallery with seating room for 100 people. The entire building has been fitted throughout with electric light by Messrs. Richard Patterson & Sons, under the superintendence of Mr. John Woodside. The builders were Messrs. Hewitt Brothers, Ballyhackamore; and the architect, Mr. W. D. R. Taggart, Belfast.

FREE GRAMMAR SCHOOL, TAUNTON.—On the 10th inst. were opened the new science buildings, erected after plans and designs by Mr. F. W. Roberts, of Taunton. The additions comprise a chemical laboratory measuring 40 ft. by 20 ft., with benches for sixteen students, ventilating chambers, a balance-room, &c., and a physical laboratory. The school, which now has 210 pupils, most of whom are boarders, was originally established in 1522 by Richard Fox, Bishop of Winchester, in buildings situated within the Castle gate, and about thirty years afterwards was endowed with 60 acres of land by William Wallbee. The Bishops of Winchester were lords of the manor of Taunton from a long period before the Conquest until its sale in 1822 by Bishop Tomline. Some years ago the Corporation bought the old school buildings for municipal purposes, and in 1890 the Charity Commissioners made a scheme for the consolidation into one foundation of the former endowments by Bishop Fox and Wallbee, and a yearly sum of 100l. paid from the Taunton Town Charity to Huish's Girls' School.

ALMSHOUSES, NEWPORT, MON.—The Mayor of Newport recently laid the foundation-stone of the Queen Victoria Memorial Almshouses, on Stow Hill. The new buildings are being erected on land given by Lord Tredegar, having a frontage to Stow Hill of 127 ft. The houses are to number eventually nine, but six only are being built now. The buildings are one story in height, and provide sitting-room, bedroom, scullery, coalhouse, pantry, &c., for each inmate, with a covered-in porch at the entrance. The buildings are being constructed with brick, with Bath stone dressings. The flooring will be laid with wood blocks and red tiles. The contract has been let to Messrs. Jewell & Sons, of Newport, for the first section, at the sum of 1,200l. Each house costs, including boundary walling, draining, levelling of site, &c., 200l. The architects are Messrs. Haber-shon, Fawcaker, & Groves, Newport and Cardiff.

BANK, BYKER, NORTHUMBERLAND.—The North-Eastern Banking Co. have just opened new buildings at the corner of Shields-road and Addison-road, Byker. The building is in the Classic style, and is built of dressed stone, the base and dressings to windows on ground-floor of red polished granite. The entrance to the banking-room is in Addison-road. This compartment is about 30 ft. by 25 ft. Off this room is the manager's private office, with doors opening from the public space and from back of counter. In the lower ground-floor there is a large strong room, also coat rooms and lavatory accommodation. The heating will be by hot-water radiators on the low-pressure system, and the banking-room will be lighted by electricity. The manager's house is over the banking premises, and is entered by a private door from Addison-road. The work has been carried out by Mr. C. H. Mauchlen, Newcastle, under the superintendence of the architects, Messrs. Newcombe & Newcombe.

FOREIGN.

RUSSIA.—It is reported from Kertch, in the Crimea, that another ancient "kurgan," or burial-mound, has been opened there. These mounds are nearly all of them buildings covered over with earth. In the present instance the "kurgan" has been found to contain a tomb dating from the second or third century of the Christian era. The tomb is vaulted, and the entrance protected by a stone slab bearing an artistic carving of a medusa's head. The floor of the tomb and the sides are built of large stone slabs, and traces of painting are still visible. Many interesting ornaments were discovered during the excavations, and a selection of them has been sent to the Imperial Museum at St. Petersburg, which is already very rich in gold and precious stone ornaments from the ancient burial-mounds of the Crimea. Underground telephonic communication is to be established at St. Petersburg, and American tenders have been accepted for carrying out the work. The work will be commenced not later than October next year, and is expected to be completed by the autumn of the year following. The American tender is said to have been 315,000 roubles lower than any other.

EGYPT.—The Khedive has recently opened the new building of the museum of Egyptian antiquities in Cairo. The whole collection has been arranged in it under the supervision of M. Maspero, Emil Brugsch Bey, and others.

GREECE.—Dr. Rudolf Hertzog, Professor at the Tubingen University, who has been making excavations in the island of Kos, is reported to have discovered the temple of Asclepius. The building is of marble, 30 metres long and 17 metres wide. The interior was converted into a Christian church, the altar and cross of which have now been brought to light. Some interesting inscriptions have also been found.

FRANCE.—The Académie des Beaux-Arts, which has received a legacy of 20,000 francs for the encouragement of rising landscape-painters, has decided on establishing a landscape competition every two years, with a prize of 2,000 francs. The managers of the Louvre propose to arrange, in two of the new galleries adjoining the Thomy-Thiers collection, a certain number of works of modern painters, especially Isabey, Diaz, Corot,

and Trovon, mostly transported from the Luxembourg Museum. The opening of the Petit Palais is fixed for the beginning of December, probably between the 5th and 8th. The "Vieux Paris" Committee have passed a resolution recommending that the Municipality should organise every year a competition in photographs of sites in Paris. M. Tisot has left to the Louvre his series of pictures of "The Prodigal Son." He has divided his collection of etchings between the museums of Nantes and Besançon, and the National Library at Paris. The Château d'Eu, the property of the Duc d'Orléans, has been almost entirely destroyed by fire. It appears how almost all of the valuable works of art it contained have been saved. An art-exhibition is to be opened at Lyons on January 10; an exhibition of the Société des Amis des Arts at Nantes is to be open from January 31 to March 15; and the thirty-ninth exhibition of the Société Artistique of Pau will be held from January 15 to March 15. M. Bonnay, the architect, has prepared a scheme for the restoration of the church of St. Martin at Brives, which is classed among the Monuments Historiques. The Municipality of Troyes has opened a competition for the reconstruction of the Hôtel de Ville, at an estimated cost of a million and a half francs. The death is announced of M. Auguste Ledru, a decorative sculptor, pupil of M. Dumont, Boissieu, and Thomas. He exhibited at the Old Salon objects of decorative art and plaster work.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Messrs. Barrett & Driver, architects, have removed from 53, Blomfield-road to 23, York-place, Baker-street, W.

INTERNATIONAL FIRE EXHIBITION MEETING.—This meeting, called for Wednesday last, which was postponed owing to the unavoidable engagement elsewhere of the Duke of Cambridge, who was to have taken the chair, will be held at the same hour (12 noon) on Wednesday next, the 26th inst., at the Royal United Service Institution, when the Duke of Cambridge will preside.

LEEDS MASTER BUILDERS' ASSOCIATION.—The members of the Leeds Master Builders' Association, together with representatives from kindred organisations in Yorkshire, dined on the 13th inst. at the Queen's Hotel, Leeds. Mr. George Wilson, of Headingley, the newly-elected President, took the chair. After the loyal toasts, Mr. J. Biggin proposed "The Leeds Master Builders' Association." Mr. W. Nicholson, in response, referred with satisfaction to the fact that the Association was never so strong financially as at the present time. He would like the Association to take up the question of contract agreement. Since he was a boy there had been a feeling in the building trade that the architect should not be the sole arbitrator, but that condition still remained. If the Association were determined and the architects were approached, he thought they would agree to an arbitration clause being inserted in agreements. The present arrangement was not fair, it was not equity, and it very often acted greatly against the builders. Another question upon which they ought to be agreed was that of apprentices. The present, when trade was quiet, was the right time for the young men to go to work. Trade was good and material was extremely dear, but labour was very scarce. In regard to that scarcity he blamed the masters. If every master did his duty, and bound a sufficient number of apprentices and made them learn their trade properly, they would not in days of good trade suffer from the scarcity of skilled labour, as they did three years ago. The too frequent practice had been to take on boys who were called improvers. They were not improvers; they did not improve themselves, and they did not improve matters for the masters. Mr. G. Mansfield (President of the Yorkshire Federation) gave "The City and Trade of Leeds." Commenting on the increase of competition, he said that we could not afford to "play," and that Englishmen did not do so much as they might do. Mr. Paul Rhodes responded. He said he did not wish to see English employers or men toil as in America, but both classes would be better for a little of the American spirit. As to municipal trading, if it were not stopped the day would come—perhaps not in their time—when there would not be any such thing as the great municipalities asking for tenders. If municipal trading was as cheap as throwing work open to tender, he would not object; but it cost more. Mr. J. T. Wright next submitted the health of the President. Mr. Wilson suitably replied. In proposing the toast of Peace, Mr. Wright said that Mr. Myers said he did not advocate that in the building trade they should imitate American methods, for he felt strongly that there was a human side to the question. While they did not want to see English workmen driven like dumb cattle, almost without a say, from Monday morning till Saturday night, for the sake of filling English employers' pockets, they wanted a fair day's work for the money they paid. "We do not," he observed, "always get the return for the money we pay. In our trade we have no fear of foreign conditions, and that being so, does it not mean that the matter is largely in our

own hands? We ought to be able, if we had confidence in one another, to have something more than a livelihood, something to lay by for a rainy day. The price at which work is taken to-day does not remunerate us in the way we ought to be remunerated for our daily anxieties and worries." Mr. John Pickard (the ex-President) acknowledged Mr. toast. Mr. Nicholson gave "The National Federation of Building Trade Employers and Branches." The Federation might not have fulfilled all our expectations, but he claimed that it had done a great amount of good, and he looked forward to it doing a greater amount of good. Mr. Biggin replied.

CREMATION.—The following remarks on the subject occur in the last monthly Report of Dr. Orms Dudley, the Medical Officer of Health to the Borough of Kensington:—"It is not to be expected that the practice of cremation will make rapid progress in this country, and not probable, therefore, that burial authorities will be in a hurry to avail themselves of the powers conferred by the Act. And when Metropolitan Borough Councils do take action, it is more than likely that they will comply for the purpose of erecting crematoria for the common use of their several districts. With respect to the Council's cemetery at Putney, having inspected the same, I am afraid there is no suitable spot at which a crematorium could be erected, having regard to the restrictions of the Act. Closely adjacent there is another cemetery under the jurisdiction of the Council of the City of Westminster, somewhat larger, and having a considerable area of ground in which interments have not been taken. I would, therefore, be glad to see erected in this cemetery a crematorium which would not infringe the provisions of law *qua* distance from houses and highways; but whether there is available unconsecrated ground I cannot say. Should the Council of the Royal Borough and the Council of the City of Westminster think it desirable to make provisions for cremations, they might consider it so by erecting a suitable building at one or other of the cemeteries, for the joint use of the inhabitants of the two districts, and without incurring any very large expenditure."

"A DESIGN FOR LIVERPOOL CATHEDRAL."—Mr. Waller's brief description of his design in the last issue, the brevity of a large design, should have read "an expedient of a large dome."

ARCHÆOLOGICAL DISCOVERY, PETERBOROUGH.—A discovery has been made at Peterborough during excavations for underpinning the Knight's Chamber gateway in the Cathedral precincts. About 15 ft. below the present level the workmen came upon the ancient wall seat *in situ*. About 18 ft. below the present level the original well-worn paving of monastic days. The original level was, therefore, nearly 3 ft. lower than the existing one, and corresponds to the pavement level of old Peterborough, which is often met with in town excavations, at which coincides with the floor level of the parish church—Times.

THE GARDEN CITY SCHEME.—In a communication from the secretary for this scheme we are informed that there has been a fourfold increase in its income and membership during the past fourteen months. The membership is now over 1,600, and the members have arranged 130 lectures among them for the next few months, to be delivered in parts of the company, which holds its statutory meeting on Monday next, has been subscribed promised. The directors are desirous that the remaining capital should be subscribed at once, permit them to take advantage of certain offers which have been made conditional on the whole amount being raised. Further progress in similar condition would also be welcome. A reception will be held by the council of the Garden City Association in the Grafton Galleries, on the 26th inst. It is hoped that by that time the remaining sixth of the capital will have been subscribed.

NATIONAL TRUST FOR PLACES OF HISTORIC INTEREST OR NATURAL BEAUTY.—The annual general meeting of this trust, which seeks to promote the permanent preservation, for the benefit of the nation, of lands and tenements of beauty, historic interest, and, as regards lands, to preserve their natural aspect, features, and animal and plant life, was held on the 17th inst. at the offices, Victoria-street. Mr. J. C. Bailey, who presided, moved the adoption of the Report, which stated that the trust had purchased for the Brandon how estate, on Derwentwater, was on a much larger scale than anything previously attempted by the Trust, and the Council felt that the success of which it met was to be interpreted as a verdict of approval of the work which the National Trust had undertaken, and of the mode in which such work was carried out. Princess Louise, Duchess of Argyll, who performed the opening ceremony on October 16 last, was now President of the Trust. The acquisition made during the past year was that the monument erected on the Dorset coast to the memory of Sir Thomas Hardy, Nelson's first captain. The tower had been handed over to the Trust on a 500 years lease, while Colonel Villiers M.P., had presented a maintenance fund to the Trust. The Council regretted the action of the owner of Stonehenge in surrounding the stones with a barbed-wire fence, because it believed that doing so he had not only obstructed public rights of way, but had done grave injury to the monument.

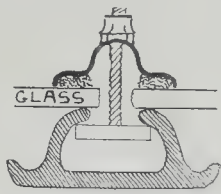
relation to the surrounding country. The Council strongly of opinion that the national interest in the scheme should be jealously guarded, and it considered that the most satisfactory solution of the problem would be for the monument to pass into the hands of a public body. Reference was also made to the action of the Council in connexion with the view from Richmond Hill. The Report was adopted, and the members of the Council were afterwards re-elected, with the addition of the names of Y. Anderson, Dr. G. Dawtre Drevitt, and O. Fleming.

NEW LIFT FOR THE HOUSE OF COMMONS.—Messrs. Waygood & Co. some months ago erected one of their latest types of electric lift in the House of Commons. This having proved very successful they have now received an order from the Office of Works to erect a similar lift in the House of Commons.

W. A. TIMBER TRADE.—Mr. Woodhouse, British Consul, in a report which has just been received from him at the Foreign Office, gives a very lucid statement of the condition of the timber trade at it was bad last year, he says, for nearly everybody concerned in it, and lucky was the buyer who did not succumb to the continued fall prices. At the beginning of the year, when consignments were made, all the mills in Europe were full up with stocks for f.o.w., but instead of being disconcerted by this fact, and in spite of the efforts of buyers that consumption had declined, seemed to think that if they held out they would obtain the prices, or, at least, the prices of the year 1900. The Swedes notably held out, selling a few buyers were tempted into paying high prices for f.o.w., but most kept back, and a price of 5s. or so per standard being between buyers and sellers. When the first open water drew in and but few goods had been sold, shippers began to lower their prices, and to show a willingness to sell at prices previously offered, but buyers, save in a few instances, now bid less, and very little business had been done when the month of May ended. By this time it became evident that though the fresh log supplies would be considerable, less than in 1900, still they were too ample for the state of the market. Shippers and buyers of stock became uneasy, and a general decline in prices began and lasted until October. The fall in prices, as compared with 1900, amounted to 18 per cent. for some descriptions of goods, and as much as 25 per cent. for others. White wood was affected to a great extent. In October prices began to recover. At the opening of the present year, 1902, the position of affairs had become greatly strengthened. The visible stocks of sawn goods were still fairly large, but it was known that in all countries the output of logs from the forests had been greatly curtailed, and consequently that it would be very difficult to replace the stocks. Especially in Riga, in this case, the log output, being the smallest on record, not more than 8,200 rafts having been floated down, against about 16,500 in 1901 and 22,000 in 1900. In sawing logs the deficiency was even greater than these figures would show, and the total supply for this year can hardly be more than 10 per cent. of the quantity of 1900. Prices, therefore, have all along been very high for sawing logs, and, most of the time, being ill-provided in quantity, Riga stocks of sawn wood have remained small and prices very firm. If, however, stocks are small, demand seems to be also small, partly because of the fact that Riga has declined to export, partly because buyers abroad—especially in the United Kingdom—persistently refuse to believe in the shortage of goods at Riga. They say they have heard the same story of log shortage, and all there has been a full supply. Probably the men of the jobbing section of Riga shippers, who are the smaller mills, which do not export in their name, but sell locally. These jobbers sold a good deal on speculation at lower figures, thus leading to a further decline in the log shortage, but at high prices and have sustained heavy losses in consequence. Prices of sawn goods have still an upward tendency, and it is not at all improbable by the spring of 1903 they will have reached the highest level ever known. It is practically certain that the first open water stocks of 1903 will be smaller than Riga has had for twenty years. Mr. Woodhouse adds that the total quantity of logs exported from Riga in 1901 was 30,850,000 cubic feet, against 46,550,000 cubic feet in 1900—a decrease of about 6,700,000 cubic feet.

CHURCH OF ST. MARY, ISLINGTON.—A report has been made to the Public Health Committee of the Borough Council by Dr. A. E. Harris, Medical Officer of Health, upon the condition of the church beneath the parish church of Islington. Dr. Harris calculates that the vaults contain 400 coffins, many of which are in a state of decay, and has said that some of the bodies were put, without any shroud, into the vaults when they were covered in with concrete. He points out that the vaults should be at once removed by the removal of the coffins and human remains to the parish church at Finchley. The church, the re-

building of which has recently been under consideration, was erected in 1751-4, after plans and designs by Launcelot Dowbiggin. The brick tower carries a stone spire that rises to a height of 164 ft. **LUXFER PATENT ROOF GLAZING.**—This glazing, patented by the Luxfer Prism Companies, is shown in section in the accompanying diagram. Its construction is obvious enough from the section; it consists of a hollow steel rib and a copper capping (which may, however, be of cheaper material) screwed down to the glass with a brass screw attached



to a square brass clip held by the jaws of the steel rib. The packing between the capping and the glass is of asbestos fibre. The important point in the method is the ease with which a broken screw or clip may be replaced; as the nuts are unscrewed and the capping taken off, when the screws and clips can all be slid out to the end of the groove, and broken ones replaced.

THE PLANNING AND FITTING-UP OF BOARD SCHOOLS.—A summary has just appeared of a set of rules which the Board of Education have framed for the guidance of school managers and their architects, and which must in future be observed in the planning and fitting of all new school premises and enlargements before the proposed dispositions can be approved by the Board. The rules, which will shortly be published, declare what will be considered as essential requirements in respect of plan, construction, and equipment in the schools. The Board are of opinion that in ordinary cases no school should be built for more than from 1,000 to 1,200 children in three departments, no one department being for more than 400 children. For the three departments of a school to accommodate a total of, say, 360 boys, 360 girls, and 360 infants, they consider the most suitable plan to be that of seven classrooms grouped about a central hall, whilst smaller departments would be suitably planned with classrooms entered from a corridor. Special cases excepted, there should always be at least one classroom, though one classroom or more, with a large room, will for a small school be considered sufficient. The Board hold that, in any case, a school building should not be of more than two floors, as there are many objections to a building of three floors, which should be proposed only under special circumstances or upon a very costly site. At the same time, they think on a large, open, and fairly even site, the most economical plan is that for a school consisting of only one floor. In a general way, the Board will require that every school shall have an ample playground, be suitably lighted and warmed, and be thoroughly ventilated without draughts. It must have a sufficient number of entrances and adequate cloakroom accommodation—every part of the building must be thoroughly adapted for the work of school teaching.

LEGAL.

THE RIGHT TO THE SUBSOIL OF REGENT-STREET.

MR. JUSTICE JOYCE, in the Chancery Division on the 12th inst., concluded the hearing of the case of Mappin Bros. v. Liberty & Co., Ltd., and the Attorney-General, an action by the plaintiffs, a firm of jewellers and silversmiths, carrying on business at No. 220, Regent-street, for an order to compel the defendants, the lessees of Nos. 218 and 222, Regent-street, which premises adjoined those of the plaintiffs, to remove a subway or tunnel that the defendants had constructed through the subsoil of Regent-street in front of the plaintiffs' shop, for the purpose of connecting their two houses.

It appeared that the plaintiffs were lessees of No. 220 for a term of fifty years from March 25, 1860, and as such claimed to be entitled to the soil of the street adjoining their premises as far as the middle of the street for the residue of the term. The plaintiffs founded their claim upon the presumption that a conveyance of land abutting on a highway passed the soil of the highway *usque ad medium filum viae*. The defendants, Liberty & Co., contended that the soil of this part of the street was vested in the Crown, and that what they had done was done under the licence of the Crown. The Attorney-General was added as a defendant to support this view. The plaintiffs and the defendants' premises were situated on part of a tract of land acquired by the Commissioners of Woods and Forests under an Act of Parliament passed in 1813 entitled "an Act for making a more convenient communication from Marylebone Park and the northern parts of the Metropolis, in the parish of St. Marylebone, to Charing Cross, within the Liberty of Westminster,

and for making a more convenient cleavage for the same." Under this Act the Commissioners made Regent-street and granted leases of several houses fronting the street, including leases of the plaintiffs and defendants' premises. The lease of the plaintiffs' premises was granted on February 17, 1823, in which the demised property was described as fronting "a road now forming, called, or intended to be called, Regent-street." The defendants' case was that by the terms of the lease the Commissioners retained in their own hands the soil of the street which was essential to them for the performance of the obligations cast upon them by the Act.

In the result, his Lordship, at the conclusion of the arguments of counsel, said he was of opinion that the soil of this part of Regent-street on which the plaintiffs' house abutted was land wanted for the purposes of the Act. Section 34 of the Act did not confer upon the Commissioners any power to sell any part of the street, and he doubted whether they had any power to demise it. However that might be, there was no single reason for their including the soil of the street in the lease of No. 220, and there were a thousand and one reasons against their doing so. He accordingly made a declaration that no part of the subsoil of the street passed by the demise of No. 220.

The action was accordingly dismissed. Mr. Hughes, K.C., and Mr. D. Pollock appeared for the plaintiffs; Mr. Younger, K.C., and Mr. G. Cave for the defendants, Liberty & Co.; and the Solicitor-General and Mr. F. Vaughan Hawkins for the Attorney-General.

It was intimated that the plaintiffs would probably appeal from his Lordship's decision.

ANCIENT LIGHT DISPUTE AT BERMONDSEY.

MR. JUSTICE SWINFEN EADY on the 14th inst., in the Chancery Division, delivered judgment in the case of *Courage & Co. v. The South-Eastern Railway Co.* on a motion by the plaintiffs for an injunction to restrain the defendant Company from erecting on land which belonged to them in the parish of Bermondsey any dwelling-house or other buildings so as to darken or obstruct the plaintiff's ancient lights in a public-house called the White Bear.

It appeared that under the London County Council (Tower Bridge Southern Approach) Act, 1895, the London County Council had power to take certain land for the purpose of the improvement and for providing space for the erection of houses and buildings adjoining or near the improvement. Section 17 of the Act empowered the Council to appropriate the soil of any street or passage stopped up or diverted by them, and to extinguish the rights of way or other rights over the same, and the soil of such street or passage was to vest in the Council. Section 28 gave the Council power to grant leases of such lands so acquired by them, and not required for the purposes of the improvement. The land upon which the defendants' buildings were erected (which were complained of) was leased to them by the Council for the purpose of the erection of workmen's dwellings. The defendants obtained their power to acquire the land and to erect the buildings thereon under the South-Eastern Railway Act of 1897, and the Company proceeded to erect buildings on the north side of Long-walk, Bermondsey, on the land leased to them by the Council for the purpose of rehousing persons displaced by them in connexion with the widening and works executed by them under their Act. The scheme and the plans of the buildings had been approved by the Secretary of State for the Home Department, as provided by Section 39 of the South-Eastern Railway Act, 1897. The defendants did not dispute that their buildings would darken or obstruct the plaintiffs' light to some extent, and that the plaintiffs would suffer some damage, but they contended that the plaintiffs' only remedy was to obtain compensation under Section 68 of the Lands Clauses Act.

His Lordship, in giving judgment, said he was of opinion that the defendants were only doing what they were by statute empowered to do, and that for any injury which the plaintiffs might thereby suffer their remedy was to proceed under Section 68 of the Lands Clauses Act, 1845, for compensation.

He accordingly made no order on the motion. Mr. Eve, K.C., and Mr. Sheldon appeared in support of the motion, and Mr. Micklem, K.C., and Mr. C. T. Mitchell for the defendant Company.

THE COST OF CONSTRUCTING A ROAD AT BROMLEY.

THE case of *Moore v. Todd* came before Mr. Justice Bigham, sitting without a jury in the King's Bench Division, on the 13th inst., it being an action by Mr. John Moore, of Oakwood, Beckenham, against the defendant, the Rev. John Wood Todd, of Forest Hill, to recover 108*l.*, which the plaintiff alleged to be due to him from the defendant by virtue of a covenant in an indenture dated November 22, 1888.

It appeared that in the year 1888 the defendant was developing some land fronting the road at Bromley, Kent, for building purposes, and widened the roadway running by his land, constructed a road and metalled and made up the surface. The

plaintiff, as the owner of property on the opposite side of the road, agreed to contribute 250*l.* towards the expenses the defendant was put to in improving the road, and under the terms of the deed of November, 1888, the defendant entered into a covenant with the plaintiff in the following terms:—

"The said John Moore his heirs or assigns, or his or their tenants shall not be under any liability to contribute to the maintenance or repair of the said roadway and sewer and main drain, or any works connected therewith, but on the contrary the same and every part thereof shall be wholly and solely maintained by the said J. W. Todd his heirs executors administrators or assigns unless or until the same shall be taken to by the parish or some other local or public authority." The Local Authority at Beckenham in 1901 called upon the frontagers to make up the road, and they failing to do so, the Authority executed the work and charged the frontagers with the cost under the provisions of Section 150 of the Public Health Act, 1875. The apportioned cost which the plaintiff was called upon to pay amounted to 108*l.* and he brought the present action to recover this sum from the defendant under the terms of the covenant.

His Lordship, after hearing the arguments of counsel, held that the real object of the covenant was to protect the plaintiff from the kind of liability which he had incurred by reason of the notice of the Local Authority. He thought the intention of both parties was to indemnify the plaintiff, and that their object was to protect the plaintiff from further burdens in connexion with the road until the Local Authority took over the burden themselves. He accordingly gave judgment for the plaintiff for the amount claimed in the action.

A stay of execution was granted with the view to an appeal.

Mr. Eldon Bankes, K.C., and Mr. R. F. Colam, appeared for the plaintiff; and Mr. C. A. Russell, K.C., and Mr. C. C. Scott for the defendant.

THE TRIBUNAL OF APPEAL: THE LONDON HOSPITAL CASE.

IN our issue of last week we gave a detailed report of the hearing of this case by the Tribunal of Appeal on the 11th inst., when the Hon. S. Holland, barrister, Chairman of the House Committee, appeared in person on behalf of the Governors of the Hospital to appeal against a requisition of the District Surveyor, Mr. Arthur Crow, under Section 78 of the London Building Act, 1894.

The very extensive alterations which have been in progress at the hospital for the last four years involve the erection of two additional stories over the whole of the building. In addition to this, over the east wing, which is the portion of the building in dispute, there is to be a concrete flat, with a series of large water-tanks, extending the whole length of the wards. Having regard to the extra load of the new stories, the concrete flat, and the water-tanks, the District Surveyor declined to hold himself responsible for the safety of the building unless the external walls, which are of great age and bulged in places, were strengthened by additional piers or buttresses of brickwork.

The members of the Tribunal (Mr. Penfold, Mr. A. A. Hudson, and Mr. E. A. Gruning), having been shown over the building by the architect, Mr. Rowland Plümbe, on Wednesday, the 12th inst., the chairman (Mr. Penfold) stated that they were unanimously of opinion that the building required strengthening, but instead of the buttresses asked for by the District Surveyor, their order would be that a support of steel on brick should be built against the centre pier of the east and west walls of both sections of the block. These supports would be carried up to the new stone string at the third floor level, and be tied together in pairs by a steel girder running right across the wards from the east wall to the west wall. The projection at the base would be from 7 ft. to 8 ft. The supports would be in the nature of permanent shores, and prevent the warping of the walls. The details of the structure would be worked out by Mr. Plümbe in consultation with Mr. Crow, and submitted to the Tribunal for their approval. Copies of the drawings would then be attached to the formal order.

The case for the District Surveyor was argued by Mr. D. P. Andrews, of the Solicitors' Department, London County Council.

ANCIENT LIGHT DISPUTE AT BARNSTAPLE.

THE case of *Furdon v. Liverton* came before Mr. Justice Buckley in the Chancery Division on the 13th inst., it being an action brought for an injunction to restrain the defendant from building so as to darken or obstruct the plaintiff's ancient lights and also for a mandatory injunction to compel the defendant to pull down so much of his building as had been erected after the issue of the writ in the action. The plaintiff, however, did not now ask for a mandatory injunction, but claimed compensation for the damage that had been done to his property. The plaintiff was a wholesale and

retail grocer carrying on business at No. 78, High-street, Barnstaple, and the defendant was a glass and china merchant carrying on business at No. 20, High-street, which was the shop and premises exactly opposite the plaintiff's premises. High-street, Barnstaple, is an old-fashioned narrow street running from north-west to south-east, the plaintiff's shop being on the south side of the street and faced practically the north and east. The width of the street was 26 ft. or 27 ft. only from wall to wall, the width of the plaintiff's shop being 20 ft. and the shop window 9 ft. high. The depth of the shop was 56 ft. 6 in., and with the exception of a little light which came through a counting-house at the back, the front window was the only light to the shop. The plaintiff also claimed in respect of windows on the first floor, which lighted a sitting-room and which he said had been darkened by the defendant's building. The plaintiff's case was that the defendant's old building which formed the east end of the site of the present building was 29 ft. high to the top of the eaves. The defendant's new building was already considerably higher than the old building.

Evidence was called on behalf of the plaintiff that the damage to the plaintiff's premises by the defendant's building was between 20*l.* and 25*l.*

Mr. H. Terrell, K.C., on behalf of the defendant, submitted that the selling value of the plaintiff's premises was 1,350*l.*, and it was impossible for the value to have been diminished by 62*l.* by reason of the defendant's new building. He first contended that the plaintiff had made out no case for relief, but if the plaintiff had been damaged, the damage would be met by the payment of a comparatively small sum.

His Lordship, in giving judgment, said the fact that the plaintiff's lights had been darkened by the defendant's new building was practically uncontroverted. One of the witnesses assessed the damage at 20*l.* off the rental value, and giving that twenty years' purchase, he estimated the damage at 200*l.* Some had put it as high as 625*l.* Sitting as a jury to determine what the amount of damage actually was, and taking everything into consideration, he estimated the damage at 350*l.* He accordingly gave judgment for the plaintiff for that amount with costs, and granted an injunction to restrain further building.

BUILDING DISPUTE AT ENFIELD.

MR. JUSTICE FARWELL, in the Chancery Division on the 18th inst., concluded the hearing of the case of *Webster v. Brewis*, an action by the plaintiff, Janet Brown Webster, for a mandatory injunction to compel the defendant to remove a building which the plaintiff alleged was a breach of a covenant that the predecessor in title of the defendant had entered into.

It appeared that the predecessor in title of the defendant purchased, in 1894, a piece of plot of land which formed part of a building estate at Enfield, and in the conveyance he entered into a covenant that he, his heirs, and assigns would not erect on the land any other buildings than one or two detached villa residences, "with the appurtenances thereto," of a specified value. On the plot of land a dwelling-house, stables, and coach-house were erected, and in June, 1900, the same were conveyed to the defendant, Mr. Thomas Brewis.

The plaintiff, in February, 1900, purchased an adjoining plot of land on the same estate, upon which she erected a dwelling-house. It seemed that the defendant recently had pulled down some part of the fence which separated his piece of land from the plaintiff's, and erected a building for the storage of bicycles and other utensils, which building was about 30 ft. in length and about 20 ft. high. The plaintiff's case was that the erection of this building was a breach of the covenant entered into by the defendant's predecessor in title and caused her injury, inasmuch as it obstructed the access of light and air to certain of the windows of her house, from which it was only about 8 ft. distant. The plaintiff also alleged that defendant's building interfered with the view from the windows of her house.

In the result, his Lordship, after hearing some evidence and the arguments of counsel, held that the purposes for which the defendant erected and used the building, complained of, were reasonable for the convenience of a villa like the defendant's, and that he was entitled to erect such a building, it being within the terms of the covenant. He was of opinion that the action was wholly misconceived, and must be dismissed with costs.

judgment accordingly.
Mr. C. E. Jenkins, K.C., and Mr. Percy Wheeler appeared for the plaintiff; and Mr. W. H. Upjohn, K.C., and Mr. Manby for the defendant.

IMPORTANT PATENT ACTION: ELECTRICITY METERS.

IN the Court of Appeal, composed of Lords Justices Vaughan Williams, Stirling, and Cozens-Hardy, on the 19th inst., the hearing was concluded of the case of *De Ferranti v. the British Thomson-Houston Co., Ltd.*, on the appeal of the plaintiff, Mr.

Sebastian Ziani de Ferranti, an electrical engineer, from a decision of Mr. Justice Swinfen Eady in the Chancery Division.

The action was brought by the plaintiff to obtain an injunction to restrain the alleged infringement of his Letters Patent No. 701 of 1887 and for damages. The term of the patent expired shortly after the issue of the writ, and the action was, therefore, treated as one for damages only. A plea that the patent was invalid, the patent in question being related to improvements in electrical meters, was put in.

Previous to the year 1887 the plaintiff had invented an electrical meter in which the current to be measured was made to pass through a bath of mercury in a magnetic field so disposed that the mercury was put into a continuous rotatory movement by the passing of the current, the movement of the mercury being recorded by means of a float or other device with recording mechanism. That improvement was designed for use with a continuous current, and with a solid magnet of cast iron, the residual magnetism of the cast iron serving to assist the rotation of the meter to start even very small number of lamps in use. In order to adapt the meter for use with an alternating current, it was necessary to employ pole pieces which did not retain residual magnetism, and laminated iron was substituted for the cast iron magnets. Then, in order to effect the object previously stated, the residual magnetism was so enabled the meter to start and register correctly with a low load, the plaintiff, in 1887, achieved this result by employing an additional coil of an insulated conductor which would act as an electro-magnet and thus compensate for the loss of residual magnetism arising from the absence of solid cast-iron magnets. This invention was the subject of the Letters Patent of 1887.

The infringement alleged against the defendant was in having in a Watt or energy meter additional coil on their shunt circuit for the purpose of increasing the strength of the magnetic field, the original Thomson-Houston meter, by the introduction of the additional coil, the meter which was connected with the recorder was obtained by the interaction of the shunt derived from the shunt current passing through the armature and derived from the lamp current passing through the series coils. When no lamp current was passing through the series coils (as in the case where no lamps were running) there was no interaction, and so to give a torque or turning movement, as the meter, as the shunt current did not set up any movement of the meter.

The plaintiff did not complain of this matter, but complained was that the defendants, in order to increase their magnetic field, introduced a coil into the shunt passing through the armature, the effect of this being to give a torque or turning movement, even when no lamp current was passing. In the defendants' meter the torque was always constant, whether lamp current was passing or not, while in the plaintiff's meter the torque when no lamp current was passing was proportional to the number of lamps. Mr. Justice Swinfen Eady held that the application of an additional shunt to a Thomson-Houston meter did not constitute infringement of the plaintiff's patent. He held the defendants had made use of an old contrivance—an additional coil—and had applied it in a manner which was not within the plaintiff's specific claim.

He accordingly dismissed the action with costs. Hence the present appeal of the plaintiff.

Mr. Cripps, K.C., Mr. Astbury, K.C., Mr. Colman, and Mr. Frost appeared for the appellant, and Fletcher Moulton, K.C., Mr. Bousfield, K.C., Mr. A. J. Walter for the respondents.
At the conclusion of the arguments of counsel which lasted several days, their Lordships reserved judgment.

ACTION BY AN ARCHITECT.

THE case of *Goldie v. Maunsell and Others* came before Mr. Justice Lawrence and a special jury in the King's Bench Division on the 19th inst.

This was an action by Mr. Edward Goldie, architect, to recover 11*l.* for professional services rendered. The defendants, who are the Superior and two other ladies connected with Roman Catholic convent in Hertford, pleaded that owing to the negligence of the plaintiff in advising them as to ancient lights his plans were useless, and they counterclaimed for the expenses to which they had been put.

Mr. Rawlinson, K.C., and Mr. Geo. W. appeared for the plaintiff; while the defendants were represented by Mr. R. McCall, K.C., Mr. Horton, and Mr. D. O'Connor.

Mr. Rawlinson, in opening the case, said it was more serious bearing than the amount claimed, indicated, because the plaintiff was accused of having been negligent as an architect in the charge of his business. The defendants had property at Hertford, and in the early part of the year it was their intention to build a new school or orphanage. They got out some pencil sketches of what was required and sent

14,749.—IMPROVEMENTS IN BALL-MILLS FOR SLURRY, CEMENT, AND SIMILAR MATERIALS: *P. T. Lindhard*.—A screening-plate is fitted on to the

discharge outlet, and its lowest openings are set below the levels of the inlet and outlet respectively. A cone that communicates with the outlet and has a conveyor covers the screening-plate. The widths of the blades of the conveyor become greater as they are nearer the larger end, at which point they will prevent the material from passing out of the drum when the latter is not in motion. The blades will be driven frictionally when they are sprung into the cone.

14,831.—SLABS FOR USE IN THE CONSTRUCTION OF FLOORS AND CEILINGS: F. Freckmann.—Recesses and zig-zag grooves for taking the mortar are fashioned in slabs made of concrete or cement. The attachment of the plaster support of the ceiling is facilitated by means of wooden strips that are embedded in the slabs, of which the sides may be inclined, or at a right angle, to the ends. The sides of a mould for making the slabs are held together with clamping-screws, and there are partition plates either perpendicular or inclined to the sides. Ribs make the grooves and cores make the openings, and strips are laid at the bottom of the mould.

14,900.—TRUCK-TIPPING APPARATUS: F. W. Davison.—A drum that slides in a pivoted guide tips the truck and is worked with a chain around a pulley and wound upon a drum; it is also pivoted on to a pivoted frame on which is mounted an adjustable block which engages with the axle of the truck.

14,917.—ELECTRICAL COUPLINGS: E. Fischer-Schaad and H. Schneider.—A continuous wire which is wound helix-wise forms a sleeve which will be substantially straightened when the ends of the wire are turned. The conductors can then be inserted, and the torsion of the coil will hold them firmly.

14,920.—A SCRIBING-GAUGE AND SQUARE COMBINED: F. Olson and J. Opland.—A crosspiece is caused to slide up and down a scale which has a middle rib along its length. A screw affixed to the scale secures a scriber, which is in the shape of a small semi-circular blade. Another screw retains a sliding block, in which another similarly-shaped scriber is mounted. The crosspiece is faced with metal in certain parts, and is to be clamped with a screw that works upon a strip.

14,931.—AN ELECTRICAL CURRENT, ENERGY, AND RESISTANCE METER: W. McWhirter.—To provide for the damping-oscillation of the indicator, a disc or a hollow cylinder of some non-conducting material is mounted upon a spindle within the field of an annular electro-magnet, or in fields that extend from pole-pieces mounted radially-disposed electro-magnets. The windings of the magnets may be connected in series or parallel with the meter-coil. In the case of an iron-clad meter-coil the iron may form part of the damping electro-magnet. The indicators are those of volt-meters, amper-meters, watt-meters, and ohm-meters.

14,934.—TIES FOR USE IN THE BUILDING OF WALLS: F. W. Richards.—For building hollow walls the ties or bonds are fashioned out of short lengths of wire that are twisted together at the middle point and are turned back in the same plane at 90 deg. at their ends. The convolutions of the twisted parts will divert the moisture of condensation into the open space between the walls.

14,938.—A VENTILATING APPLIANCE: F. G. Bate, F. W. Wotton, and C. Bauer.—The appliance consists of a set of vanes whereof each will move about a pivot at its one end, so that one can shut or open, at will, the middle opening which is produced by the grouping of the vanes. The fixed pivots are attached to a stationary washer, but the other pivots will engage with a washer which is partially turned round. The middle opening can be completely shut up by means of a lug, and the ventilator is available for use in a window.

15,000.—A HAND MORTISING MACHINE: N. N. Haigh.—The inventor supplies a method of adjusting the height of the tool-slide and the middle working lever. The lever that works the slide on which the tool-holder is mounted is pivoted on to the wings of the slide and has a counterweight at one end and a handle at the other end. To the lever is attached a toothed segment in gear with a rack upon the machine frame, the shifting of a pin from one hole to another in the slide will effect the adjustment at the desired height. In a variant form the handle end of the lever is secured to the centre of the segment, whilst the counterweight end is annexed to one side of it, the two named parts of the lever being, in this instance, detached from one another.

15,020.—MANUFACTURE OF PORTLAND CEMENT: A. T. Ashton, F. Crompton, and F. B. Kelly.—Towson sand, a natural calciferous sand found in Cornwall, is first pulverised and then calcined at a high temperature in a rotary kiln; the product is ground again for a cement. The process may be applied to materials analogous to Towson sand, and lime, granite, and so on may be added to make up for a deficiency of silica, lime, or alkali.

15,031.—PROCESS OF SAWING STONE OR SLATE: G. Pickles and F. Jones.—A carriage moved along rails by a screw carries the saw, which is driven by an endless belt. On the driving pulley shaft are fast and loose pulleys having open and crossed belts from the motor. The feed-screw is driven through bevel-gearing pulleys and open and crossed belts from the driving pulley shaft, whereby the saw can be traversed at any rate of speed

required, and can be caused to cut the stone or slate upon the trolley in either direction of traverse. Holes drilled vertically in the edge of the saw-blade or at an angle to, but not quite through, the edges, hold the diamonds, which are made fast with metal. The turned-up bottom edges of the saw-guard serve to form a lip for saving any loose diamonds.

15,045.—A CONTRIVANCE FOR USE WITH ARC LAMPS: R. C. T. Evans.—The inventor seeks to reduce heat radiation from an arc lamp by passing the carbons through tubes that are cooled with water and reach to near their points, and by enclosing the arc in a water-cooled casing; he puts water between two projecting lenses, or a disc and lens, which may be made of quartz. The current flows directly from the carbon tubes, which have terminals, to the carbons, that may be fed with grooved friction-wheels of ebonite mounted on the tubes, or by other gearing. A spring detains the upper carbon when its end has passed beyond the friction-wheel.

MEETINGS.

FRIDAY, NOVEMBER 21st

Architectural Association.—Papers by Mr. Cecil C. Brewer and Miss Jane Walker, M.D., entitled "Some Notes on Sanatoria for Consumptives." Illustrated by lantern views. 7.30 p.m.
Institution of Junior Engineers (Westminster Palace Hotel).—Inaugural Meeting of twenty-second Session. Col. Edward Kahan, C.B., R.E., will deliver his Presidential Address on "The Preparation of Engineering Projects." 8 p.m.

Birmingham Architectural Association.—Mr. W. Henman on "The Development of Hospital Design, illustrated by the Royal Victoria Hospital, Belfast." Illustrated by lantern views. 7.30 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. E. Worth on "Scavenging, Disposal of House Refuse." 7 p.m.
Institution of Mechanical Engineers.—(1) The adjourned Discussion will be resumed and concluded upon Captain C. C. Longridge's paper on "Oil Motor-cars of 1902." (2) If time permits, the following paper will be read and discussed:—"Recent Practice in the Design, Construction, and Operation of Raw Cane Sugar Factories in the Hawaiian Islands," by Mr. J. N. S. Williams. 8 p.m.

SATURDAY, NOVEMBER 22.

The Craft School (Globe-road, Bethnal Green, E.).—Mr. H. Llewellyn Smith on "Stage Scenery as an Art," with illustrations. 8.30 p.m.

MONDAY, NOVEMBER 24.

Architectural Association.—Special meeting to consider the question of the proposed acquisition of the Architectural Museum premises. 7.30 p.m.
Surveyors' Institution.—Discussion on Mr. C. H. Hooper's paper on "Compensation for Fruit Planting." 8 p.m.

Society of Arts (Lecture Lectures).—Professor Vivian B. Lewes on "The Future of Coal Gas and Allied Illuminants." I. 8 p.m.

TUESDAY, NOVEMBER 25.

Institution of Civil Engineers.—Paper to be further discussed: "Electric Tramways," by Messrs. Charles Hopkinson, B.Sc., Bertram Hopkinson, B.Sc., and Ernest Talbot. 8 p.m.

WEDNESDAY, NOVEMBER 26.

Architectural Association Discussion Section.—Mr. C. P. Bankhart on "Decorative Painting." 7.30 p.m.
Society of Arts.—Dr. Gustave Goerg, Professor of Technology at the High School of Commerce, Geneva, on "Le Tunnel du Simplon, et la Nouvelle Ligne de Chemin de Fer Directe Anglo-Italienne pour l'Orient." 8 p.m.

Northern Architectural Association.—Mr. F. Baker on "The Old Rectory at Northfleet—a Typical Timbered House." Illustrated by sketches. 7.30 p.m.
Institution of Civil Engineers.—Students' visit to inspect the conversion operations in progress on the South London Tramways. Assemble at the car terminus, east end of Westminster Bridge. 9 p.m.

International Fire Exhibition.—Meeting at the Royal United Service Institution, Whitehall. H.R.H. the Duke of Cambridge to take the chair. 12 noon.

THURSDAY, NOVEMBER 27.

Institution of Electrical Engineers.—Professor Sir Oliver Lodge on "Electrons." 8 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

November 5.—By PROTHORPE & MORRIS, (at Ilkley).
Ilkley, Yorks.—Bridge-lane, Low House and two houses adjoining, f. y. r. 61. 8s. £950
November 6.—By BAXTER, PAYNE, & LEPPER (at Bromley).
Bromley, Kent.—Canoeval, &c., thirteen plots of freehold building land. £342
By MARGRETS & TOWNLY (at Camden Town).
Camden Town.—9, Busby-pl., u.t. 47 yrs., g.r. 74, ex. 55l. 580
By KNEE BROS. (at Bristol).
Priddy, Somerset.—Priddy Farm, 283 a., f. y. r. 61. 8s. £1,700
9 November 7.—By FARADAY & ROBERTS.
St. Pancras.—14 and 15, Medburn-st., u.t. 42 yrs., g.r. 61, y.r. 64l. 700

By A. PARVOST & SON.
West Ham.—35, 37, 39, and 41, Union-rd., u.t. 63 yrs., g.r. 404, w.r. 135l. 4s. 48
Leytonstone.—7 and 9, Fendalton, f. y. r. 54l. 48
By REYNOLDS & EASON.
Eastbourne, Sussex.—Silverdale-rd., building site, area 12 a., u.t. 99 yrs., g.r. 404, w.r. 135l. 4s. 48
Leytonstone.—7, Hainault-rd., f. y. r. 30l. 48
Chingford.—Endlebury-rd., f.g.r. 74, reversion in 85l yrs. 2
By F. & S. SMITH.
Kingsland.—15, Englefield-rd., u.t. 18 yrs., g.r. 54 58, ex. 36l. 4
Finsbury Park.—38, Woodstock-rd., u.t. 65 yrs., g.r. 61 108, ex. 44l. 4
Clerkenwell.—7, Cumberland-ter., u.t. 17 yrs., g.r. 54 178, ex. 60l. 4
By EDWARD WOOD.
Kensington.—56, Wellesley-rd., u.t. 63 yrs., g.r. 61, w.r. 54l. 125 3
November 10.—By ALDRIDGE.
Acton.—25, 27, 29, and 31, Stirling-rd., f. y. r. 25l. 45. 1,0
November 11.—By HOOKER & WEBB.
Croydon.—High-st., f.g.r. 88l. 105, reversion in 80 yrs. 2,3
By ROGERS, CHAPMAN, & THOMAS.
Pimlico.—110, Cambridge-st., u.t. 28 yrs., g.r. 9l, ex. 75l. 4
By St. G. & S. SMITH.
Walthamstow.—St. Mary's-rd., f. y. r. 38l. 5
By SAUNDERS & SON.
Kensington.—1, Victoria-rd., with studio, f. y. r. 300l. 3,19
By W. BROWN & CO. (at Woburn Sands).
Wavendon, Bucks.—Ironmonger Close, 5 a. 1 r. 13 1/2 p. 3
Cobey Moor and St. Mary's-rd., f. y. r. 45 p. 9
By FERGUSON, SONS, & ADAMS (at Masons' Hall Tavern).
Tooting.—Garrett-lane, The Fountain, p-h., freehold rental of 8s. reversion in 94 yrs. 5,17
November 12.—By HAROLD GRIFFIN.
Caledonian-rd.—35 and 37, Freeling-st., u.t. 41 yrs., g.r. 204, y.r. 28l. 3
Battersea.—13, 15, and 17, St. George's-rd., u.t. 23 yrs., g.r. 51, w.r. 105l. 68. 7
23, Newcomer-rd., f. y. r. 35l. 28. 3
573, Battersea Park-rd., u.t. 72 yrs., g.r. 74, p. 5
27, Grafton-rd., f. y. r. 40l. 5
Wandsworth.—20 to 30 (even), Warple-way, u.t. 50 yrs., g.r. 27l, w.r. 143l. 8
By G. HERBERT-BURTON.
Kensington Town.—Litcham-st., f.g. rents 30l, reversion in 52 yrs. 6
Litcham-st., f.g. rents 44l, reversion in 52 yrs. 6
57, Grafton-rd. (S), f. y. r. 40l. 5
Holloway.—Cardwell-rd., f.g.r. 74 105, u.t. 36 yrs. g.r. nil. 1
By PERCIVAL WATSON.
Camden Town.—105, High-st. (S), u.t. 42 yrs., g.r. 51, y.r. 80l. 7
107 and 108, Park-st. (S), u.t. 202 yrs., g.r. 10l, y.r. 120l. 7
273 and 275, Great College-st. (S), u.t. 212 yrs., g.r. 10l, y.r. 85l. 7
125, Albert-st., u.t. 202 yrs., g.r. 74 78, y.r. 39l. 2
Hamstead-rd.—81, Edward-st., u.t. 191 yrs., g.r. 94, y.r. 55l. 3
Wood Green.—1, 2A, 2, and 2A, May-villas, f. y. r. 190l. 1,2
1 to 4, Shandon-villas, f. y. r. 190l. 1,2
By HOLLINGSWORTH & COLLYER.
City of London.—11, Wormwood-st. (warehouse), beneficial lease, u.t. 16 yrs., y.r. 190l. 1
Hamstead.—Pattinson-rd., Powis Lodge, u.t. 92 yrs., g.r. 81, ex. 45l. 6
By MOSS & JAMESON.
Holloway.—93, George-st. (S), u.t. 1 and 1A, Adam-st.; and 95 to 106 (even), Wellington-rd.; f. y. r. 169l. 1,3
89 and 91, George-st. (S), u.t. 53l. 68; also plot of land in rear. 6
By RUTLAND SON & VINCE.
Hamstead-rd.—105, Mornington-cres., u.t. 16 yrs., g.r. 10l. 105, y.r. 70l. 3
By A. W. TAYLOR & CO.
Putney.—153, High-st. (the Parish Offices), f. p. 7,0
By C. F. WHITELEY.
Brixton.—Eiffa Parade, a plot of freehold building land, area 2,350 ft. 2, p. 1,0
New Park-rd., freehold school buildings and yard, area 4,535 ft. 1, p. 1,0
Poplar.—Orchard-pl., freehold school buildings and playground, area 2,980 ft.; also 10 and 11, Orchard-pl., u.t. 142 yrs., g.r. 84, w.r. 39l. 8
Wilkesden.—Taylor's-lane, &c., freehold building land, area 4 a. 0 r. 6 p., p. 4,12
By WORSFOLD & HAYWARD.
Bloomsbury.—11, Eddleleigh-st., u.t. 99 yrs., g.r. 304, y.r. 704. 4
By DOUGLAS YOUNG & CO.
Perkham.—Winchester-pl., f.g.r. 51l, reversion in 43l yrs. 1,0
Winchester-pl., f.g.r. 164, reversion in 47l yrs. 1,0
Britannia-ter., f.g.r. 18l. 18s., reversion in 48 yrs. 4
Brookley.—47 and 49, Adelaide-rd., u.t. 63 yrs., g.r. 123, ex. 135, f. y. r. 190l. 8
61, Adelaide-rd., u.t. 63 yrs., g.r. 74, y.r. 38l. 4
By GEORGE HODGSON (at Carlisle).
Stanwix, &c., Cumberland.—Crimdale Estate, 142 a. 1 r. 12 p. 4,3
November 13.—By CHINNOCK, GALSORTHY, & CHINNOCK.
Regent-st.—58, Great Marlborough-st., area 1,850 ft., f. y. r. 140l. 5,17
By C. RAWLEY CRAB & CO.
Acton.—2A, 25, and 26, Elmwood-gdns., u.t. 94l yrs., g.r. 34l. 13s., y.r. 190l. 1,8
By DRIVERS.
Holloway.—414, Hornsey-rd. (S), u.t. 53 yrs., g.r. 9l. 5d., y.r. 60l. 4
By FERGUSON, SONS, & ADAMS.
Hammersmith.—5 to 9, Uni-d-st., u.t. 68 yrs., g.r. 20l, y.r. 177l. 92

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Clubhouse	Arbroath Golf Club	Not stated	Nov. 29
Schools	Holyhead School Board	do.	Dec. 3
Workmen's Dwellings	Beeles (Lancs.) Corporation	50l., 30l., 15l.	Dec. 12
Clock Tower	Surbiton Corporation	Not stated	Dec. 10
Additions to Hospital	Surbiton Corporation	Not stated	Dec. 31
Central Home and Cottage Homes for Children	Arbion-in-Makerfield U.D.C.	10l., 10s.	Jan. 15
New Public Library	Kilcannon Guardians	25l., 15l., and 10l.	Jan. 20
Designs for University Buildings, Cape of Good Hope	Workington Corporation	25l., 15l., and 10l.	Jan. 31
Extension of Town Hall	Acnt.-Gen. for Cape of Good Hope	400l., 300l., 100l.	do.
	Hull Corporation	300l., 200l., 100l.	do.

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Water Mains, &c.	Llandudno U.D.C.	F. P. Stephenson, Engineer, Town Hall, Llandudno	Nov. 24
Laying Cast-iron Pipes (265 tons)	Alcester R.D.C.	Willcox & Raikes, Engineers, 6, Temple-row, Birmingham	Nov. 25
Steel Water Tower, &c.	Peckham R.D.C.	do.	do.
Rebuilding the Manor House, Marytavy, Tavistock	Mr. R. Collins	H. W. Collins, Architect, Redruth	do.
Fencing, &c., Chester-road	West Hartlepool Corporation	J. W. Brown, Borough Engineer, West Hartlepool	do.
Flagging Grange-road	do.	do.	do.
Wall, Blackhouse Reservoir	Soyland (Yorks) U.D.C.	J. Wadsworth, Surveyor, Ripponden, Yorks	do.
Street Works, Litherland-road	Bootle (Lancs.) Corporation	Borough Engineer, Town Hall, Bootle	do.
Alterations to 99, Promenade, Bridlington	J. M. Biddon	J. Barnshay, Architect, Carlton House, Bridlington	Nov. 23
Rebuilding Warehouse and Offices, Bradford	do.	France & Co., Architects, 99, Swan-arcade, Bradford	do.
Supply of Horse Ambulance	West Ham Union	Master of Workhouse, Leytonstone, N.E.	do.
Vestry, Edwardsville, near Tr-harris, Wales	Mr. R. C. Cooke	W. Dowdeswell, Architect, Brynau, Trebarnis	do.
Farm Buildings, Higher Trehwiddle, St. Asaph	Gravesend Town Council	T. B. Andrew, Architect, 1, Trevorick-villas, St. Asaph	do.
Rail Stone, &c.	Mr. J. W. Atkins	C. E. Hutton, Court House, Gravesend	Nov. 27
Hospital Buildings, Stables, &c.	Gateshead Corporation	J. F. Curwen, Architect, Highgate, Kendal	do.
Offices, Telephone-avenue	Bristol Water Works Company	J. Bower, Civil Engineer, Town Hall, Gateshead	do.
Sewers, Reading-road	Basingstoke Corporation	H. Williams, Architect, Corn-street, Bristol	do.
Mortuary, &c., Lancaster-road	Preston Corporation	G. Filton, Borough Surveyor, Town Hall, Basingstoke	do.
Public Convenience, Friargate	Tynemouth School Board	Borough Surveyor, Town Hall, Preston	do.
Additions to Schools, Conch-lane, North Shields	do.	Marshall & Tweedy, Architects, 17, Eldon-square, Newcastle	do.
Buildings at Destructor Depot, Grimsby	Hull Corporation	H. G. Whyatt, Civil Engineer, Town Hall-square, Grimsby	Nov. 28
Car shed, &c., Hedon-road	Pinchley U.D.C.	A. E. White, Civil Engineer, Town Hall, Hull	do.
Electrical Plant	Messrs. Lee & Green, Ltd.	E. H. Lister, Council Offices, Finchley	do.
House, &c., Skegness, Lincs.	do.	J. Clare, Architect, Sleaford	Nov. 29
Villa, West-road, Egham	Reigate R.D.C.	Sutherland & Jamieson, Architects, Egham	do.
Church, Churchdown, near Gloucester	do.	W. B. Wood, Architect, 12, Queen-street, Gloucester	do.
House and two Shops, Nursery, Clayton	Camberwell Borough Council	S. Spencer, Architect, 314, Great Horton-road, Bradford	do.
Sewers, &c., Horley	Pinchley U.D.C.	Taylor, Sons, & Sons, Crimp, C. E., 27, Great George-street, S.W.	do.
Memorial, Our Lady's Mount, Cork	Thornhill, &c., Sewerage Board	S. F. Byrnes, Architect, 21, South-mall, Cork	Dec. 1
Paving and Making-up Street	do.	Council's Engineer, Town Hall, Camberwell	do.
Laboratory, Christ's College	Blackpool Corporation	E. H. Lister, Council Offices, Finchley	do.
Storage Culvert, &c.	Biggleswade R.D.C.	A. Hinde, Civil Engineer, 41, Abingdon-street, Blackpool	do.
Cast Iron Pipes (150 tons), Thornton	Hibernian Bank, Ltd.	do.	do.
Road Works, Sandy	Felixstowe U.D.C.	J. Owen-Jones, Surveyor, Biggleswade	do.
Banking Premises, Kilkenny	Hants County Council	W. H. Byrne & Son, Architects, 20, Suffolk-street, Dublin	do.
Fire Station	Rev. W. H. Booth	W. B. Jennings, Town Hall, Felixstowe	do.
Bridge Substructure, Eversley	do.	W. J. Taylor, County Surveyor, The Castle, Winchester	do.
Church, Aughnacloy, Co. Tyrone	Dover Town Council	Doyle & Co., Architects, Dawson Chambers, Dublin	do.
Street Works, Beaconsfield-road	Great Northern Railway Co.	D. W. Morris, Surveyor, 68, Harcourt-street, Dublin	do.
Annual Contracts	Southgate U.D.C.	H. E. Sutgou, Civil Engineer, Dover	Dec. 1
250 tons Leicester Granite	Sheerness Economic Society, Ltd.	Stores Superintendent, Doncaster	do.
New Bakery in Broad-street	Chislewick U.D.C.	Council's Surveyor, Council Offices, Palmer's Green, N.	do.
Making-up Roads and Erection of Sheds	Metropolitan Asylums Board	Council's Office, 32, High-street, Sheerness	Dec. 3
Receiving Home and Stabling, Tooting Bec Asylum	do.	Council's Surveyor, Town Hall, Chislewick	do.
Rebuilding Refuse Destructors, &c., Gore Farm	Walsall School Board	A. & C. Haxton, Architects, 15, Leadenhall-street, E.C.	do.
Schools	do.	Office of Board, Embankment, E.C.	Dec. 6
Alterations to Church, Castledawson, Belfast	Croydon Borough Council	Bailey & McDonald, Architects, Bridge-street, Walsall	do.
Extension of Car Sheds, Purley Depot	County Borough of West Ham	T. Houston, Architect, Wellington-place, B'ham	do.
Heating Apparatus, &c.	Lanshieth Guardians	Borough Engineer, Town Hall	Dec. 8
Doorway and other Work at Dispensary	do.	E. T. Hall, Architect, 54, Bedford-square, W.C.	Dec. 9
Pump House at Renfrew-road Workhouse	do.	The Clerk, Guardians' Offices, Brook-street, Kennington, S.E.	Dec. 10
Erection of Fire Station	Felixstowe and Walton U.D.C.	do.	Dec. 11
Superstructure of Museum, South Kensington	Commissioners of H.M. Works, &c.	Council's Surveyor, Town Hall, Felixstowe	do.
Bandstand, Trees, &c., New Beckton Park	East Ham U.D.C.	Aston Webb, Architect, 19, Queen Anne's-gate, S.W.	Dec. 13
Isolation Hospital	Rowbridge & Dis. Jt. Hosp. Com.	Council's Engineer, Wakefield-street, East Ham, E.	Jan. 5
Construction of Streets	Cape Town Corporation	J. Hugh Goodman, Town Hall Chambers, Reading	Jan. 27
Pulling-down and Rebuilding Aylwyn College, Arside	Clayton School Board	Davis & Soper, 54, St. Mary Axe, E.C.	No date
Additions to Schools, Burgess Hill	do.	J. Stalker, Architect, Kendal	do.
House and Stabling, Clarendon-road, Watford	Mr. C. Sayer	C. Botham, Architect, 123, Queens-road, Brighton	do.
Church, Langolles	Office of Works	G. Longley, 71, High-street, Watford	do.
Three Houses, Heltham, Durham	Mr. G. Taylor	W. J. Morley & Sons, Architects, 229, Swan-arcade, Bradford	do.
Parcel Post Office Foundations, Waterloo-st., Glasgow	do.	R. H. Kitching, Architect, New Shildon	do.
Eleven Houses, &c., Conisbrough, Yorks	do.	The Secretary, Office of Works, Storey's Gate, S.W.	do.
		F. E. Simpson, 32, Lookwood-road, Wheatley, Doncaster	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Technical Assistant in Architect's Department	London County Council	300l.	Dec. 8

Those marked with an asterisk (*) are advertised in this Number.

Competitions, iv.

Contracts, pp. iv. vi. viii. & x.

Public Appointment, ix.

LONDON.—For alterations and additions to Messrs. Sim & Rawdall's Auction Mart, 280, Romford-road, Forest Gate, E. Mr. P. C. Ashton, architect, Bank-buildings, 704, Romford-road, Forest Gate, and Ilford, E. :—
H. C. Howsall .. £250 0 | A. B. Hill .. £220 0
J. Gregory .. 220 17 | Hardie & Co. .. 153 1

LONDON.—For rebuilding Nos. 81, 83, and 85, High Holborn, W.C., for Mr. James Rosedale. Mr. R. H. Keir, architect :—
A. V. Paddison .. £3,080

LONDON.—For new school buildings at the children's homes, Sidcup, for Greenwich Union Guardians. Messrs. Thomas Dinwiddie & Sons, architects, Greenwich :—
Foster & Dicksee .. £16,500 | C. Wall .. £14,400
Kilby & Gayford .. 15,518 | T. Knight .. 14,700
E. E. Nightingale .. 15,115 | T. Rowbotham .. 14,200
Thomas & Edge .. 1,110 | J. Lonsdale .. 14,100
W. Shepherd .. 1,000 | H. L. Holloway .. 14,000
Walls & Son .. 14,125 | J. J. Wise .. 13,900
Holliday & Green .. 1,157 | T. D. Leng, Deptford .. 13,120

LONDON.—For the erection of factory premises, Middle-row and Domingo-street, St. Luke's, E.C. Mr. Richard J. Lovell, architect, 46, Queen Victoria-street, E.C. Quantities by Mr. W. H. Welber, 7, Great James-street, Bedford-row, W.C. :—
Burman .. £5,249 | Patman & Fotheringham .. £4,951
Adamson .. 5,651 | Hunt .. 4,892
Ivery .. 5,035 | E. A. Roome & Co. .. 4,670
L. H. & R. Roberts .. 4,953

MIDDLETON (Lancs.).—For paving Norman-street, &c., for the Corporation. Mr. W. Welburn, Borough Surveyor :—
Partington & Son, The Lodge, Middleton .. Schedule
Ogden & Holland .. contracts.
R. Heard ..

PORT TALBOT (Wales).—For the execution of street works, Tunnel-terrace and Gwynfi street, Blaengwynf, for the Glynceorrwg Urban District Council. Mr. W. P. Jones, surveyor, Council Offices, Glynceorrwg, Port Talbot :—
M. Thompson .. £940 0 0
S. Rees .. 700 0 8
Harry Improvements Co., Ltd., Barry .. 758 19 2
[Surveyor's estimate, £755 3 8.]

RAMSEY.—For the erection of new schools for 510 children, for the Ramsey School Board, and alterations and additions to present schools at Parkston. Mr. J. W. Start, architect :—
W. Chambers .. £6,316 | A. W. Robins .. £5,510
Dupont & Co. .. 6,190 | Smith & Beaumont .. 4,791
F. Bennett .. 6,050 | E. Saunders .. 4,790
Wiles & Son .. 6,000 | W. C. Theobald .. 4,790
J. McKay .. 5,540 | Chappel .. 4,637

SILLOTH (Cumberland).—For the erection of two houses, for Mr. T. Longcake. Mr. Geo. Armstrong, architect, 24, Bank-street, Carlisle :—
Plumbing—Jos. Taylor .. £80 5
Plastering—Jas. Gannan .. 110 0
Slatting—J. T. Kellett .. 57 0
[All of Carlisle.]

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Yorkshire Stone.

ESTIMATES GIVEN FOR EVERY DESCRIPTION OF ROAD MAKING.

SWANSEA.—For additions to schools, Pencllyn, for the Llangyfelach Mawr School Board. Mr. W. David, architect, 97, Gorselane, Swansea. Quantities by the architect :—
Lloyd Bros. .. £2,051 0 0 | Walters & Thomas .. £1,780 0 0
Walters .. 1,850 0 0 | J. C. Howells .. 1,780 0 0
H. Billings .. 1,720 0 0 | Craigenfen .. 1,720 0 0
T. Richards .. 1,720 0 0 | part, Clydach .. 1,753 0 0
D. Jenkins .. 1,300 0 0

WEST MOLESEY (Surrey).—For the erection of sewerage works, &c. (portion only), for the Urban District Council of East and West Molesey. Mr. J. Stevenson, Engineer, District Council Offices, East Molesey. Quantities by Engineer :—

Contract No. 1.
Kavanagh & Co. .. £2,305 10 11 | Free & Sons .. £1,485 0 0
George Bell .. 1,702 15 5 | Parry & Co. .. 1,229 15 7
F. W. Trimm .. 1,160 0 0 | Putney .. 1,229 15 7
[Engineer's estimate, £1,738 4 4]

WILLENHALL (Staffs.).—For the execution of road works, Rose-hill and Wood-street, for the Urban District Council. Mr. T. Edgar Fellows, C.E., Town Hall, Willenhall. Quantities by engineer :—

Wood-street.
H. Holloway .. £132 13 11 | G. Trentham, Handsworth .. £110 0 0
W. H. Reading .. 119 0 0
J. Owens .. 119 0 0
[Surveyor's estimate, £106 15s.]

Rose-hill.
H. Holloway .. £382 17 4 | G. Trentham, Handsworth .. £302 0 0
J. Owens .. 348 0 0
W. H. Reading .. 339 13 10
[Surveyor's estimate, £395.]

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Formal Gardens.

TO write about gardens, and formal gardens in particular, is no mere taste of to-day, whatever one might think from the number of books on the subject recently published. Lovers of gardens have always found the subject one on which it is pleasant to write and easy to be eloquent; besides the excitement of recommending one's own views and condemning those of others (and each garden-fancier has his own predilections), the subject introduces so many images of things that are pleasant and picturesque to dwell upon. Two or three years ago Mr. Sieveking published a collection of citations on gardens from authors of all ages, and it is curious how very modern some of the very old ones seem, though the old writers do not distinguish the subject as that of "formal" gardens, because in the view of most garden-lovers of all times all gardens were formal; the garden being regarded as essentially an artificial pleasure, not merely a strip of nature captured and tamed.

Mr. Sieveking's extracts commence with ancient Egypt, and the plan of an Egyptian garden which, with a difference of drawing, might very easily be translated into a Renaissance garden, with its rectangular ponds symmetrically placed, its central lawn and its regular rows of clipped trees. Pliny's description of his garden suggests again something very like a modern formal garden, even in its conceits. "In the front of the garden is a sort of terrace, embellished with various figures and bounded with a box edge, from whence you descend by an easy slope, adorned with the representation of various animals in box, answering alternately each other, into a lawn; . . . this is surrounded by a walk enclosed with evergreens, shaped into a variety of forms. Beyond it is the *gestatio*, laid out in the form of a circus, ornamented in the middle with box cut in numberless different figures." After mentioning that the whole is fenced

in by a wall covered by box, he adds—"on the outside of the wall lies a meadow that owes as many beauties to nature, as all I have been describing within does to art;" exactly what we have been reading in recent essays in regard to the contrast between the artificial beauty within the garden fence and the natural beauty outside it. The one can be made by the art of man, the other cannot; and hence all the fallacy of the so-called "landscape gardening," the endeavour to artificially create the kind of charm which only belongs to the unordered working of nature; a false form of art which is eternally doomed to failure.

As we turn over Mr. Sieveking's extracts, we come from time to time on the opposite opinion. The reaction seems to appear first in France, for in the early part of the eighteenth century we find Huet, under the head of "natural beauties preferable to artistic ones," satirising the taste for regular parterres; "a fountain issuing in great cascades from the foot of a rock, will not please the people at court as much as a jet of foetid and muddy water drawn up at enormous cost from a frogmarsh": a rhetorical way of putting things which is hardly quite fair. The complaint is a curious one to come from the country which made Versailles. From another quotation, however, it appears that he quarrels rather with the people who adopted parterres and nothing else; for he observes that Le Nôtre, though he did adopt the Italian method (the formal parterres) to the King's gardens, "added covered alleys, shaped woods, trees of lofty trunk, palisades, and green shades." By the expression which Mr. Sieveking translates "shaped woods" (we have not the original by us) he probably meant not clipped trees, but woods planted within formal lines, like the radiating avenues at Hampton Court. "The majority of private persons" he goes on, "possessing neither sufficient ground, nor sufficient means to give their gardens all these ornaments, and keep them up, have only adopted its parterres, which require little time and expense, but in which walking is out of the question throughout the day, and in which ladies, regardless of their complexion, would only venture to appear

after sunset." There is some truth in this, in spite of one's recollection of the solemn promenade of Louis XIV. and his Court round the *bassins* at Versailles at four in the afternoon, as depicted by M. Gérôme. The full beauty of the formal garden is not brought out but by its contrast with the surrounding freedom of nature; but the makers of such gardens may have this effect without possessing a vast domain, if only they have a contrasting scenery in existence and in view from their garden. Huet's objection evidently was that there would be no part of the private garden affording shade; an objection more serious in France than in England, where we seldom have more sun than we can very well do with in a garden.

A little later than Huet comes Batty Langley, in full revolt against the formal garden, in criticisms in which some truth is interspersed. "How," he asks, "can any person make a good design for a garden, whose situation they never saw?" a remark which seems to imply that there were persons who drew out gardens on paper without knowing the site; and as to the fallacy of such a proceeding Batty Langley is quite right. "To draw a beautiful regular draught," he proceeds, "is not to the purpose; for although it makes a handsome figure on the paper, yet it has quite a different effect when executed on the ground." This may or may not be the case, according to circumstances and to the nature of the "draught"; a point to which we shall have to recur. Some of Langley's further precepts are worth quoting: *ex. gr.*

"GENERAL DIRECTIONS, &c.

I. That the grand front of a building lie open upon an elegant lawn or plain of grass, adorned with beautiful statues (of which hereafter in their place), terminated on its sides with open groves.

II. That grand avenues be planted from such large open plains, with a breadth proportionable to the building, as well as to its length of view.

III. That views in gardens be as extensive as possible.

IV. That such walks, whose views cannot be extended, terminate in woods, forests, misshapen rocks, strange precipices, mountains, old ruins, grand buildings, &c.

V. That no regular evergreens, &c., be planted in any part of an open plain or parterre.

VI. That no borders be made, or scroll work cut, in any such lawn or plain parterre; for the grandeur of those beautiful carpets consists in their native plainness.

VII. That all gardens be grand, beautiful, and natural.*

This last is indeed a counsel of perfection, expressed with a commendable force and brevity—could one but know how to arrive at it. But what were Langley's ideas as to the meaning of the word "natural" in gardens becomes rather a puzzle in the light of some of the succeeding recommendations:—

"X. That hills and dales, of easy ascents, be made by art, where Nature has not performed that work before."

It would seem from this that the imitation of things which might have been there naturally, but are not, is with Langley the same thing as "natural." But precept XIV. is much worse:—

"That the walks leading up the slope of a mount have their breadth contracted at the top, full one half part; and if that contracted part be enclosed on the sides with a hedge whose leaves are of a light green" [aerial perspective!], "it will seemingly add a great addition to the length of the walk, when viewed from the other end."

No doubt; but how when it is viewed from the mount, regarding the perspective the wrong way? This is perhaps the most original way of rendering a garden "grand, beautiful, and natural" that was ever suggested. And he goes on, in the next precept, to extend the treatment to "all walks whose lengths are short, and lead away from any point of view," which should always be made narrower at the further end; "for by the inclination of their sides, they appear to be of a much greater length than they really are." Such precepts, one must suppose, were intended for the esoteric audience of the landscape gardening trade, and not for the general reader. Surely in vain the net is spread in the sight of any bird.

What was called in the eighteenth century the "English taste" in gardens, which was in reality only a temporary aberration from the old English taste, spread into France, and the "jardin anglais" became for a time the fashion there, according to which fashion was laid out for Marie Antoinette the land around the Petit Trianon; the only poor piece of work in the domain of Versailles. But Versailles has held its own, and the modern French mind has recognised its greatness. This is how Théophile Gautier speaks of it, after referring to the manner in which Victor Hugo and De Musset, "in the days of our romanticism," had belittled Versailles:

"We were wrong; this garden was quite the garden of this château, and there was a marvellous harmony in this collection of regular forms, in which the life of the period could develop at ease its majestic and rather sluggish evolutions. The result is an impression of grandeur, symmetry, and beauty, which no one can resist. Versailles ever remains unrivalled in the world; it is the supreme formula of a complete art, and the expression, at its highest power, of a civilisation arrived at its complete expansion."

Unhappily, it is not now kept up as it should be. It would surely be worth while for the present French Government, which has made it into a public park, to spend money a little more liberally in keeping up to its pristine beauty and completeness such a grand and unique creation in artistic gardening.*

* See, on this subject, an article on "Versailles under the Republic," in the *Builder* of August 26, 1899.

After the various books which have been recently written on the subject, with illustrations on a small and inadequate scale, a great illustrative work, like that just completed by Mr. Inigo Triggs,* was just what was wanted to complete the representation of the subject. We have had literary matter enough upon formal gardens; we have now a fine collection of illustrations on a tolerably large scale. As his main object was illustration, Mr. Triggs has not burdened his collection with much text, the writing being confined to the descriptions of the places illustrated in the plates, and a short "Historical Note" by way of introduction. This is a good and well-written summary of the development and the changes in taste in English gardening since the time when we have any data to go upon, which is not from a very early period, for our ideas as to the forms of mediæval gardening are a good deal conjectural, depending mainly on the conventional representations of illuminated MSS. Mr. Triggs points out, very justly, the true meaning and scope of Bacon's celebrated essay "Of Gardens"—that it should be read as an attempt to improve the national taste, not as an exact picture of the formal garden of his day; indeed, Bacon was the last man to accept anything on trust or merely because it was the fashion of the day. It is noticeable that Bacon indicates the real origin and use of the "Mount," which became so common a feature in Elizabethan gardens; it was to see over the enclosure into the country: "At the end of both the side grounds I would have a mount of some pretty height, leaving the wall of the enclosure breast high, to look abroad into the fields." A garden was a place of privacy and retirement, hence the enclosing wall was an important feature; still, it was well to have a vantage ground whence you could see the neighbouring country if you wished. With the eighteenth century landscape gardeners this view of the country was provided by the unhappy invention of the sunk ditch and wall or "ha-ha," which removed the visible enclosure and with it all sense of retirement and seclusion. We notice also the author's remark at the conclusion of the essay, that the reaction against the formal garden by the landscape-gardening school, however it may be regretted, "was largely owing to the excesses and abuses which had crept in during the early part of the eighteenth century," in the designing of elaborate parterres and conventional scrolls, often plotted out in coloured sands and box edgings; "these are but toys," as Bacon observes. An old plate of the garden in front of the terrace at Hampton Court shows it all laid out in these elaborate scroll patterns where the lawn now is. A semicircle of small fountains round the circumference is a charming feature, which we might well wish to have back; but in other respects the present lawn is far preferable to the old patterns. The taste for clipping trees into artificial shapes was also carried to extravagant lengths, and is, to adopt Bacon's words, "nothing to the true pleasure of a garden"; and though we would have such old clipped gardens as Levens Hall and Heslington Hall kept up, as interesting historic examples, we should have no hesitation in saying that in itself, the

topiary garden at Heslington, as shown on plate 48 of the book, is very ugly, and that at Levens equally so. The hornbeam hedge at Levens is another matter; there is a kind of monumental grandeur about that, enhanced by one's conviction of the time it must have taken to bring it to perfection, giving the idea of ancestral dignity to the site. We are glad to notice that Mr. Triggs gives the correct meaning of "pleached"—viz.: close-knit or interwoven; several modern writers have jumped to the conclusion that it meant "clipped," because the term was found in connection with these clipped hedges; but they were equally "pleached" whether they were clipped or not; Tennyson uses the word in the true sense.*

The author half suggests that for the expression "formal garden," which to some ears carries an idea of disapproval, we might substitute "architectural garden," which would indeed be more suitable, since such gardens are really designed on architectural principles and in order to harmonise with the architecture of the mansion. To one point in his introduction we must object; we cannot allow that Repton is to be classed with such a man as "Capability Brown," and referred to as a "Vandal." Repton's faults in taste were those of his day, but he was no commonplace man; in much of his written criticism he shows the feeling and instinct of an artist, about architecture as well as about landscape; he lived at an unfortunate period, but his merits were his own, and he was worth a great many Capability Browns.

The author gives Montacute as the first garden plan in his collection; this however is hardly a typical plan as regards the arrangement of house and garden, as the gardens are on each side and not on either of the fronts of the house, nor are they centralised so as to form an architectural whole in combination with it. The house, on a plan in H form, has been turned round; that is, the old entrance forecourt is now a garden, and the entrance is by an avenue to the opposite side of the house. We quite agree that there is a remarkable charm about Montacute, with its higher garden on one side and its lower one, down a wide flight of stone steps, on the other; but this arrangement does not realise the stateliness and grandeur possible with an axial garden plan. The plans of Longford and Wilton, with the axial garden stretching from the front of the house, with parterres on each side of the central walk, and each terminating in a semicircular boundary with a vista of long planted walk beyond, realise more what may be called the architectural idea of a garden in connexion with the mansion. Wilton is preferable in one point—the interruption of the central alley half-way by a fountain; a long unbroken central walk is not so effective. Neither of these very symmetrical plans would have full effect, however, without a richer and wilder natural scenery beyond the boundary to contrast with and emphasise the highly artificial character of the garden; and in the case of Longford the view shows that this condition is completely fulfilled, the heavy irregular masses of the trees beyond coming in with excellent though perfectly unstudied effect. As an example from the book, however, we have preferred to give

* "Formal Gardens in England and Scotland." By H. Inigo Triggs. London: B. T. Batsford. 1902.

* See the poem—"A Dirge."

the plan of the gardens of Hampton Court, as formerly existing (see plate); both because of its interest as representing an old plan now destroyed, and also as being, in its elaborate arrangement, exceedingly characteristic of the period (early eighteenth century). The author notes the fact that the avenue of approach leads right to the forecourt, round which it was possible to drive (or ride) up to the door, this arrangement differing from the earlier type, when it was customary to traverse at least one court on foot before arriving at the front door. So we read in Bacon's Essay "On Building" that you must have three courts of approach before you come to the front—a green court, then a court also green, but "garnished" with little turrets or other embellishments on the wall; and a third court enclosed with columned terraces or galleries.

Stately approach indeed, belonging to a time when stateliness rather than convenience was studied in the mansion. To turn to the plan of Old Hampton Court, it seems to illustrate a certain amount of truth in Batty Langley's criticism before noted, that a "draught" may look very well on paper but fail of its effect in execution. The double garden with the little square ponds at intervals, for instance, looks like a kind of ornament on paper, but could hardly have that effect in reality, and the little ponds would probably illustrate the censure of Bacon, that "Pools mar all, and make the garden unwholesome, and full of flies and frogs." One can fancy how green and stagnant those little ponds would have been, which look so nice on paper; unless there were arrangements made, according to Bacon's further (and perfectly sensible) suggestion, that such ponds should always have a flow of water through them, which is hardly likely to have been the case here. Eight fountains similarly placed could have been charming, but automatic pumping machines to secure a head of water were not available in those days. The garden canal may have been a fine feature, but as a whole this plan is to some extent an example of the weakness of formal gardening; it is a paper design, very clever and ingenious as such, but which, for actual effect, is over-elaborated and cut up into too many small portions, so that there could have been little effect from it as a whole.

Among the other old plans shown in Mr. Riggs's plates, that of Fairford is a good example of the garden axially arranged with the house, and treated somewhat in the same way as Longford, with a semicircular boundary at the end opposite the house; it has the centre fountain which Longford wants. Another old plan, that of Lowther Hall, is an exceedingly fine one, which not only looks well on paper, but must have had a fine effect in execution; on a small scale, it has something of the combination of symmetrical and axial centre with wooded walks entered at an angle, which makes so much of the charm of Versailles; and it is not too much broken up into small parts to allow of a fine coup d'œil from the house. The only real mistake in it is the in-and-out symmetrical outline of the bowling-green; for an elaborated outline of retiring angles and of segments of circles, only shows its shape on paper; on the ground it is lost or distorted by perspective. Another kind of effect is shown in the plan and view of the existing terrace garden at Bowood, where the formal garden is

arranged in two terraces parallel with the long low Italian front of the mansion. The arrangement of the garden in this case exactly suits the special design and proportion of the front of the building, the whole appearing a part of the same design.

Among all the plates in the collection, however, there is perhaps none which gives so fine an idea of the stately effect possible with a large and finely-designed formal garden as that of the garden at Trentham Hall, laid out by Sir Charles Barry, of which we have given a reproduction. The effect of this large and spacious ornamental garden, with the lake and the irregular lines of the wooded hills beyond, is magnificent; and it may be observed that Barry has avoided the mistake made in some of the older symmetrical gardens, of having one continuous and comparatively narrow alley down the centre; by interrupting the centre with a large circle he has given a far greater breadth and dignity to the whole. And here we may take occasion also to observe, in reference to the distinction before referred to between ornamental forms on paper and the same forms on the ground, that the circle (or semicircle) is the one form of the kind which can be depended on to look well in execution. More elaborate and broken-up forms lose their decorative effect when laid out on the ground; but the eye can always take in and follow the line of a circle in perspective, and see it for what it is; and its effect in contrasting with straight lines can always be depended upon. The ellipse will not do, as from some points of view it will look like a badly laid-out circle; but the circle will always define itself clearly in perspective.

The Scottish gardens illustrated in the collection are for the most part less extensive and stately than the English ones; in Scotland the wealth necessary for the creation and keeping up of such gardens was for the most part wanting. There are the celebrated examples of Drumlanrig Castle in Dumfriesshire, and Drummond Castle in Perthshire; the view of the former shows an effective contrast between the formal garden and the wild forest beyond. Among the smaller examples Stobhall (Perthshire), with its plain, almost barn-like house, and its garden punctuated at the angles of the lawns with cut trees, is interesting and characteristic; so are the garden house and fishgates from Kinross, with their naive stone details.

The gates and gate-piers which give access to sumptuous gardens have often been an occasion for fine and impressive design. We reproduce the illustration of those of Drayton Park, Northants, which are exceptionally good, especially in the bold modelling of the eagles on the principal piers. In modern times gate-piers are generally treated with much more timidity and reserve than in ancient work; the opportunity for this kind of effect is not unfrequently presented, but the modern gate-pier is too often a starved-looking concern in comparison with the bold and massive treatment of former days; possibly the blighting influence of the contract system has shorn them of their ancient glories.

On the other hand the garden houses and dovecots illustrated in this collection are poor enough, and though historically interesting, hardly worth illustrating as examples. The illustrations of "topiary work" (cut trees) are characteristic and not

extravagant; probably the more *outré* examples described in old works, in which groups of figures are represented, have all perished long ago; a more reasonable taste has not thought it worth while to keep them up. Those which are figured by Mr. Triggs are merely somewhat fanciful forms with no special meaning; things that are worth keeping up where they exist, as curiosities of the taste of another time; but on the whole the less of them there is in a modern garden the better. They represent a false and rather frivolous taste. Of the two plates of lead cisterns—things which do not really belong to gardening—we have reproduced one, because it shows how much trouble and cost it was then thought worth while to go to in decorating these objects of practical use, now generally hidden out of sight and left in the native plainness of the material (where it is used at all). Nevertheless, we do not regard these as examples for imitation; they are too stiff and formal for a material so ductile; a modern artistic lead-worker might produce something far more characteristic and more in keeping with the material; but they serve to remind us how much may be done with a lead cistern.

The whole book does the greatest credit both to author and publisher, and will probably for a long time to come remain the leading illustrative work on the subject of Formal Gardens.

NOTES.

PROBABLY no one who has followed the history of the subject of Vauxhall Bridge will be in the least surprised that the London County Council has again refused to listen to any of the criticisms that have been passed on their method of dealing with new bridges. They are totally ignorant of what is meant by the architectural treatment of a bridge, and are apparently resolved to go their own way in the expenditure of public money out of sheer obstinacy. There can be no other reason for their action. They have only been asked to do what the Paris City Council invariably do in such cases—to appoint an architect of repute to design the decorative portion of the bridge. It could do them no possible harm to accede to so reasonable a request; it would be to their credit, in fact; but they prefer their own Philistinism. Mr. Ward, the ex-Chairman of the Bridges Committee, repeated again the statement which engineers always try to work in, that the Tower Bridge was designed by an architect and engineer, and that no structure had been more criticised by architects. The first part of the statement has been contradicted over and over again, as Mr. Ward ought to know perfectly well; the engineer got a Gothic draughtsman to do the details, who worked under him and whose name never appeared. That is *not* what is wanted of the London County Council, and they know that it is not. What is wanted is that they should employ an eminent artist to design what ought to be artistic work; and this is what they doggedly refuse to do. We do not think, however, that they have heard the last of the matter yet. It is not only a question of Vauxhall Bridge, of course, but of the proper designing of all future Thames bridges.

Nuisances and Urban Authorities.

A CONSIDERABLE number of cases dealing with the respective rights of house and land owners and the powers and duties of the Local Authorities have come before the Courts in the past four weeks, and a question of some importance was raised in the case of *Leyman v. Hesse Urban District Council*.* The plaintiff applied for a mandatory injunction for the removal of a urinal which the Urban Council, purporting to act under Section 39 of the Public Health Act, 1875 (which gives powers for the erection of such conveniences "in proper and convenient" situations), had erected on the main road between Hull and Hesse, and within 12 ft. to 15 ft. of the plaintiff's front gate. Mr. Justice Joyce, on the facts of the case, held that the urinal constituted a nuisance, as it materially interfered with the ordinary comfort and convenience of the plaintiff in the enjoyment of his property, and granted the injunction without having to give any decision on the powers of the District Council under the section of the Act; but as this question is of considerable interest to owners of property, it may be useful to point out that it has already been held that this section does not authorise the creation of a nuisance, but in that respect leaves the Urban Authorities in the same position as a private individual (*Vernon v. Vestry of St. James*, 18 C.D. 449). When, however, the erection does not constitute a nuisance—as, for instance, where it is some distance away (and in one case 250 ft. was held a sufficient distance not to render a urinal a nuisance), or where it is only in course of construction—then the section has to be considered, and the effect of the cases seems to be that where no improper motive has been proved, and where the Authority has properly exercised a discretion, the Courts will not interfere, and thus, in the absence of nuisance, the householder seems to be without remedy, as it has also been decided that in such cases neither has he any right to compensation under Section 308. In some of the older cases there are expressions which seemed to indicate that the discretion of the Authority need only be exercised as to where the public need can be conveniently satisfied; but in the recent case of *Pethick v. Plymouth Corporation* Mr. Justice Chitty expressly laid it down that the surrounding land and its owners and occupiers were also to be taken into consideration; so in flagrant cases, it appears, the Courts would interfere on the ground that the Local Authority had failed to exercise its discretion properly.

Liability of Road Authorities.

In the case of *Bull v. Mayor, &c., of Shoreditch* the Court of Appeal had a question of considerable difficulty to decide on the findings of a jury after a second trial in the Courts below. The defendants were sued in their capacity of road and sewer authority by the plaintiff, who had suffered personal injuries through being overturned in a hansom cab. The defendants had opened a certain road to lay down a sewer, and afterwards had filled up the trench, but it had subsequently sunk. The cabman, finding the right side of the road unfit, had driven to the off side, and there run over a heap of gravel, which overturned the cab. The jury found the trench to have

been dangerous, and that the cabman was justified in going to the off side; that the road had been properly finished, but the rain had caused it to sink; and that the heap of gravel which caused the accident had not been placed where it had been by the defendants' servants or with their permission. On these findings, the Judge, at the second trial, had given judgment for the defendants, and the plaintiff now appealed. The defendants contended that there was no misfeasance on their part, but only non-feasance for which no liability attached to them; and secondly, that the heap of gravel having been placed where it was by a wrongdoer, no liability for the accident attached to them. The majority of the Court of Appeal found that the defendants were guilty of misfeasance, as they should have made the road permanently fit and not only temporarily so, and that, although the heap of gravel was not placed where it had been by the defendants themselves, they were fully aware of its position, and as they had failed in their obligation to one of the public to make the road safe, there was a sufficient chain of causation to connect the breach of duty with the ultimate mischief. It is to be observed that the decision might have been different if the defendants had been unaware of the position of the heap of gravel. It is important that the general public should recognise the distinction between cases of "non-feasance" and "misfeasance" in this connexion. Thus, if gratings or manholes are in proper condition and properly fixed in a road, but owing to the road being improperly kept up they become dangerous, the authorities cannot be made liable, whilst it is otherwise if the grating itself is defective or imperfect. Whether it is desirable that the authorities should, through a dereliction in their duties, be allowed to endanger the public safety in this manner without liability is not now a question for the Courts, but for the Legislature, and we think the sooner this anomaly in the law is removed by legislation the better, as no logical distinction can be traced between the two kinds of negligence.

"Appurtenances" to Detached Villas.

THE case of *Webster v. Brewis*, reported in our last issue, raises an important question for householders in these days of increased building operations, with the consequent diminution of light and air. The defendant held a plot of land on a building estate, which was held subject to a covenant restricting the erection of any buildings on the land other than one or two detached villa residences of a certain value, "with the appurtenances thereto." At the time this land was conveyed to the defendant subject to this covenant made with his predecessor in title, a dwelling-house, coach-house, and stables had been erected upon it. The defendant pulled down the fence between his land and the adjoining plot and erected in its place a building 30 ft. long and 20 ft. high within 8 ft. of his neighbour's windows, which he intended to use for the storage of bicycles, firewood, laundry utensils, &c. The plaintiff then brought this action for breach of the covenant, and for obstructing the light and air, but failed in his action, the court holding this structure to be a reasonable one for the purposes of such a villa, and to be an "appurtenance thereto." It is unfortunate

the report is silent as to the value of the villa, but the addition of such an outhouse to a villa already supplied with stables and a coach-house seems a serious matter, and one which can hardly have been within the contemplation of the parties to the original contract.

Gates for Movable Weirs.

AFTER about sixteen years service the dam in Lake Winnibigoshish, controlling the head waters of the Mississippi River, has been reconstructed. The new structure rests upon the old foundations, and includes two concrete abutments, five concrete piers, five steel "Tainter" gates, and one wooden Parker "bear-trap" gate. The Tainter gates are of steel, sheathed with 3 inches of oak. Each gate has five sets of radial arms securely connected to a steel axle having cast steel trunnions revolving in cast-iron journal boxes bolted to the pier masonry. Concrete counterweights are hung by chains which are fastened to each end of the gate and pass over sheaves supported by steel framework. Hoisting is effected by means of double-purchase winches, and it is quite possible for one man to raise or lower a gate. The "bear-trap" gate situated at one end of the dam is of somewhat singular construction, consisting of three timber leaves, with forged steel hinges, and arranged, as the name implies, after the fashion of a trap. Although this gate is heavily loaded with protecting iron plates and rails, it responds readily to the regulating mechanism, and comes to its final upward position without any jar or jerk. This curious form of gate was originally devised in the year 1819 as a means for the improvement of navigation on the Lehigh River in Pennsylvania, and it is said that the name was given to the gate by the workmen then engaged as an answer to curious persons who desired to know what they were making. Since 1819 the bear-trap gate has been considerably improved, and it has been used in various parts of the United States by the United States Engineer Corps and civil engineers.

Cheaper Gas.

ON Monday evening last Professor Lewes delivered the first of a course of four Cantor lectures upon "The Future of Coal Gas and Allied Illuminants" before the Society of Arts. After pointing out that the cost of producing coal gas must tend to increase rather than decrease, owing to the gradual exhaustion of the best beds of gas-making coal, and the consequent rise in prices, the lecturer said that in order to produce cheaper gas it will be necessary to resort to the use of a cheap diluent. Fuel gas of the Mond or Dowson type must be rejected, because it consists mainly of non-combustible material, which cannot be economically distributed over large areas. Water gas, however, contains very little incombustible matter, and has double the heating power of fuel gas, and is therefore more serviceable for general distribution. Water gas is produced by the action of steam upon red-hot coke, one of the residuals obtained in the manufacture of coal gas, and can be manufactured on a gasworks at one-third the cost of coal gas. Referring to the poisonous character of carbon monoxide as a constituent of water-gas, Professor Lewes pointed out that this gas is al-

present in coal gas to the extent of about 1 per cent., and that if the proportion of carbon monoxide in the public supply were limited by Act of Parliament to 16 per cent. the risk of poisoning by leakage would not be materially increased. In view of the popular agitation against water-gas, and of the Bill dealing with the subject which has been introduced into Parliament, the discussion of the subject by Professor Lewes is very opportune. A cheap supply of gas has become a matter of great industrial and social importance, for the number of gas engines and other gas-consuming appliances economically employed for industrial purposes throughout the United Kingdom has increased in a very remarkable manner during the last ten years, while to cheap gas we must look as the only practicable substitute for smoke-producing fuel. Many of our competitors on the Continent and in America have for years been supplied with water-gas, and its use in limited proportions in this country should not be prohibited if commensurate reduction in the price charged for the gas can be obtained.

THE BRIDGES COMMITTEE OF THE OXFORDSHIRE COUNTY COUNCIL have decided to carry out the original plans of their Surveyor for lattice-iron bridges of 50 ft. span, on iron piers. We fully expected this result, although it was a duty to protest. They have gone far to spoil a beautiful place; but that seems to matter nothing in comparison with the saving of money, which is the sole reason alleged for the action of the Committee.

It is not often that one can find even a small exhibition in which every work is worth attention and the majority are among the best productions of their authors, but this privilege has been provided for us by the generosity of Sir Cuthbert Quilter in lending his pictures for exhibition in Messrs. Lawrie's Gallery in New Bond-street. Round the walls of the larger room are disposed a group of pictures so fascinating in their varied interest and beauty that it is difficult, having once entered the room, to make up one's mind to leave it. First in the collection comes Turner's extraordinary effort, quite at the end of his career, to rival Titian in his own field, in the painting of "The Departure of Adonis for the Chase." The figure of Venus, needless to say, does not equal the drawing of Titian; but the whole effect of the picture, as a kind of modern echo of the great Renaissance painter, is wonderful in its way; the sky seems as if it had been actually cut out of one of Titian's pictures. Reynolds's "Nymph and Piping Boy," one of his finest efforts in colour and composition, comes next; then an example of David Cox at the highest point of his art—if there is a finer David Cox than "The Skirts of the Forest," we do not know it. This is balanced by a fine Linnell landscape, not quite equal to the Cox in breadth and power of style, but in its own style an interesting contrast to the other. Between these two the "Bella Mano" of Rossetti represents, the best of Rossetti's art—somewhat over-rated in our opinion, but impossible to overlook. Romney's "Mrs. Jordan" is followed by Walker's "Bathers," perhaps his most complete and

typical work. Millais's "Joan of Arc" is a perfect work in execution, and much finer in expression, as a realisation of the heroine, than seems to be generally recognised—Millais is so entirely free from exaggeration or theatrical effect in these things. Landseer's "Titania and Bottom," not so much admired now as it once was, is a typical example of his *finesse* in execution; Constable's "The Edge of the Wood," a masterly work, is followed by Millais's "Murthly Moss," one of the most beautiful landscapes ever painted—looking more beautiful every time one sees it; and in a small collection like this it can be more fully appreciated than amid the crowd of a large exhibition. The remaining three in the large room are Mr. Herkomer's "Last Muster," perhaps his best work; Mr. Leader's "Parting Day," belonging to the secondary and popular grade of landscape art, but showing the artist at his best; and Mr. Holman Hunt's "Scapegoat," which has compelled the attention of the world by sheer power of painting, in spite of its ugliness and the absurd incongruity of the solemn text on the top of the frame. By the way, how came so conscientious a painter to misrepresent the familiar markings of the moon's surface as he has done in this picture? The smaller room contains some very interesting portraits of the Constable family; John Phillip's last and not quite finished picture; Millais's wonderful portrait of John Bright; and Mr. Riviere's fine and poetically suggestive painting, "The Magician's Doorway." It is a wonderful collection to find in so small a space, and forms a notable exposition of the variety and power of modern English painting.

THE collection of water-colour drawings by Mr. Claude Spéro—an Italian, we presume, from his name—at Mr. McLean's Gallery in the Haymarket, may be said to be rather of topographical than artistic interest; at least, their artistic interest is not of the highest; the style is mannered and conventional. The drawings from Pompeii and the neighbourhood are, however, of considerable interest and value as representations; the most effective are "Outside the Stabian Gate" and "Evening in the Forum," in both of which Vesuvius plays an important and effective part in the background. Among the "Drawings in Capri and the Neighbourhood" there is a characteristic one of "A Caprean Villa," with its colonnade painted red in the lower portion and climbed over by a vine, and its circular medallions with decorative subjects; and among these and the "Miscellaneous Sketches" are landscapes which are very pretty in effect and carefully finished; but they give one rather too much the impression of drawings suitable for reproduction in chromo-lithography.

HOSPITAL, AUCKLAND RURAL DISTRICT.—On the 20th inst., at a meeting of the Auckland, Shildon and Wellington Joint Hospital Board, tenders were received for the new hospital to be built at Helmington Row with a capacity of twenty-four beds. The tenders were:—T. Manners, Bishop Auckland, 9,057l. 9s.; Walton Bros., Crook, 9,060l.; W. D. Ayton, Tow Law, 10,280l.; W. Hudson, Bishop Auckland, 9,511l. 15s. 11d.; T. & J. White, Newcastle, 7,205l.; G. H. Bell, Bishop Auckland, 9,396l.; J. C. Nichol, South Shields, 9,440l. The second lowest tender, that of Walton Bros. was accepted. The estimate of the architect, Mr. W. Perkins, Bishop Auckland, was 9,005l.

THE ARCHITECTURAL ASSOCIATION.

AN ordinary fortnightly meeting of the Architectural Association was held on Friday evening, last week, in the Meeting-room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, Mr. H. T. Hare, President, occupying the chair. The minutes of the last meeting having been read and confirmed, and some nominations having been read, The following gentlemen were elected members:—Messrs. L. L. Jeeves, C. D. Power, G. R. Bryce, H. Rigg, B. G. Gwyther, J. Swanbrick, G. A. Soames, and A. C. Bossom. The following gentlemen were also reinstated, *i.e.*, Messrs. P. M. Horder and H. W. Roberts. Mr. R. S. Balfour, Hon. Secretary, announced the following donations to the library, *i.e.*, a parcel of books, comprising some volumes of the Royal Institute of British Architects' Transactions, *Builders' &c.*, presented by Mr. Andrew Oliver; "The Life, Work, and Influence of Sir W. Chambers," presented by Mr. J. MacLaren Ross; "The Life, Work, and Influence of Sir John Vanbrugh," presented by Mr. G. H. Lovegrove; and "Lettering in Ornament," by Mr. Lewis F. Day, presented Mr. B. T. Batsford. A vote of thanks was accorded to the donors. Mr. Cecil C. Brewer then read the following paper on "Sanatoria":— The principle which seems to have actuated your Committee in their invitation to me to speak to-night on "Sanatoria for Consumptives," seems to have been this, that if you invite some one who but half knows his subject you are likely to get a livelier discussion than if you put up your expert, and by so doing frighten away other speakers. I am perfectly conscious that there are others here to-night much more competent to speak than I, but I was assured by the Secretary that none were willing to take up the subject, and as it is one on which I am most anxious to obtain information, I consented to act as a bait to these gentlemen, and I can only hope that they will be drawn by my remarks to give to the meeting some of the knowledge they undoubtedly possess. I feel, too, that I am speaking at a not very opportune moment. I had hoped that before this date something would have been known as to the outcome of the King's Sanatorium Competition. That is to say, something further than the mere awards—that the essays and plans would have been published, and that we should have had a chance of seeing and discussing the plans accompanying the prize essays on the ideal sanatorium, as judged by the leading medical specialists. However, these have not been published, and nothing is as yet publicly known as to the form the building will ultimately take. Let it be understood that I shall confine myself to sanatoria for the treatment of consumptives by the so-called open air, or "Nordrach," system, of which the two main features are open air and abundant feeding, though Dr. Walker will tell you that it means a great deal more than this. I shall speak first of these sanatoria generally, mentioning some of the most prominent of those already built, both for paying and non-paying patients, and shall then go on, if there is time, to discuss some details of construction and fittings. I shall not tell you anything about sites, aspect, climate. Those are all more medical than architectural points, and I shall leave them to Dr. Walker, who is to speak after me, and who will, I hope, give you a description of the life of a sanatorium patient and of the essential points of the treatment, and will, from her very great practical experience of the treatment, answer any questions you may put, and give reasons for many of the things that I shall state as axioms. Existing sanatoria as to their plans may roughly be divided into two classes: Firstly, those built on a concentrated plan; and, secondly, those on the cottage, or block system; that is to say, they vary from the large hotel-like buildings, such as Falkenstein and Hohenhonner, in Germany, both having five floors, to Nordrach and the American Cottage Sanatoria, with quite small blocks, having two floors at most. In comparing the two systems, it must be remembered that Nordrach, perhaps the most successful of all these sanatoria, is on the cottage plan, and there can be no doubt that, from a purely medical point of view, this plan is best; but the disadvantages in working are many and obvious, both as regards convenience and economy.

The medical requirements are extremely simple. Every part of the building must be:

- (i.) Well ventilated.
- (ii.) Free from dust and easily cleansed.
- (iii.) Patients' rooms, in addition to abundant fresh air, must have as much sunlight as possible, and must be protected from cold winds.

(iv.) The building must be as sound proof as practicable.

The perfect sanatorium, therefore, will be the one that fulfils these requirements, and at the same time is convenient of management and supervision, provides reasonable comfort for patients in all weathers, and has not too much the appearance of a hospital or barrack, but which must not, on the other hand, degenerate into the hotel or hydropathic establishment.

At Nordrach, which is rightly called a colony, the various buildings are scattered throughout the village at some considerable distance apart; some of them have been especially built, but others, such as the administration and staff offices and some patients' blocks, are merely old buildings converted, and I think it is generally admitted that the success of this sanatoria has been due to management, strict régime, and the personal magnetism and enthusiasm of Dr. Walther, the founder, rather than to its buildings or site.

Nevertheless, some recent sanatoria in this country have been built closely following the Nordrach plan. One lately built, which I have seen, has its dining-room, kitchen, and staff offices on one side of a little valley, and the patients' rooms on the other, at least 200 yards away, and with no other means of communication between them than an uncovered and unsheltered path. Now, considering that in any sanatorium a certain proportion of the patients must be confined to bed, and must at the same time be provided with substantial and appetising meals, such a plan is surely absurd, and I can see no reason why, because a sanatorium in the Black Forest has succeeded, in spite of such an arrangement, that we should handicap ourselves with it in England—and the cottage system seems unsuitable to our climate—but would rather suggest the large building spread over as much ground as possible, and so arranged that the parts may be easily isolated.

I propose now to show you the plans of some sanatoria built in Germany and elsewhere on the concentrated plan, discussing them as they are upon the screen.

1. Falkenstein.—I have placed this first, as it was one of the earliest, and now is, perhaps, the best-known, German sanatoria, having been much advertised lately through the visit of our King, and it happens to be one which I have myself seen. This building, which was erected in 1876, accommodates 112 paying patients on five floors, of which I have only been able to obtain the main or ground-floor plan. There is a basement below this occupied by very large stores, bathrooms, and offices, with a verandah in front, and above are three floors of patients' rooms. The lay-out is ingenious, but it is doubtful whether the central recess on the plan is an advantage, for the rooms in the centre are somewhat deprived of sun. The building generally is too much of the hotel type, and the number of sitting-rooms is altogether excessive and harmful; they are difficult to supervise, and are a temptation to patients to spend too much time indoors; it being now generally admitted that patients when indoors should be as much as possible in their own rooms, which can be thoroughly ventilated, and where talking and forbidden amusements are not indulged in. There are also too many mouldings, decorations, curtains, and other dust-traps about the building. The water-closets are not detached from the main building, and the ordinary baths are poor, except for the douch, &c., which are much used, and which are situated in the basement under the stairways, and here the bathing is done under medical supervision, and the taps are placed outside the rooms. The dining-room, the one really important sitting-room in a sanatorium, though a fine room, is not well placed, having only north and east aspect. The patients' rooms are 13 ft. to 14 ft. high, which is quite unnecessary, and even inconvenient, 8 ft. 6 in. to 9 ft. having been found in practice to be quite an efficient and convenient height. But to take the chief objection to this plan last, the patients' rooms are placed on both sides of corridors, and it has become an

axiom that patients' rooms should only be placed on one (and that, of course, the south) side of a corridor; in other words, that your patients' block must only be one room thick. This has been realised in Germany now as well as in England, as you will see in the plans of more recent German buildings which I shall show immediately.

Let me first show Hohenhonnet. This closely resembles the Falkenstein plan, but is, I think, an improvement on it, as it should be, having been built sixteen years later. The wings here are shorter, so that the centre is not so shut off from the sun. The dining-room with east and west aspects and the complete blow through is better; and on the upper or patients' floor, the central portion is only one room thick, and the water-closets are partially isolated. But we get the same excessive number of sitting-rooms and the same number of stories. In both these sanatoria, which are for paying patients, there are bedrooms for visitors and friends of patients, and these together with the number of reception rooms lead one to suppose that the life more nearly approaches to that in a large hotel than would be allowed at Nordrach, and certainly the general aspect of Falkenstein when I saw it three years ago was very different to that of the newer and stricter English sanatoria.

3. Ruppertsheim.—This sanatorium for the poorer classes, built about six miles from Falkenstein in 1895, is, as regards plan and arrangement, to a great improvement on the former. The building was originally planned to accommodate men in the west, and women in the east wing, and was so being used when I visited it; but a new sanatorium for women was then being built close by, and the whole of the old building was to be given up to men. The arc form is distinctly good, although the thickening of the ends seems a mistake, and overshadows the rooms next to them. Here you will notice that the room and corridor plan has been adopted, so that by the use of fanlights over doors an excellent blow through may be obtained. You will notice that a dining-room and a dayroom are the only sitting-rooms provided, but that there are ample open-air galleries. The basement contains, beside the day-rooms, douche-rooms, stores, cellars, heating chambers, &c.

On the first and second floors the dining-rooms occupy the centre, one being for men, the other for women, and there are small parlours off them—a certain amount of the light housework being done by patients, both men and women. The bedrooms are arranged for one, three, and five beds respectively, but at the time of my visit they were being used for larger numbers than these. This dormitory arrangement can only be tolerated on the ground of expense, and possibly in the case of very poor patients who, Dr. Walker tells me, do not always appreciate the luxury of a single room. But any one who has slept for many nights in the next room even to a coughing consumptive patient will realise how essential separate rooms are.

Here the sanitary arrangements are fairly isolated, and for the most part good, except for the earth closets, which are of a strange and wondrous pattern—that is to say, they are on the soil-pipe plan—this pipe being a 9-in. glazed stoneware one, and as it bends and twists, and is jointed to connect to the closets below, the result may be imagined, and I could well believe the doctor when he assured me that they must shortly be abolished and water-closets put in.

The two small buildings on the extreme west of the plan, are objectionable, being pigsties, and comfortably placed between the open air gallery and the scullery. In spite of these objections the buildings are well laid out and built, and as there is no ornament, and reasonable precautions are taken to avoid the lodgment of dust, they struck me as in every way better than those at the parent institution, Falkenstein.

Alland.—This sanatorium, which was opened in 1897, is thirty miles from Vienna, and at present accommodates 118 patients, but the grounds, farm, laundry, lighting, laboratory, and other blocks are sufficiently large for a sanatorium for 300, and new patients' blocks will shortly be built to bring the number to this total. This sanatorium is particularly interesting to us in England at this moment, as in present size and completeness it closely approaches the King's scheme. It is intended for patients of the poorer classes, the charges

being about 30s. per week for first, and 12s. per week for second-class patients.

You will see by a glance at the ground floor plan that the patients are accommodated in dormitories as at Ruppertsheim, but here each dormitory accommodates eight patients, except for six small rooms to accommodate two each. The lay-out of this main patients' block is fairly good as a whole. The sanitary blocks are not, of course, sufficiently isolated for English ideas. But the chief fault lies to my mind in the size of the dormitories, and the fact that each acts as a passage-room for at least one other. As at Ruppertsheim, the washing is done in the lavatories and not in the bedrooms, excepting in the case of patients confined in bed, and, where dormitories are used, this is the best arrangement; though where separate rooms are provided it is a very vexed question as to whether washing and bathing should be done in the rooms or not. At Nordrach, where great stress is placed upon bathing, each room is provided with a shower-bath, and in other sanatoria a fixed lavatory is placed in each room. The disadvantages in having wash and supply pipes in rooms are so obvious that I think it is better to have all washing and bathing done in separate rooms, allowing washstands and baths, which may be connected only to the first-class of patients and to those too ill to walk to the bath rooms.

The dining and kitchen block are to the south-east of and rather lower than the patients' block, the ground floor being on a level with the basement of the latter, to which it is connected by a covered way. There are two basements to this block, used for cellars, servants' rooms, offices, &c. This dining-hall is a well placed room, and the cooking arrangements seem excellent.

Alland, like the projected King's Sanatorium, has a fine laboratory block, with mortuary and dissecting-room, also a scientific library, and accommodation for one or two foreign medical men who may wish to visit the place for purposes of study; there is also an electric light-house, laundry, and model farm. These are detached from the main building, and as they are similar to those which must be provided for any general hospital, I do not intend to describe them—the whole is very well and fully set out in the Alland Sanatorium Association's report, published in Vienna, which contains full plans, diagrams, &c.

Albertsberg.—I have included this among my slides, for though I can tell you little about it, it seemed an interesting plan for an inexpensive poor patients' sanatorium, the cost having been but 125l. per bed against 173l. per bed at Ruppertsheim, and 240l. at Alland. The dormitories here are for ten beds each, but there are said to be eight single-bedded rooms in the block behind the dining-room. This seems a mistake, for they must, unless the slope in the ground is very great, be somewhat cut off from light and air. Another very obvious fault is that the open-air galleries are too much sheltered between the blocks; but there seems an idea in the plan, and the use of the dining and sitting-rooms as passages seems an expedient to which no real objection can be taken.

Before leaving these German sanatoria, let me add that they all, except the last, appear too high, having five floors. This, even though the stairs be made easy of go, places too great a strain upon consumptive patients.

Now, gentlemen, having shown you plans of several German buildings, only some of which I have seen, may I be permitted to show you the plan of a small English sanatorium which I know well—namely, that built for the East Anglian Sanatorium Co. at Nayland, Suffolk, and of which Dr. Walker is the Medical Director. This building was originally intended for twenty-eight paying patients, but seven more rooms were fitted up in the roof during construction. You will see here that slightly radiating wings were adopted, and, I believe, the angle which these make with the centre has been found to be about right, that is to say, they afford a certain amount of shelter without shutting off the sidelight from the centre. Each wing contains six ordinary patients' bedrooms (10 by 14 by 8 ft. 6 in.) on each floor, and larger bay rooms at each end; those next the open air galleries being given up to staff officers' rooms so that control is always kept over patients in the galleries and also over the corridors. Practically the whole width of the south wall is window from 2 ft. 6 in. sill level to the ceilings. A corresponding light is put in right across the north

wall of the room above 6 ft. high, and again in the corridor opposite, so that a complete blow through can be obtained.

The sanitary blocks are placed centrally behind the patients' blocks, and a nurse's room at each end close to the secondary staircases. The administration block is at right angles to the main block, with a passage through to the dining-room, which is an almost detached room. The small passage connecting the administration block with the dining-room was originally planned as an open verandah, but after one or two south westerly gales which had an unfortunate knack of upsetting nurses with trays passing to patients' bedrooms, glass screens had to be fitted, which in really fine and settled weather can be removed. Now, if one short length of corridor open on one side proved itself inconvenient here, it seems to me that a cottage or villa block sanatorium could never be a success in English climate unless the blocks were connected by enclosed passages either above or below ground, or unless each block was provided with kitcheners and full equipment for serving meals, and either of these two expedients would be exceedingly extravagant, and I cannot see that there would be corresponding advantages.

But to return to the plan before us. Stretching eastwards from the dining-room come the kitchen and offices, with extra larders and stores in a basement under the east end of the block. Here an open corridor is provided, but there is a passage-way through kitchen and pantry, which can be used in windy weather. There is no first floor over the dining-room and kitchen block. On the first floor over the administrative block is a pathological room, and sewing and linen rooms. The front portion of the first floor is similar to the ground floor. On the top floor on the east side are patients' room, and on the west nurses' and servants' rooms. You will notice that owing to the slope of the ground the administrative blocks are mid-way between the ground and first floor patients' room, so that patients on either floor have only to go up or down one flight of steps to reach the dining-room.

I have chosen these plans from those available, almost haphazardly, I am afraid. Open air sanatoria are being built all over Europe and North America. They are to be found in Africa, and I learn from the highest authority that Wei-tai-wei is considered a suitable position. In Switzerland, of course, are many of the best known ones, though I do not think that these are constructed on the latest and most scientific methods, which I am endeavouring to describe to-night.

But having seen these few plans, you will probably have realised how extremely simple the planning of small sanatoria is. Difficulties, undoubtedly, increase enormously directly the numbers to be accommodated increase. You are then at once confronted with the question of area covered, and distance from dining-room and kitchen, and the number of floors allowable. As it is exceedingly important that patients should dine in the general dining-room as often as possible, this question of the distance of the patients' rooms from the dining-room is really a vital one. It has sometimes been suggested that the buildings should be built on a great number of floors, and lifts provided. Against this there are two objections (1) the fear that the lower rooms may ventilate into the upper; (2) the expense of running the lifts, which would have to be very large, as they would be chiefly used in going to and from meals, and therefore by practically the whole of the patients at once.

As to construction, everything that applies to general hospital construction applies here, but an effort should be made not to give the place too much of the hospital air. In this climate verandahs outside the bedrooms are generally considered a mistake. The open air galleries should be placed either in between the rooms (I have sometimes wondered whether the ideal plan would not be to have one between every alternate room), or at the ends of corridor or quite away from the house. They should not be less than 10 ft. deep, and there should be ample space laterally, say 8 ft., to each person. When I visited Falkenstein and Ruppertsheim the couches in the open-air galleries seemed much too close together.

Ventilation.—In some German and, I believe, some American sanatoria mechanical ventilation is resorted to. But this seems a great mistake—one of the objects of the treatment is the

hardening of the patients, and for this there can be nothing better than open windows. Casements opening in have been found the best form of window. Sashes only allow of half the window-space being used for ventilation, and casements opening out are most troublesome and noisy in windy weather. The upper parts of the windows should be hopper hung or on centres, and it is a good plan to have lift butt hinges to the casements so that they may be taken right away in hot weather.

Open fireplaces, except for appearance in sitting rooms, are not advisable on account of the dust, and low pressure steam is generally admitted to be the best form of heating. Hot water would, of course, be preferable, were it not that in sanatoria the temperature of rooms may fall below freezing, and there is a danger of burst pipes, and as the radiators are chiefly used for a short time while patients are dressing, hot water will not heat them rapidly enough. Besides, with very long, low buildings such as I have been advocating, hot water cannot be efficiently used.

The best position for the radiator in patients' rooms is another point, I think, to be settled. I show you three plans of patients' rooms at Falkenstein, at the East Anglian Sanatorium, and at a sanatorium recently designed. The position of the radiator in the last, under the windows, has been severely criticised by doctors as not efficiently heating the room, and the other position is probably the best. The foot of the bed has been suggested, and the place seems an excellent one, were it not for the difficulty of moving the bed. The radiators should be fixed at some little distance from the wall to allow of dusting behind, and should be of such a pattern that a brush can be used between tubes.

The doors of patients' rooms and open-air galleries should be made large enough to allow of beds being wheeled in and out with ease. The flooring of patients' rooms and corridors is a question to which a great deal of attention has been given—smooth, plain linoleum is probably the best for both. Tiles, parquet or mosaic, are excellent, except on account of noise, and this is of the very greatest importance. Sanatoria with long lengths of corridor and a number of rooms having both doors and windows opening on to them are apt to be so noisy as to have a really bad effect on nervous patients, and everything in the way of rubber door stops, silent window fastenings, and noiseless floor coverings must be adopted. Probably the india-rubber flooring now used in banks, &c., would be the best if expense allowed. The floors of the dining-room may very well be of hardwood, and of the open-air galleries glazed tiles.

Fixed hanging cupboards running up to the ceiling are better than wardrobes, as dust underneath, behind, and on the tops of the latter is avoided. Electric light is, of course, the best form of illuminant, and its advantages are so great that it should be installed almost at any cost. It is necessary to have the fitting arranged so that the lamps shall not swing and be broken by the draughts that blow through the rooms, and, of course, to have the switches in patients' rooms within reach of the bed. It is also well to have at the same point an extra plug which may be used for keeping plates warm or for a lamp for examining throats. Here also should be fixed the push of the bell to ring in the servants' bedroom.

As to the height of rooms, I have previously said that 8 ft. 6 in. or 9 ft. at most has been found a good and convenient height. I have no doubt that there are many who will criticise this, and it is not in accordance with the custom in Continental sanatoria, where rooms vary from 12 ft. to 14 ft. The advantages of low rooms are—

1. The reduction in the height of the building, consequently in the number of stairs.
2. The reduction in the cube, and consequently the cost of the building.
3. The convenience of cleaning, the top corners being easily reached with an ordinary mop.
4. The ease of opening the top lights of windows.

But, of course, with such low rooms the windows must be tight up to the ceiling. After all, if patients are to live in a constant stream of fresh air, I cannot see that it matters whether that stream is 8 ft. 6 in. or 14 ft. deep.

Before concluding, may I recapitulate what seem to me the chief points to remember in

designing the ideal room of a consumptive patient?

The room should face south or south-east; should be ventilated back and front, as should be the corridor behind.

The windows should be the full width of the room, and the sill low enough for the patient to see out when lying in bed, and should be carried right up to the ceiling; they should open inwards and to their full extent, as well as being entirely removable.

Open fireplaces should be avoided, and the heating provided should be such that the room may be warmed speedily. The doorway should allow the bed to pass.

The room should be as close to dining-rooms, bath, and water-closet, as possible, and separated from them by the least number of steps. The usual hospital precautions against dust should be taken, and the walls and floor should be made as sound proof as possible.

In conclusion, let me recommend to any one wishing to study the subject Dr. F. R. Walter's exhaustive work, "Sanatoria for Consumptives," to which I am indebted for some of the plans I have shown to-night.

Notes on the Construction of a Sanatorium from a Medical Point of View.

Dr. Jane Walker then read the following paper—

In building a sanatorium for the treatment of consumptive patients, we must keep ever before our minds the meaning of the so-called "open air treatment." This term, which has come into very general use, is a convenient one, but is apt to be misleading, for it has led, not only the general public, but even people in authority, to assert that all that is required is open air, and that, if windows are only opened, consumption will diminish, and in time cease to exist.

Now the sanatorium treatment of consumption is a great deal more than this. It is a minute and elaborate system made up of endless details, all of which are important. It is not enough to say, open all windows in all weathers, and all will be well, nor even to add: feed all patients very plentifully. With these two points, essential as they are, must be united careful regulation of exercise and rest and constant medical supervision. No two cases can be treated on exactly the same lines; the sick individual, not the individual sickness, must concern us; in other words the reaction of a patient to his environment is a very important element in the cure of consumption. The moral qualities which most aid consumptives in recovery are, firstly, strength of will; secondly, common-sense; thirdly, equability of temperament. Therefore, the essentials in the treatment of consumption are to preserve and strengthen the physique, to enforce prudence, and to induce placidity. Hence it follows that a sanatorium which is designed to be an ideal establishment, must be arranged (so far as is possible in a mere structure of bricks and mortar) in such a way that not only the physical, but the mental and moral well-being of the patients may be taken into consideration.

In building a sanatorium for a large number of phthisical patients, the points which must be kept specially in mind are that, just as overcrowding and want of sunlight and fresh air are factors in promoting the disease, so abundant space for each patient, and, if it may be so stated, a superabundant supply of fresh air and light are among the chief means of combating the disease. Abundant sunlight and fresh air are necessary on two grounds: firstly, because they tend directly to kill the organisms of disease; and, secondly, because they increase the patient's power of resistance; whereas, impure air keeps him in a low state of health, and so renders him an easy prey to the inroads of the tubercle bacillus.

There is in some minds a great feeling against treating patients in a sanatorium instead of in their own homes, partly because of the supposed danger of massing a large number of consumptive patients together, and partly because of the fear lest the treatment in a sanatorium should degenerate into a mere routine, by which every patient is treated exactly alike. The first danger is overcome by (in addition to antiseptic precautions) spreading the sanatorium buildings over a large area, in a somewhat isolated spot; and the second by realising that the sanatorium treatment is essentially individualistic. In a sanatorium the treatment of consumption is

continuous—it does not consist in prescribing a dose of medicine and then giving no more attention till the following day, but it lies in ceaseless care and attention every minute of the time. For example, the amount of food, the amount of exercise and rest, the time that may be given to employment and recreation, the kind of employment and amusement, and every detail of the daily life, is carefully regulated according to the requirements of each individual patient. A good deal of the necessary routine of the open-air treatment is irksome to most patients, and is easier to bear if the sufferer be one of a community all the members of which are undergoing the same strict regimen.

The following conditions are necessary for an establishment for consumptive patients. The building must be placed on a slope facing south, and at such an elevation above the surrounding country that an air is ensured free from the impurities caused by industrial establishments, business, or traffic of any kind. The building should be therefore in an isolated district, far from lines of traffic, and should be at a considerable distance from any town or large village. It should be so constructed that patients can be distributed over a considerable space, and that there may be constant and efficient ventilation. The building should be surrounded by woods, meadows, and streams, and the farm should be at some distance from the sanatorium.

The sanatorium should be so constructed that the strictest attention can be easily paid to cleanliness; the heating should be by some central system. The greatest restrictions should be placed upon all accessories, such as carpets and curtains, &c., which may harbour dust, and the lighting should be by electricity. But as, in spite of the best ventilation, the air inside a building is never so pure as that without, arrangements must be made to allow of patients spending as much time as possible in the open air, so that the rooms are used practically for sleeping only. In this climate verandahs are a mistake; they keep off sunlight and air. There should be covered shelters either quite away from the house or built as an extension of the corridors.

A very important element in the possibility of constantly living in the open air, and of rational ventilation, is protection from wind. This can best be obtained by placing the building on the slope of a hill at some distance from the top and facing nearly due south. A south wind is rare, and, as it nearly always brings rain, it cannot bring dust, and, therefore, is the least harmful that blows. Another point in the efficient ventilation of the building is the construction and situation of the windows. It is essential that the patients' part of the building, at any rate, should be only one room thick, the rooms facing south with a corridor behind into which open windows facing north. Each patient's room should have practically the whole of the south side window space; the lower part of the window should be of the casement type, as sash windows at the best only allow of half the available space being used as fresh air inlet; the upper part of the windows should be flaps or casements, falling inwards. On the north side of the rooms should be a similar series of upper windows which should be opposite to the windows in the corridor.

In a building such as this, standing in complete isolation, the only source of infection can be from the patients themselves. To eliminate risk from this source as much as possible, all excreta must be rendered harmless, and care must be taken that no infectious disease be able to spread. The means by which this is obtained are by total prohibition of all promiscuous expectoration, by providing each patient with a suitable portable spitting flask when he is out of his room, and placing a properly fitting cup in each bedroom; by having a disinfecting chamber for furniture, clothes, bedding, &c., by having walls that can be colour-washed and floors that are impermeable. All these measures should be taken, not only to render the tubercle bacilli harmless, but also to eliminate the various other micro-organisms which endanger health. Owing to these precautions, the prophylactic treatment of persons of a phthisical tendency, especially children, can go on side by side with that of consumptive patients.

As carefully regulated exercise and rest play important parts in the curative treatment of consumption, it is necessary in an establishment of this kind to have due facilities for

carrying out these two factors in the treatment. The great end in view is to strengthen the heart and body muscles, and with this object the building should be surrounded by a sufficient number of paths at varying gradients, some shady, some sunny, and all free from dust. Arrangements should be made for sufficient rest and avoidance of over-exertion, by providing a large number of benches and covered seats at intervals along the paths. There should also be a suitable couch in each patient's room, and an ample supply of reclining chairs in all the shelters of a kind which will not be injured if left out in all weathers. The extent and duration of all patients' walks must be fixed daily, and notes taken of patients' pulses, temperatures, and conditions as to fatigue, sweating, &c., on their return from exercise. The attention to all these details necessitates constant medical supervision.

The subject of the sanitation of a sanatorium is important. In view of the fact that the Royal Sewage Commission in their interim report practically admit the possibility of bacterial processes producing reasonably good effluents, it would seem that either land treatment, or treatment by one or other of the bacterial processes, might be adopted. The exact method of sewage disposal will depend on the nature of the soil surrounding the sanatorium, and also on the slope of the ground. If the soil be light sandy loam, and the slope and other conditions favourable, land treatment should be preferred. If, on the other hand, the soil be peat, or clogging sand, such as Bagshot sand, probably a septic tank, followed by some form of bacterial bed, will be the best method. Whether land or bacterial process be chosen, a septic tank should be interposed to hold back solid matter, much of which will be liquefied when septic action is started.

In dealing with the land system, some experienced person is needed, who will treat the land carefully, so as not to let it get "sick," and also obtain the best possible results in the way of crops—*c.g.*, cabbages, rye grass, or other growths.

If one or other of the forms of bacterial beds is to be used, Dibden's Contact Bed, Whitaker's Continuous Process, Duckett's Aerobic Self-acting Continuous Filter, or Scott Moncrieff's Process may be adopted. It is impossible to say which of these processes is the best, but, from the London County Council experiments carried out at Barking and Crossness, it is extremely doubtful if any of them can be relied on to destroy pathogenic germs. In the case of the land effluents the destruction of pathogenic germs could not be relied on, but no doubt mechanical separation of the organisms takes place, and also, the process being slow, as compared with bacteria beds, pathogenic germs would be more apt to be destroyed.

Considerable difficulty arises if the effluent must go into a watercourse which, in its turn, runs into streams or rivers, supplying water which is to be used for drinking purposes. Provided the water is not subsequently to be used for drinking purposes, sterilisation might be disregarded, if the effluent were non-putrescible and incapable of creating any nuisance. Probably the Mersey and Irwell standard will suffice.

But with regard to effluents running into streams used for drinking water, the subject is very complex, and until the Royal Commission on sewage disposal has made some definite pronouncement on the matter, it would be rash to express too definite an opinion. Personally I should be inclined to say that complete sterilisation, that is destruction of all spores as well as bacilli themselves, is impracticable, except in a very large establishment, on account of its extreme costliness. Therefore the point to be aimed at is to consider whether partial sterilisation, to the extent of destroying the tubercle bacillus, is also impracticable. On this point the greatest diversity of opinion exists. Available data do not permit of a definite pronouncement being made. Thermal processes, though on theoretical grounds the best methods, cannot compete in point of cost with chemical methods. The ozone method has been tried, with apparent success, on the Continent, both with water and sewage effluents, but the cost of installation is a serious element. I should feel inclined to advocate the use of chlorine compounds; for example, bleaching powder, or else sodium hypochlorite. These chemicals are cheap, the former can be bought anywhere, and the latter

from the United Alkali Company, and they are possessed of conspicuous germicidal properties. But whatever process be adopted, the effluent, to be of any value, must first be brought into a chemically pure condition, such as has been attained by the Mersey and Irwell Board.

To supplement the remarks of Mr. Brewer on the internal arrangements of the Sanatorium, I have a few observations on the treatment of the walls. The walls of the bed and sitting rooms and of the corridors should be painted or colour-washed with some cheap material. It is not advisable to have varnished walls. There is a constant percolation of air through the ceilings and walls of ordinary dwelling-houses sufficient to materially aid in their ventilation. By varnishing walls, not only is the air prevented from gaining access to the rooms, but a cool surface is presented upon which in cold weather the warmer air of the rooms condenses, and a continual state of moisture of the walls results, which, especially in damp or foggy weather, may be described as sweating. I have found, by personal experience of a varnished bedroom, that all metal things, such as keys, scissors, &c., are continually rusty, and the room tends to have a damp, musty smell, and that in spite of perpetual open windows. At the Pinewood Sanatorium I was interested to find the other day, when I visited it, that they have similar difficulties owing to varnished walls. There is constant moisture on the walls, and all their metal things, such as the edges of the temperature chart holders, get rusty and tarnished, and so much is this the case that they are putting radiators into all the rooms to try and dry them by heat. I doubt myself whether they will not find that the rooms have to be heated to a high degree to make any appreciable impression whenever the weather is either cold and damp or cold and dry.

The moist condition of the walls is not only unpleasant, but is certainly injurious, as germs tend to breed in moisture, and, though varnished walls can be readily washed and cleaned, yet, unless they are done most thoroughly every day, and every part of the wall is dried, I consider that such accumulations of moisture are a very distinct drawback. It is not so much that the walls are likely to be harbourers of the tubercle bacilli, as that anything which forms a nidus for any kind of micro-organism, is to be highly deprecated in a building which sets out to be upon correct hygienic principles.

If walls are colour-washed, and done again as a routine thing from time to time, and the walls of the bedrooms are always done when a patient leaves the sanatorium, the expense is not great, and the certainty that the walls are clean and aseptic is secured.

The description of the daily régime of the sanatorium may not be without interest to many here. Breakfast is at 8 or 8.30 o'clock. Before breakfast the doctor visits each patient, and after hearing how he has slept, and what the pulse and temperature may be, says out the morning in accordance with these conditions. Those patients who are well enough to be out and about take their prescribed amount of exercise some time before 12 o'clock. From 12 to 1 o'clock all patients rest on long chairs either in their rooms or out of doors. During this hour they are again visited by the doctor, who settles what they may do during the afternoon, and all temperatures are registered at 12 o'clock. At 1 o'clock is dinner, which generally consists of three courses. Each patient is given, and expected to eat, the amount of food provided, for the doctor supervises each helping, and though, in common with many other doctors who have to do with the care of consumptive patients, I do not feed patients so largely as I used to do, yet it is really surprising how cheerfully and willingly patients eat three substantial meals daily when they are out in the open air from morning to night.

After dinner patients again take a regulated amount of exercise, and from 6 to 7 o'clock they rest before supper, which is at 7 o'clock, on the same lines as dinner, though it is generally a rather lighter meal. During the evening rest hour the patients take their temperatures again, and are again visited by the doctor. Of course, patients who are quite confined to bed, or those who are at all weak, have their meals taken to them, either in their rooms or out in the garden. Those who are being kept in bed often require to be fed by a nurse, and therefore in any sanatorium in which any but slight cases are taken, the accom-

modation provided for nurses must be ample, for in a day such as I have described, full of endless small, but important, details, a day so arranged as to guard against the slightest fatigue on the part of the patient, good and efficient nursing is one of the most important points. All patients who need it have a visit from the ubiquitous doctor before they settle down for the night. It is of the highest importance to realise that in the treatment of consumption the patients must be considered and treated individually; there must be no massing of them together, either physically, so far as the building is concerned; or mentally, so far as the doctor is concerned; the ordinary red tape of hospital routine will not work with consumptive patients. With some the visit of the most harmless and unscintillating old lady will send the temperature up a degree or two; others suffer from boredom, and require, and are the better for, some amusement and the visits of friends occasionally. Four visits a day from one's medical attendant may seem excessive, especially when one is suffering from a complaint which is likely to last for months, if not for years, but it is, in all cases necessary, where phthisis is at all active, to watch closely the effect of exercise upon the pulse, temperature and respirations of each patient, and to note at once any signs of fatigue. Probably one of the secrets of the so-called "open air" system lies, not really so much in the open air as in daily, intelligent, and tactful management of each individual patient.

Mr. Edwin T. Hall, in proposing a hearty vote of thanks to Mr. Brewer and Dr. Walker for their interesting and up-to-date papers, said the subject was one which naturally commanded the attention of medical men and architects who practised in hospital work—more perhaps than was the case with any other subject of recent years, and emphasis had been given to this by the scheme which His Majesty the King had recently promulgated. There was so much that was admirable in both papers, which focussed so much available information, that there was little to criticise, and he could only support, as the result of his experience and investigation, what had been so well put in the papers. He thoroughly agreed with the authors as to the height of sanatoria. The tall sanatoria in Germany were a great mistake; buildings of four, five and six stories should not be provided where there was a large area of land available because, for one thing, there was the fatigue of climbing upstairs; and if lifts were provided there was the great expense of running them. He thought the buildings of two stories suited admirably in the East Anglia building, and he thought he plan, too, of the building was good, although personally he would have preferred to have had the patients' block detached from the other buildings in the centre, so that the east and west winds might blow right across. It had been pointed out that with larger buildings there was the difficulty of combining adequate concentration and a sufficient spreading of the patients over the land. He showed a drawing of the Brompton Consumption Hospital Sanatorium which he was erecting at Frimley, which was exactly the size of the King's Sanatorium, where they had to face the problem of how to concentrate and how to keep the patients well separated. The plan of the main building was a cross, the arms being only one room deep with a corridor behind, as described by Dr. Walker, with windows opposite the doors so as to ensure a blow through. In these buildings they placed eleven patients on each floor in each wing, and though they had 100 patients to deal with those most removed from the centre were only eleven rooms away. As to the vexed question of balconies and verandahs, at the large and modern sanatorium at Harlaching, near Munich, where staff buildings had been erected to deal with 600 patients, and where the accommodation was gradually being increased up to 600, on the south side of the big wards were verandahs extending from end to end. The doctor there considered them admirable from the point of view of convenience, though he thought they were too wide (12 ft.), and that they ought not to be more than 9 ft. wide. These verandahs certainly obstructed the sun getting into the wards owing to the way they were erected, but if they had been columnar and treabated in treatment instead of arcuated, the result would have been admirable. At Frimley they had tried to com-

promise, and instead of having verandahs they had rolled sunblinds, which had been provided all over the ground floor. Another thing which he thought was very desirable was that all the windows should be carried down to the ground floor, so that in the summer beds could be wheeled out into the open air when patients could not walk out themselves. Patients could thus get the open air, and, if the sun were too strong, shelter under the sun blinds. At Alland the arrangement was the same as that he had described at Harlaching. As to Falkenstein, it must not be forgotten that that originally was a private house; it had grown, and was not so good a building for its purpose as it probably would have been had it been built *de novo*. Many of the arrangements were very unsatisfactory. Although there might be a great many things to admire in these German buildings, there was one thing to avoid, *i.e.*, any imitation of their sanitary arrangements, for they did not seem to know the first principles of sanitation. One could find three or four water-closets in an evil-smelling room, with one window, in the middle of an institution and a slop-closet behind that. As to the size of rooms, he agreed with what had been said; high or large rooms were not wanted in these buildings, for the patients were to live in the open air as much as possible, and all that was necessary in the bedrooms was room to move about. If they had a cube of 1,100 ft., they had all that was necessary in rooms of this type. As to the position of the radiators, he thought the best position was that which all the German authorities adopted. If they had a radiator under the open window, one of two things would result: either it was chilled by the very cold air, or the hot air went out of the window; and they wanted to put the radiator where they could get the benefit of it, *i.e.*, at the back. As to the dayrooms, they should have as few rooms as possible. In reference to nurses, at Nordrach, the Garden of Eden where this open-air system originated, the doctor objected to nurses. At Falkenstein there were no nurses unless the patient chose to bring them, but waiters were provided. At Nordrach the place was remarkable in many ways. For instance, there was provided in each bedroom a lavatory in which to wash and another into which to spit, the waste from which ran down goodness knew where. But the place was beautiful in itself—no dust, beautiful scenery, and it had a masterful doctor, who simply compelled his patients to get well. In every German sanatorium there was a good dairy, which was close to the other buildings, as a rule. As to sewage, that was always a great difficulty. Bacteriological beds were admirable in theory, but in practice, he was told, the smell was sometimes abominable, they were good, but much abused. In Germany there was not one anywhere. At Falkenstein, which was a large and extravagant place, the sewage system was remarkably simple. It consisted of nothing more than putting sulphur meal in the sewage, and the effluent, which was without smell, was turned on to the naked ground, apparently without the slightest evil result. The same system, though more elaborate in detail, was applied at the new and perfect hospital at Nuremberg, and there was no smell and no inconvenience whatever. At Planegg, near Krailing, they had the same system. As to wall covering, he agreed with Dr. Walker that some form of distemper was desirable. Varnish was admirable where there was a dry atmosphere and the windows were closed, but where they were open and the walls were exposed to the humid air, varnish became sticky, and was not good for the purpose.

Mr. Keith D. Young, in seconding the vote of thanks, said that what struck one very forcibly about the open-air treatment as a system was that it was preaching the gospel of fresh air. Quite apart from its special application to the treatment of lung diseases, it taught a very valuable lesson in the value of open windows—a value which had been somewhat lost sight of in late years by considerable insistence on the value of another system which depended entirely upon shafts and shut-up windows. As to the height of rooms, he thought we were apt in all hospital buildings to consider cubic space and height to the detriment of floor space, which, after all, was the valuable element in wards, and he could not see what advantage was to be gained by having very high walls. In small rooms, the height Mr. Brewer mentioned was much more to be desired than rooms 12 ft. or 14 ft. high. Not

long ago he was engaged in a competition, and he and others were told that the rooms were to be 14 ft. high, he thought, which was an enormous height for small rooms. As to wall surfaces, he was very glad to hear Dr. Walker's views as to distempered wall surfaces. The sanitary value of a wall which could be periodically scraped and resurfaced must be very great, and superior to a varnished wall which might or might not be regularly cleaned down—as a matter of fact, they were not cleaned down as often in practice as they were in theory. The question of floor surfaces was another difficult question. As to the india-rubber floor referred to, he supposed Mr. Brewer meant the American interlocking rubber tiles, which made a beautiful floor, but which cost almost as much per foot as terrazzo, for example, cost per yard. [Mr. Hall: More; it costs 2l. per square foot.] He had obtained it for less than that, but in any case it was very expensive. For the wards he should like to suggest the use of teak boards laid practically on to the concrete, without joints. Teak made a very quiet floor, though a noise could be made on it with high-heeled boots—but so it could on linoleum. It seemed to be a most practical form of floor, because it was practically impervious and was not very expensive. Another idea had occurred to him, though he did not know whether it was practical, and that was whether one could have a large sheet of linoleum and counter-sink it, as it were, on to the concrete. The concrete, of course, must be floated to a good smooth surface, so that the surface of the linoleum exactly coincided with the surface of the corridor floor and all round the room they would have a hollowed skirting, and if they wax-polished the linoleum it would last practically for ever and be quite impervious and very cheap. [Mr. Hall remarked that he had often done this.] He echoed Mr. Brewer's desire that they would soon see the essays and plans sent in in the competition for the King's Sanatorium. The profession would like to see the successful plans.

Mr. W. J. Morton, secretary of the Mount Vernon Hospital, said that one thing which struck him that evening, as it had done before in listening to papers and discussions on this subject, was the absence of any reference to a laundry. No one seemed to think it necessary to have a laundry in which to wash the clothes of consumptive patients; but it seemed an important point, for if there was anything in the theory on which consumptive people were treated, it must be a source of infection to those who were not consumptive to have their clothes washed with those of the patients. They had heard that thermal means were not always effective in destroying germs, and there must be some danger when large quantities of linen in an establishment were passed through one disinfectant. Dr. Walker had referred to verandahs being a mistake in this country. He could not quite agree with that, for during the last few years he had seen the effect of patients under treatment under verandahs and, side by side, the effect of treatment in wards, and almost invariably patients did better under a verandah and when removed from the wards; patients, on the contrary, removed from verandahs back to the wards did not do so well. At Mount Vernon they were building new verandahs some 12 ft. wide, 80 ft. long, and 12 ft. high. As to the height of wards, he thought they should be 12 ft. in height; if they had low wards, those wards would get stuffy in spite of open windows, especially if radiators were in them. There was nothing more objectionable than the atmosphere of a room where was a radiator. They would say the open window did away with that; so it did to some extent, but not entirely, and so he did not believe in radiators, but he did believe in the open fire-place. It might be a minor matter, but if they had a fire in a room it was much more comfortable and homelike, and that was a good deal to a patient. The objection to dust could be got over in a properly arranged Teale grate; with such a grate there was little dust, and the atmosphere of the room was well warmed, with none of the objections set up by the radiator. There were radiators in Mount Vernon, but they were not used; and it did not seem desirable to heat rooms by radiators when the object was to harden patients. As to hardening patients, at Mount Vernon there were thirteen patients sleeping in open tents and improving in health. As one who had watched the

open-air treatment for three or four years he could say it was not so much the buildings as the individual attention given to patients that was so important. There was no "system" of open-air treatment at all; it was the open window, good feeding, individual attention, and regulated exercise that cured consumptive patients, if consumption could be said to be cured, as he believed it could. As to the site of a sanatorium, it was important that a suitable site should be chosen, but that was not the only consideration. However desirable it was to have an ideal site, he thought there was something in the view of Dr. Knopf, when he said: "Let us cure patients as near as possible to the homes where they work"; if you can cure them in London, do so; if 20 miles out of London, do so. If this can be done, do not go 100 miles away. As the result of observation, he could say that this is being done—in the suburbs, at any rate—though, perhaps, the improvement was not in that case so rapid. It was a great help, too, to a poor patient to see and have a talk occasionally with a near relative—a husband or wife—and patients who could see their friends occasionally did better than those who could not. During the smallpox epidemic recently, Mount Vernon Hospital was closed to visitors for fear of infection, and it was remarkable to notice how some of those patients who could not see their friends went back in their condition or remained stationary; and then, again, how they progressed when the prohibition was removed! As to flooring, he had seen and tried several kinds, and he believed there was nothing to beat linoleum upon a deal floor, say. It was soft, quiet, and was not tiring to the nurses, which was a very important point. There was nothing more tiring to a patient than to walk upon a granolithic floor, or a teak floor.

Dr. Harsen said the question of floors was a very big one. If they used linoleum, there was a tendency for the linoleum to crack, and where there were cracks the bacilli germs and dirt could get in, and that, of course, was undesirable. It was better to have plain teak floors and all cracks filled in with concrete so as to get absolute smoothness and leave no room for germs to get in.

Dr. Wethered said that in the preventive medicine of the future architects would have to act more than in the past with the medical profession, and if architects and doctors worked together jointly in such matters, each side would make fewer mistakes. He agreed with most that had been said by the authors of the two papers. He agreed that in this country it was better to have two-storied buildings than high buildings, such as were to be seen in Germany. As to verandahs, there were two sides to that question—i.e., the scientific side and the economic side. Where the verandah was placed depended to a large extent on the amount of money available. If they wanted to build economically, the verandahs, by judicious arrangement, could be placed, without objection to the patients, outside the rooms on the first floor. It was not absolutely desirable to do that, and in the ideal arrangement they would not be so placed. If more money were available, the first floor should be given up to the administrative and other offices. It was a great advantage to have the verandah close to the building, and for it to be unnecessary for the patients to leave the building to get to the verandah. That was very important in the case of patients who could not get out of bed. He considered verandahs of the utmost importance, both for the comfort of the patients and for their general well-being. He thought the less accommodation in such buildings for visitors the better. As to the King's competition, the essays and plans were to be published shortly, and due notice would be given. He wished to thank Messrs. Law & Allen, the architects associated with him in that competition, for their valuable help in preparing the plans. He was quite sure no doctor would have won that competition alone, and he was equally sure no architect would have done so.

Mr. Arnold Mitchell said he was glad the King's competition essays were shortly to be published because the subject was of great interest to architects. He had examined several of the German sanatoriums before preparing his scheme in that competition, and, after hearing the very interesting papers by Dr. Walker and Mr. Brewer, he was a little surprised that no reference had been made to what he considered was the finest of them, i.e.,

Belzig, which was the most modern and up-to-date of all. The verandahs in that building were large covered shelters in front of the rooms, or, rather, adjacent to them, and he was struck to see the way in which the patients were crowded on to them—the beds and the patients being wheeled out on to them in the daytime and packed so closely that the patients were almost touching one another. That could be improved upon by providing larger verandahs, but what he had proposed in the scheme he submitted in the King's competition was to provide groups of rooms with verandahs in between, and corridors at the back of the rooms. The patients could by that arrangement be wheeled out of their bedrooms into the corridors, and then into the verandah, and by that method a blow through was provided. The verandah treatment was suitable to other than the ground floor without obstructing the ground floor rooms. They had heard how on the ground floor the windows were taken down to the ground level and the bays taken out. Why not apply that to the floors above? As to floor covering, it was obvious that linoleum was the most practical and convenient covering for the rooms, but what was the most suitable in the verandahs and balconies? He had proposed granolithic cement, which took a polished surface and stood the weather well. It did not do to have wood, for a harder and less pervious surface was required. A laundry was an absolute essential in these buildings, and perhaps that was why it had not been referred to in the papers; it was regarded as a matter of course. The gentleman who said he preferred the open fire to radiators seemed to answer himself when he said that the objection to the open fire was the dust. Exactly so; and practically all authorities were agreed that the dust was sufficient to condemn the fire in a patient's room.

The Chairman, in putting the vote of thanks to the meeting, said there was much room in the provision of these buildings for the exercise of ingenuity and common sense, and perhaps common sense was the most essential qualification which could be applied to the planning of sanatoria. There appeared to be two types of these buildings—the ordinary German type which, apparently, generally consisted of a building with a number of floors; and what, he supposed, would eventually be the English type, i.e., a building of not more than two floors. There were advantages in both systems, he thought. If they were dealing with a large number of patients on one or two floors it would be necessary to spread the accommodation over a large area of ground, and so far they must increase the difficulty of service and administration greatly; though from the hygienic point of view there was a great advantage in spreading it in that way. Still, the objections to the many-storied buildings seemed to have been exaggerated, for he could not see what practical difficulty there could be in a well-planned four-storied building, with the administrative department centrally placed and with a good supply of lifts. The objection given to the several-storied building was that it involved the patients and others going up and down stairs, and, if so, that was a very serious objection where consumptive patients were concerned; but surely that difficulty was got over when there was an efficient service of lifts; and, at the same time, in large institutions, if got over the difficulty of administration. As to the height of rooms, he thought that 9 ft. for small rooms would be ample, and anything above would be waste space, and would tend to make efficient ventilation more difficult. The question of floors was a very knotty one, not only in hospitals for consumptives, but in hospitals generally. He supposed the ideal floor was a floor without any joints, for when there were joints there would be a certain amount of shrinkage, and consequently places for the accumulation of dust, dirt, and germs. Terrazzo or cement floors seemed to him to make excellent floors, but they were very cold and uncomfortable. What was wanted was something of that kind which would be more or less of a non-conductor. He believed the Germans had been experimenting in order to produce a floor of that kind, and he had several examples in his office of a floor which is put down exactly in the same way as a cement floor, and was made up of some kind of cement mixed with sawdust. When mixed, the result was a non-conducting material which could be laid with-

out joints. Should that prove successful, it would make an ideal floor. Linoleum, or cork carpet fixed on cement, made very good floors, as he had found from experience, and he had often thought it would answer very well for hospitals. A radiator in an ordinary room was put at the window in order to prevent draughts, but that was not the object in these buildings for consumption; and consequently it seemed to him that the best position in such buildings was in the middle of the room, providing the room was large enough and the furnishing was not interfered with. From a sanitary point of view that position seemed to be the best, for the radiator could be got round and kept clean.

The vote of thanks having been heartily agreed to,

Mr. Brewer, in reply, said as to verandahs he had said he thought that verandahs outside these rooms were a mistake. In say, 9 ft. high rooms and 8 ft. to 10 ft. high verandahs outside, some sun would be shut off. With wards 14 ft. high it was a different matter, but with small and low rooms some sun was cut off by these verandahs, and in our climate sunlight in a room was so much to be desired. He thought that Mr. Mitchell's arrangement of a verandah between the rooms was an excellent one. As to the recommendation that verandahs should not be too far from the building, they were necessary at a distance sometimes, for some patients had to take a certain amount of walking exercise, and it was thought best for them to take it up to their resting place. As to the height of rooms, the German rooms of from 12 ft. to 14 ft. high seemed very depressing. People were accustomed to big wards 12 ft. to 14 ft. high in hospitals, but it seemed a mistake to make the small rooms of these sanatoria the same height as the wards of an ordinary hospital.

As to floors, indiarubber was very costly, of course. As to the American inter-locking tiles, the floor at the Birkbeck Bank seemed to be laid in sheets. All means had to be taken in these buildings to prevent noise—more so than in ordinary hospitals—and to walk down a teak floor corridor 80 ft. long caused much noise, which was especially noticeable when the patients were in bed. Teak, too, was four times the cost of linoleum. As to treating patients in the suburbs of a big city, that did not seem desirable, even though they might be near their homes, when land was so very much more costly near a city than it was in the country. As to the flooring of verandahs and open-air galleries, it seemed to him that any hard material would do. [Mr. Mitchell: You suggested tiles, but that seemed bad because of the joints.] Well, consumptives were not allowed to spit; if they did, they were removed. As to the position of the radiator, the middle of the room was a good position; but if the bed were wheeled in against that position might be a very bad one.

Dr. Jane Walker also replied and said, as to windows opening to the ground—advisable as that might be on the score of fresh air and ventilation, it was not desirable practically, for it took away altogether the sense of privacy for one patient could easily get into another patient's room, and a patient walking outside would be able to see into the rooms. If theory it was nice, but not so in practice. As to floors, it was the polish that tired the nurses and not the wood. Well-waxed and well-polished floors were impossible in a sanatorium, for all dusting must be done with damp dusters, and dampness and polish are incompatible. With regard to radiators; in a sanatorium, they were not used all day long. The object in view was to keep an equable temperature, and if the temperature outside was 40 deg. the room must be about the same; it must not be kept to the ideal temperature of hospitals. There was no sense, therefore, in an open fire. If a patient had a fire, the patient crouched over it and did not get well, but became worse. The open fire meant dust and, in a large building, more work, which was important from the staff point of view. As to the position of the radiator, when a patient was confined to bed, from feverishness, the bed had to be shifted sometimes into the verandah, and that could not be done if the radiator were in the middle of the room. It seemed absurd to erect these buildings near a big town where land would cost so much more than it did in the country. It had been suggested that there should be two laundries, and that suggestion indicated some mis-

prehension. So far as was known at present the only element of danger in these sanatoria was from expectoration, and the only garment likely to get soiled was the pocket-handkerchief, which was generally of paper and was burnt. The ill patient might sometimes soil a blanket, but the blanket would be put into a disinfectant, and the sheet and night-shirt would be boiled. The paper handkerchiefs were not used on the ones should be put into a solution of hypochlorite of soda or other disinfectant. There was no need to fix on the minds of the staff that there was any danger in associating the consumptives; for there was no danger. The thing to be seen to in the laundry was that dirty clothes should not be mixed with clean. The Chairman announced that the next meeting will be held on December 5, when Mr. J. S. Gibson will read a paper on "Architectural Practice: Real and Ideal." The meeting then terminated.

THE PROPOSED NEW HOME FOR THE ARCHITECTURAL ASSOCIATION.

A SPECIAL general meeting of the Architectural Association was held on Monday evening the Meeting-room of the Royal Institute of British Architects, at No. 9, Conduit-street, Regent-street, Mr. H. T. Hare, President, in the chair.

The meeting was held to consider the acquisition of the premises of the Royal Architectural Museum, Tufton-street, S.W., and to the Committee of the Association to accept certain conditions proposed by the Council of the Royal Architectural Museum, Westminster, their proposal to transfer to the Architectural Association the premises in Tufton-street. Details of the scheme were published on our issue for November 15, p. 444.

The Chairman said the object which called them together that evening was one of the greatest importance to the well being of the Architectural Association, and the meeting was to be an historical one in its history.

It was therefore gratifying to note by the members present, that the decision to be arrived at would receive the endorsement of a large proportion of members, and would be no less one, but would be considered from all possible points of view. The need of adequate premises for the work of the Association had been one which had pressed itself upon them for many years; but although it had been felt for the past, he did not think there had been any period in their history at which that necessity had been so urgent as it was at the present moment.

Previous to the year 1861 the work of the Association was comparatively limited and no serious attempt was made at actual architectural education. Two or three rooms were occupied at No. 9, Conduit-street, sufficient to accommodate what was then a very small library, and practically no staff except a voluntary one. The meetings were held in one of the galleries on the ground floor. When the studios and various other classes were established it was necessary to acquire greatly extended accommodation which it was not possible to find at No. 9, Conduit-street, and the present premises in Great Marlborough-street were taken. These premises served to serve the purpose for many years although lacking in dignity and importance which a Society of the nature of the Association should be able to command. The work and scope of the Association, however, increased year by year, and every session more consideration was required in order to arrange for the classes to be carried on smoothly without friction.

Two years ago, Mr. Seth-Smith initiated a movement with the object of raising funds for the erection or acquisition of new buildings, and *pari passu* for the establishment of a day school for the training of prospective architects. The former project, though prosecuted with unbounded energy, and with a considerable measure of success, appeared to have its realisation largely in the future. The profession of architecture is not in the main a wealthy one, and they could not look for any very extended support from the general public, who were lacking in interest and appreciation of architectural art. The funds collected and promised up to the present moment, though amounting to a substantial sum, were still hardly one-quarter of the total which was estimated to be required, and the collection of

the remaining three-quarters would probably be a work of some years. The second project, that of the establishment of the day school, had been, however, entirely successful, and is now proceeding in a manner which exceeds the most sanguine hopes with which it was initiated. The numbers attending, and the enthusiasm with which the students are prosecuting their studies, gave every promise for increased success and usefulness in the future. Several drawings on the wall showed some of the work executed by the students during their vacation, and any one looking at those drawings of actual measured work—measured from buildings—would be astonished at the amount of intelligence they exhibited for students who had been at work only one year. It was, he felt sure, better work than would be got from any ordinary student.

The success of the day school had accentuated the need for more room to an extent which was hardly anticipated, and the want was now so pressing that unless they could secure what they required at once, the work must be curtailed and cramped just when circumstances were most favourable for expansion. At this juncture a most fortunate circumstance had occurred, and a proposition had been made to the Association which appeared to show the way out of all their difficulties, and this in a manner well within their means. The proposal was that they should take over the buildings now occupied by the Royal Architectural Museum in Tufton-street, Westminster. The premises consist of a large central hall surrounded by galleries containing an immense and unique collection of casts, the value of which it was impossible to estimate, but which probably amounts to many thousands of pounds, together with eight large studios and office accommodation. The Council of the Royal Architectural Museum propose to hand over the whole of these premises to the Association, together with the equipment and collection of casts, without any payment beyond a deficit estimated at about 700*l.*, on condition that the Museum shall be maintained and be accessible to the public as heretofore. The deficit was mainly attributable to the comparatively sudden closing of the School of Art, which was carried on in the premises, and which had been a substantial source of revenue. The buildings are held on two leases from the Ecclesiastical Commissioners, one of which expires at Michaelmas, 1906, and the other at Christmas, 1906, at a total rental of 140*l.* per annum. The rates and taxes amount to about 17*l.* per annum, making a total of 157*l.* per annum. The rental of the Association's premises in Great Marlborough-street is 380*l.* per annum. Possession of the Royal Architectural Museum could be given on March 25 next, and by the terms of their present lease they could vacate the Great Marlborough-street premises on June 24 next by giving notice at Christmas. The proposal and the conditions had been very carefully considered by the Committee of the Association in all its bearings, with the result that they are unanimously prepared to accept the gift with gratitude, and the transaction now only required confirmation by the general body of members.

The Committee took into consideration the following points:—(1) The position of the Royal Architectural Museum and its accessibility; (2) The adequacy of the premises to requirements; (3) The leases; (4) The alterations required and their expense; (5) The terms of the transfer. With regard to the first, the Committee concluded that any disadvantage there might be in position was more than counterbalanced by the fact that the building was universally known throughout the profession and also one which had an extremely interesting past history. There were also the facts that the Museum was in close proximity to the Church House, Westminster Abbey, the Houses of Parliament, and other notable buildings, and that the entire district was rapidly improving in all respects. Westminster, too, was fast becoming the home of all kindred societies. As to the second point, that of the adequacy or adaptability to the requirements of the Association, there could be no question that there was ample room for all the classes. The only point on which they were in some doubt was as to whether they could arrange to hold the meetings there or whether it would still be necessary to have them at No. 9, Conduit-street or elsewhere. They were hopeful, however, that a meeting-room might be arranged on the premises. The Westminster

School of Art had for some years been carried on in the studios, so that they were well adapted for the purposes for which the Association require them. The third point as to the leases, or rather the lease, which expires in 1906. This gives about twenty-four years, and the Committee considered that this period was long enough to warrant them in taking the risk of being able to secure a renewal at the end of the term. The fact that the other lease was for a much longer period should prove of some assistance, but in any case it was proposed to approach the Ecclesiastical Commissioners at an early date in order to ascertain what arrangements could be made for extension. The fourth point was as to the alterations and their probable cost. This question the Committee had been unable at present to go into exhaustively, but a Sub-Committee had been appointed to consider the matter and prepare a report with suggestions. It was evident, however, that the sum which had been collected and promised towards the Premises Fund would not be more than sufficient to carry out all that they would want. The subscriptions having been given on the assumption that a new building was to be erected, it would be necessary to obtain the sanction of the donors for the fund to be applied to the alterations, but there was no reason to anticipate any difficulty on that score. As to the terms of the transfer, there did not appear to be anything to which exception could be taken on any ground. Beyond the deficit he had already mentioned, the liabilities of the Association were confined to a small compensation to one of the art masters and the retention of the present curator, whose services would no doubt be of great value to them. The opening of the museum to the public could, it seemed to him, only result in benefit to the Association, as it would tend to make it more widely known and appreciated. The Association undertook no responsibility which the present Council of the Museum had not borne since its institution, and the possession of the collection of casts would be of the greatest value in the educational work of the Association. It seemed to him, personally, as it did to the Committee without exception, that the gift of these premises was the most fortunate circumstance which had occurred to the Association during the course of its long history, and he trusted it would prove to be the starting-point for a widely-extended sphere of increased usefulness. He therefore formally proposed that the Architectural Association take over the premises and equipment of the Royal Architectural Museum and Westminster School of Art on March 25, 1903, and accept the conditions named by the Council of the Museum and agreed between the respective solicitors.

The Chairman also read extracts from letters from the following gentlemen, expressing their approval of the scheme—*i.e.*, Mr. H. L. Florence; Mr. T. Watson, who wished his name to be added for 10*l.* 10*s.* to the list of subscribers; Mr. A. T. Bolton, master of the day school, who said his contribution promised towards new premises was at the disposal of the Committee for the new scheme, and he would be glad to contribute a like amount next year; Messrs. D. J. Budge, J. Norton (a past President, who enclosed a contribution towards the scheme), C. H. Brodie, F. E. L. Downes, and A. O. Collard.

Mr. Louis Ambler then briefly seconded the motion to take over the premises of the Museum.

Mr. W. H. Seth-Smith, in supporting the motion, referred to the way in which Mr. Maurice B. Adams had brought the matter forward. Mr. Adams had for years apparently foreseen that the profession would require that invaluable museum of casts at some time for the education of students as well as the enlightenment of the public. That was what the museum was formed for; that was its specific object. The museum, with the aid of the Technical Education Board of the London County Council and the Education Department, had not only been maintained, but a group of excellent classrooms had been provided for the Westminster School of Art, as good as any the circumstances of ancient lights would permit in London. The main purpose of the museum was for the use of the architectural profession, and therefore it was quite legitimate to terminate the School of Art when full use could be made of the museum by the profession. A number of subscribers had also helped to maintain the museum in the

past, and it was to be hoped they would continue their subscriptions in aid of the Association work, for, although they were getting the premises as a gift and their future rent would be a great deal less than what it now is, the Association would not be run at a less expense, and he should not be surprised if the expense were greater, in spite of the fact that they had over 4,000, promised, or given, for new premises, and which would no doubt be available for alterations, repairs, and equipments. He hoped they would be as free to deal with the casts in the museum as objects were dealt with at South Kensington. To have their full value they would have to be circulated in the classrooms as models for study by the students.

Mr. Maurice B. Adams said he never expected that what was now proposed would be under discussion in his lifetime. He always felt, however, that the change in taste which had come over the profession during the past few years would some day revert in some form to the particular type of objects which were brought together in the Architectural Museum, seeing that they represent the national medieval style of this country in a very remarkable and complete way. It was not to be supposed that because the Association became possessed of these beautiful works of art that therefore a revolution was about to be performed. These casts—they were not all casts; there were many actual specimens—were all dissociated from the surroundings of which they formed a part originally, and they should be brought before students by an intelligent and capable teacher, who should enable the student to realise what the things really meant and what they really are. Looking at them as a whole, they were, as had been said, merely the dry bones of architectural art; but in the hands of a qualified teacher they could be made to live, and, therefore, no better use could be made of such a magnificent collection than that which was proposed. There were a great many things in the museum which were, more or less, of archaeological value, and for many years it had been his aim, although funds did not permit, to relegate the more uninteresting specimens to a less prominent part, and bring into relief some of the exquisite gems the museum contained. It had always been the custom when students required any particular cast, except some of the larger ones, such as the spandrels from the Angel choir, Lincoln, to bring it down and let the student study it in the quiet. As to keeping the museum open to the public, he thought that it would be very much to the advantage of the Association, as Mr. Hare had said, to be the owners of one of the permanent fine art collections open to the public, and open to travellers, in London, for it would make the Association better known throughout the world. The Association would not be restricted in any way in possession except so far as the general hall was concerned and the immediate appurtenances, so that all the classrooms would be private property absolutely. In regard to the whole question, the occasion was a very pleasurable one to him, especially as every one had co-operated with him in this effort which he had made for the good of the profession. There were no personal considerations; they wanted to do the thing thoroughly, and the transfer had been heartily supported. They did not mean to let the School of Art suffer if they could help it, and they hoped to get the Technical Education Board of the London County Council to find quarters for the school, which was one of the finest art schools in the kingdom. The museum was in good repair, but they had not been able to do what they wanted to do—i.e., to take the casts down and colour-wash the walls, rewrite the casts and rehang them in a more reasonable way—not that they were badly hung, but they were crowded, and some of them might be dispensed with. He should not advise that the casts be circulated about the country, for many of them were very delicate and some of them were unique. That was one consideration which led up to the thought that the museum should be more in the hands of the profession. The museum had been necessarily but gradually leaning more and more upon funds of outside bodies, and copies of the casts were frequently being asked for, and, as some of these were extremely fragile, and undercut, he did not see his way to have further copies made in all cases. It was quite certain that without the assistance of the Council of the Museum it would have been impossible to do what was now proposed.

Mr. F. T. Baggallay supported the proposal, remarking that his confidence in the scheme rested really on the approval which the Committee had given to it. He imagined that the financial responsibility of the Association would be greater than it had been, but, no doubt, the Committee had considered all that and were satisfied. He thought the Association would do well to get these premises.

Mr. C. F. Hayward, F.S.A., said, as one of the oldest members of the Association and as a member of Council of the Museum, he hoped the Association would accept the offer which had been made. It gave him great pleasure to think that the Association and the Museum were coming together in this way. He suggested that all the subscribers to the Museum should be asked to continue their subscriptions and assist in the original object with which the Museum was formed. He for one would be glad to continue his subscription. He thought that from 80s. to 100s. could, perhaps, be got in this way for the special purpose of attending to the casts.

Mr. Owen Fleming said that many of them had always had in their minds the idea that some day the Association would require to be housed in a suitable permanent building, and many of them had hoped that the collection of casts at Tufton-street would form part of that building. The present scheme was as much an advance on Great Marlborough-street as was Great Marlborough-street on the little rooms they used to occupy upstairs at No. 9, Conduit-street; but he hoped they were not going to end at Tufton-street, but were going to keep in mind a building as much in advance of Tufton-street as that was upon Great Marlborough-street. The subject of education was of the utmost importance, and while in Tufton-street they could make great progress, yet they would still need the advantages which were necessary for a successful school of architecture. He had recently visited some of the American schools, and he was astonished at the facilities which were placed at the hands of the students of architecture there. In Boston, for example, there is a building perhaps six times as large as the Tufton-street building, in which every requirement was at hand. On the ground floor there were large testing-rooms with all sorts of appliances, on the first floor were magnificent libraries, classrooms, figure and life rooms; and other rooms on the upper floors. The building was given by a wealthy American, and if we could not get the University of London, or the Technical Education Board, or the University of Oxford, or some other body, to move, he hoped that some day some wealthy man who realised the importance of architectural education would provide a building suitable to their needs. He hoped the Committee would regard the present proposal as a temporary one, and that they would not incur very large expense with a view of making Tufton-street the permanent home of the Association. As to the Westminster School of Art, that it was proposed to displace, it was not an ordinary school of art. It had a great history and an equally great reputation in the world of painting as one of the finest, if not the finest, life school in the kingdom. He had therefore been wondering whether it would be possible for the architectural students to work in harmony with the students of the art school, and so keep all the students of painting and sculpture working with the students of architecture, producing a school of fine art. One part, in that way, would react on the other part, and so produce a really fine school. When in the States he had realised that a curious struggle is taking place between the Old Colonial school of architecture and the French school. The Old Colonial work was the logical development of our Old English architecture, and there was a strong following of it in America led by Mr. McKim, who had remodelled the White House on Old Colonial lines. In America it was regretted that there is no school of architecture in England to which young Americans could come, and that consequently they all went to Paris and got imbued with French ideas and notions, which he (the speaker) had been told took them twenty years to get rid of. He hoped the Association would so develop their school that it would become a central school of architecture for the English-speaking races in which architecture would play a leading part, and which would attract young Americans as well as young Englishmen. The gift of the Museum was a magnificent one, but let

them regard it as but a stepping-stone to something better.

Mr. E. O. Sachs said he hoped they would regard the gift as a permanent, not a temporary one, or as a temporary home for the Association. As one who had been taught in large rooms—in the Technical College at Berlin and afterwards at Vienna—he thought it was not, after all, a question of halls and rooms, but of teachers and work, and there was the very great risk of teaching too academically in these halls, and he was afraid that in Berlin and Vienna there was not the same progress being made now as had been made in the past. They all knew from the illustrated papers the sort of work being done now in some of these cities—that it was becoming academic. He did not think it was in the big halls, such as they had at Boston, that great progress was made. He hoped that the word "Royal" would be retained for the museum, and obtained for the Association, and it might be a suitable time to petition for it. He hoped that the Committee would see that the leases would be continued to the Association. He hoped, too, it would be found possible to have their social gatherings, at all events, in their new home. When they were having the whitewashing and distemper-painting done in the studios, would it not be well to have drawn round as a frieze a scale in feet and metres, or in feet only, so as to accustom the students to estimate size and length at a glance—a qualification which many architects sadly lacked.

Mr. F. N. Reckitt said he hoped the Committee would make provision for future extension, and would, where possible, acquire adjoining land or leases.

Mr. Thomas Blashill supported the proposal. The premises were five minutes' walk from the junction of Bridge-street, Westminster, and the end of Parliament-street. It had been said that the Museum was out of the way, but it was not so when they could reach it in five minutes from Bridge-street.

Mr. F. G. Hooper, Hon. Treasurer, said that while the financial aspect of the proposal was favourable, the Association would still have to look not only to those who had already promised help, but for an increased amount of support to carry the scheme through effectively. A great deal would have to be done to the building, and the Association would need the help of its friends both inside and outside.

Mr. Satchell also made a strong appeal to the same effect, and Mr. Watson expressed his approval of the scheme in a few words.

Mr. Max Clarke said he hoped the Committee had considered the matter in a thoroughly business-like manner, and had fully calculated what the enterprise would cost, and whether they had sufficient funds to carry it out without perpetually asking for help. He very much agreed with Mr. Fleming's remarks, but for all that he thought the proposed transfer was a good one. Still, he did not think the Association should remain permanently in Tufton-street—the premises were five minutes from Bridge-street, they were told; what a pity it was not five minutes the other way.

Mr. White and Mr. Lishman having spoken, Mr. R. P. Jones asked what accommodation there would be for the ordinary members? Not counting the large room for meetings there should be three rooms provided for the ordinary members—a reading-room corresponding to the present common-room, where smoking was permitted; a writing-room, where silence would be observed and in which one could make extracts from books in the library without having to take them off the premises; and a room for meals of some sort. One could not expect the Association to provide a chef, but it ought to be possible for them to provide teas. For the sake of country members, it seemed desirable to provide some accommodation of the nature of a club. Was there room at Tufton-street, apart from lecture-rooms, for this accommodation?

Mr. E. H. Swinfen Harris and Mr. Cole A. Adams heartily supported the scheme.

The Chairman, before putting the motion to the meeting, said he quite agreed that it was desirable to keep before them such an ideal as that which Mr. Fleming had outlined as to a school of fine art, but, though that was a most desirable thing, he did not think it was possible at Tufton-street. For one thing, there was not room; but for all that Mr. Fleming's remarks were very valuable, and such as they might very well bear in mind. Questions as to the leases were under con-

consideration, and everything would be done to safeguard the interests of the Association. As to the use of the word "Royal," that was also under consideration. They could not seriously think of applying it to the Association, especially as they did not even know that they would be able to retain the word in connexion with the Museum, now that it was being transferred. There would be considerable difference of opinion as to whether the Association should be raised to the dignity of a Royal society, and personally he did not think it desirable that it should be made Royal. The Association had always been a junior body, and it was essentially a teaching body, and he thought it would be undesirable to have two Royal architectural societies. It would lead to a great deal of confusion, and would infringe on the privileges of the Royal Institute of British Architects. He was glad Mr. Hooper and Mr. Satchell has referred to the need of help, for the Association had not a penny too much, and it was doubtful if the funds they had would be sufficient. As to the accommodation for the members in addition to the central hall where the casts were and office accommodation, there were eight large studios, each of which was as large as the three the Association had at present. Therefore, he did not think there need be any doubt as to sufficient accommodation as to art classes and studios. As to writing and reading rooms, no doubt it would be possible to provide all that, and a larger library than they had at present. There would be a common-room, and no doubt some provision made for refreshments.

The motion was then put and carried unanimously.

The Chairman then proposed a hearty vote of thanks to Mr. Maurice B. Adams and Mr. Seth-Smith for their efforts in the matter, and also to the Committee of the Architectural Museum for having enabled them to carry out their wishes.

The motion having been very heartily agreed to,

The Chairman said the total amount of donations or promises to the New Premises Fund was £4,320.

The meeting then terminated.

THE CHURCH CRAFTS LEAGUE.

The Bishop of Rochester presided on Tuesday evening at Clifford's Inn, Fleet-street, over the annual general meeting of the Church Crafts League.

Mr. F. Burgess (secretary) submitted the third annual report, which stated that the Society now numbered 380 members, of whom sixty-three are artist and 317 ordinary members. During the year the secretary has received 143 applications for advice.

On the motion of the Chairman, the report was adopted.

On the proposition of the Dean of Westminster, seconded by Mr. Dyer Edwards, the Bishop of Rochester was re-elected President.

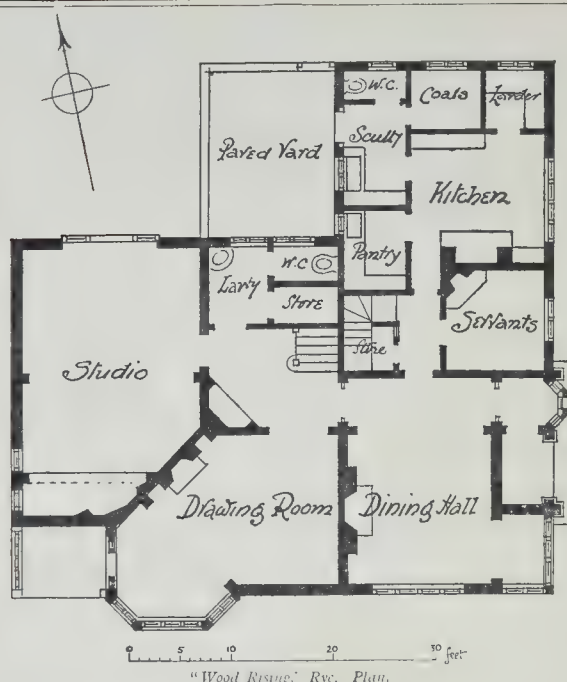
Mr. Stirling Lee proposed that Mr. Ward be elected on the Committee as an architect, and this was seconded by Mr. Ayrton and agreed to.

The Growth of an English Parish Church.

Mr. J. T. Micklethwaite, F.S.A., in the course of a lecture on "The Growth of an English Parish Church," said there was a class of men to whom an old church was generally the subject for restoration, and this class of men had been so mischievously active during the past half century that one almost hailed as friends the class to whom the church is a place to be gone to once or twice on Sunday, and otherwise left alone. Under the rule of such a class the church suffers from nothing but neglect. But still churches were for use, and if they are used they must be kept fit for use, and that meant that they must be repaired and changed from time to time. That could be done without loss of interest to the building, and even with gain to it sometimes, if it be done with proper understanding and if care be taken to whom they looked for guidance in their treatment. From the days of James Wyatt to now the accepted doctrine as to the treatment of an ancient building has been the same. It has to be smartened up and restored to its original condition. The habit is to take one part of the building as fixing what is called its "period," and to fill up the rest to imitate the work of the chosen period. He wanted to

show the fallacy of this mischievous period theory. He claimed that the Church did not belong to any one period, but to all periods, and it may have in its walls traditions far older than any work to be seen in them. It was a long time since St. Augustine landed in England, but he claimed that there were traditions in our old buildings which go back before the coming of St. Augustine. There had been Christianity in the land before we English came, but there was, of course, a great contrast between the two missionaries—the polished Italian and the Celt. The first made his way to the houses of kings and princes, and had an important share in the conversion of England; but the Celt did his share, and he believed, in the real hard work of the conversion of the people, the share of the Celt was the larger. At first the two sets of missionaries worked independently, but in time they came together, and he believed the first body which professed to speak in the name of the church was the Synod of Whitby in 664. There the Italian traditions were accepted, but many Celts remained, and their influence in moulding the future of the Church was very considerable. The Italian missionaries, when they came to settle here, tried to make things as much as possible what they were at home. They made their large churches aisled churches—naves with aisles, the altar in front and apses at the back, and some of these churches built in the seventh century still exist. The lecturer, by means of diagrams, proceeded to show examples of these early churches. One, in Kent, was of about 650, and another, at Brixworth, he described as one of the nicest churches he knew, in that they had the actual walls of a seventh-century church. It originally had a baptistry and cloister round the front of the nave. At Peterborough they had a church exactly the plan of the older churches in Rome. They also found a large mass of concrete in York Minster which, they would find, had been cut through at both ends, and it was clearly that church which Paulinus began at York. These churches are all absolutely Italian in their form, just the same as churches in Rome of the same date. There were examples of them at Canterbury, Hexham, and Ripon with the altar to the west, which was another Italian custom. Mr. Micklethwaite went on to show diagrams of smaller churches. The first was St. Martin's, Canterbury, which St. Augustine found when he came to England. That was a sixth-century church. Within the seventh century it was enlarged by the building of the present nave. Practically all that is there now, and in that church they had one with a few centuries tradition. Twelfth-century tradition also said that the church of St. Pancras, Canterbury, existed at the time of Augustine. It was said to have originally had a Pagan temple, and no doubt it was built either late in the sixth century or early in the seventh. It was a large broad church, and the peculiarity was that, instead of a chancel arch, there was a screen of three arches. The Church of Luningie was also a seventh-century church, and that at Rochester was built by Paulinus. The church at South Elman, which was on the boundary line of Norfolk and Suffolk, was now in a wood. With regard to the Celtic missionaries, we must look for their earliest form of church in Ireland and in the wilder parts of Scotland. The churches they built were totally different. Of the art of building they had none at all, and their first churches were the simplest things to conceive. The earliest were simply four walls with a queer sort of roof of stone or sods, but when they mixed with the other missionaries their influence was seen in the square nave with the small square presbytery. Another difference was that whereas in the Italian type of church the presbytery was made as open as possible, in the Celtic it was often a very small arch—merely a little doorway. The pure Italian influence seemed to have gone out when the missionary period ended, which did not survive the eighth century, and after that they found the Celtic tradition prevailed in churches in a curious way. Aisles disappeared altogether; the apse almost disappeared; and the triple chancel screen disappeared altogether. They got a state of things in which a new development began, and that was what he might call English development. A church of the simplest Celtic type was that of Deerhurst. They used to build little square buildings at the side of the

churches, which they called porticoes. Sometimes they were entrances, but not always. St. Martin's, Canterbury, had one of these porticoes. In the eighth-century church of St. Lawrence, Bradford-on-Avon, they found that porticoes were become nearly as large as the presbytery. Then it occurred to some one or other that he could make a nice bit of finished work by putting one on either side, and so they got a cross in the church, and that kind of church became a type in England. Then it occurred to some man—he wished he knew his name—to cut off the eastern portion of the nave and take it up as a tower. In a church at Dover, on the Castle Hill, they got their cross church with a central tower. This was eleventh-century. They had another example at Ripon, and Deerhurst in its present condition was also one. At the time of the eleventh century there were two types of churches in England which had gradually become accepted—one with the central tower and transepts and presbytery, and the other, which was nothing but a nave and presbytery. In the middle of the eleventh century a great architectural revival began in England and also in Europe, and it was impossible to distinguish the English work going on at that date from that in the North of France. And when they talked of Norman, it was impossible to say that the thing was developed on one side of the Channel or the other. It was, however, perfectly clear that the old books which told them that the Normans introduced the new style into England were perfectly wrong. The style was regularly developed out of the older forms of the Saxons. There was no doubt that in the eleventh and twelfth centuries there was an enormous movement for building and rebuilding churches, and when they got an old parish church in a fairly prosperous part of the country they could nearly always trace it back to the beginning of the twelfth century, and as belonging to one or other of the two types in existence before then. Taking the church of Wakefield as an example, the lecturer showed how originally it was in the form of a cross. It had a central tower, two transepts and a square presbytery. That church must have been built within a few years of 1100. In the twelfth century they wanted more room, and they built an aisle on the north side. This was done about 1150, but about the end of that century they wanted more room and built another aisle on the south side, so that the church became rather differently shaped. Then a catastrophe happened which he was afraid was rather common in these churches. They cut into the supports of the centre tower by making an arcade; the foundations were bad, and the tower came down. When the church was rebuilt, in the thirteenth century, they did not pull it all down, but they altered it very considerably. They kept many of the pillars, but they increased the height of the church by adding to the pillars. They kept the transepts, but took the chancel through with a pitched roof, and, for a time, they had no tower. The church was consecrated in 1329, and then, for a time, they went on spending money on the furniture, and they did not attempt to proceed with the lower till the fourteenth century had gone and the fifteenth century had begun. The building of a tower in those days was a very slow business. A few pounds was obtained and spent at once by building a few feet, and then they had to wait for more money. In the meantime, the church was in use, and they had to build without inconvenience to those who used it, and so they built the tower outside the church, and that happened in thousands of churches. At Wakefield the tower was begun about 1412, but the spire was not finished till the end of the century. When they had got it done so far that the work could be carried on without annoyance to the users of the church, they joined the tower to the church. Afterwards the chancel was rebuilt and the aisles carried the full length. They rebuilt the aisles of the nave and chancel on the line of the transept, so that the transept disappeared, and now in the fifteenth century they had a big church with not a trace of the cross in it. That church was practically unaltered as regards its fabric until a few years ago, and now they found it a little too narrow for a cathedral, and are hacking it about and making it longer. They would see that every step taken was not done to change the church. They did not build it in any particular style, but for their own use. Each step was simple and natural at the time it was taken, and the result was that in about 400



"Wood Rising," Rye. Plan.

years the form of the building is quite changed. It is much longer than it was; the tower is no longer in the middle; the cross form is gone altogether, and yet the church would never have had its present state had it not passed through the earlier stages. This was a common thing. The growth of Wakefield Church had been normal, and he had discussed it at length to show how absurd it was to talk of the original state of an old parish church. Its original state was probably an old wooden shanty. Churches were intended to be used and there must be changes made from time to time. All he asked was that if they had an old church to deal with they should not touch it until they had been able to understand it, and that in making the required changes they should respect the past, and not falsify it by forgeries. If it be an honest and unaffected attempt to meet real requirements, done with good taste and without any pretence of being other than what it is, it will be an effective addition to the story of the building.

Illustrations.

DESIGN FOR A COLLEGE CHAPEL.

THIS interior for a college chapel, by Mr. John S. Lee, is a design exhibited at this year's Royal Academy.

It was intended that the chapel should be faced with yellow stock bricks, with red brick patterns in the domes, and Portland stone bands, shafts, and capitals. The lower part of the apse was to be lined with Greek cipolino marble; the pavement to be of tiles and half tiles with stone bands.

The plan was sent us by the author too late for publication.

ILLUSTRATIONS OF FORMAL GARDENS.

The four illustrations given in connexion with this subject, viz.: the garden at Trentham Hall; the gates at Drayton House; the plan of old Hampton Court, Hereford; and the sheet of lead cisterns, are all reproduced, in somewhat reduced form, from plates in Mr. H. Inigo Triggs's fine book "The Formal Garden and Scotland."

They are all referred to in the leading article in the present issue, which deals with Mr. Triggs's book and with the subject generally.

WISHAW ACADEMY.

THE illustration shows the design selected in competition for the re-construction of Wishaw Academy under the Cambusnethan School Board.

The stone used will be Corncockle red sandstone, pinched rock-faced, with polished dressings. The accommodation required was for 750 scholars, while this school accommodates 756. The Board, since the acceptance of this design, have deemed it advisable to increase the accommodation to 912 scholars. The cost is estimated at 10l. per scholar.

Mr. John Steel, of Wishaw, is the architect.

"WOOD RISING," RYE.

THE illustration is from the architect's drawing, hung at this year's Academy, and forms the entrance to Mr. Fuller Maitland's recently erected residence on the hill overlooking Red Tiled Rye, the haunt of the artist and golfer.

The plan shows an ingenious arrangement for making the most of the three principal rooms on a limited site, especially in the manner in which the studio and drawing-room are fitted into each other, and the hall and dining-room made to serve a double purpose. Unless it is a question of prospect, the dining hall would have been better with an east than a south light; a south-lit dining-room may be pleasant in the middle of the day in winter, but in summer the luncheon party will be incommoded by the sun; a point apparently often overlooked in house planning.

INTERNATIONAL FIRE EXHIBITION.

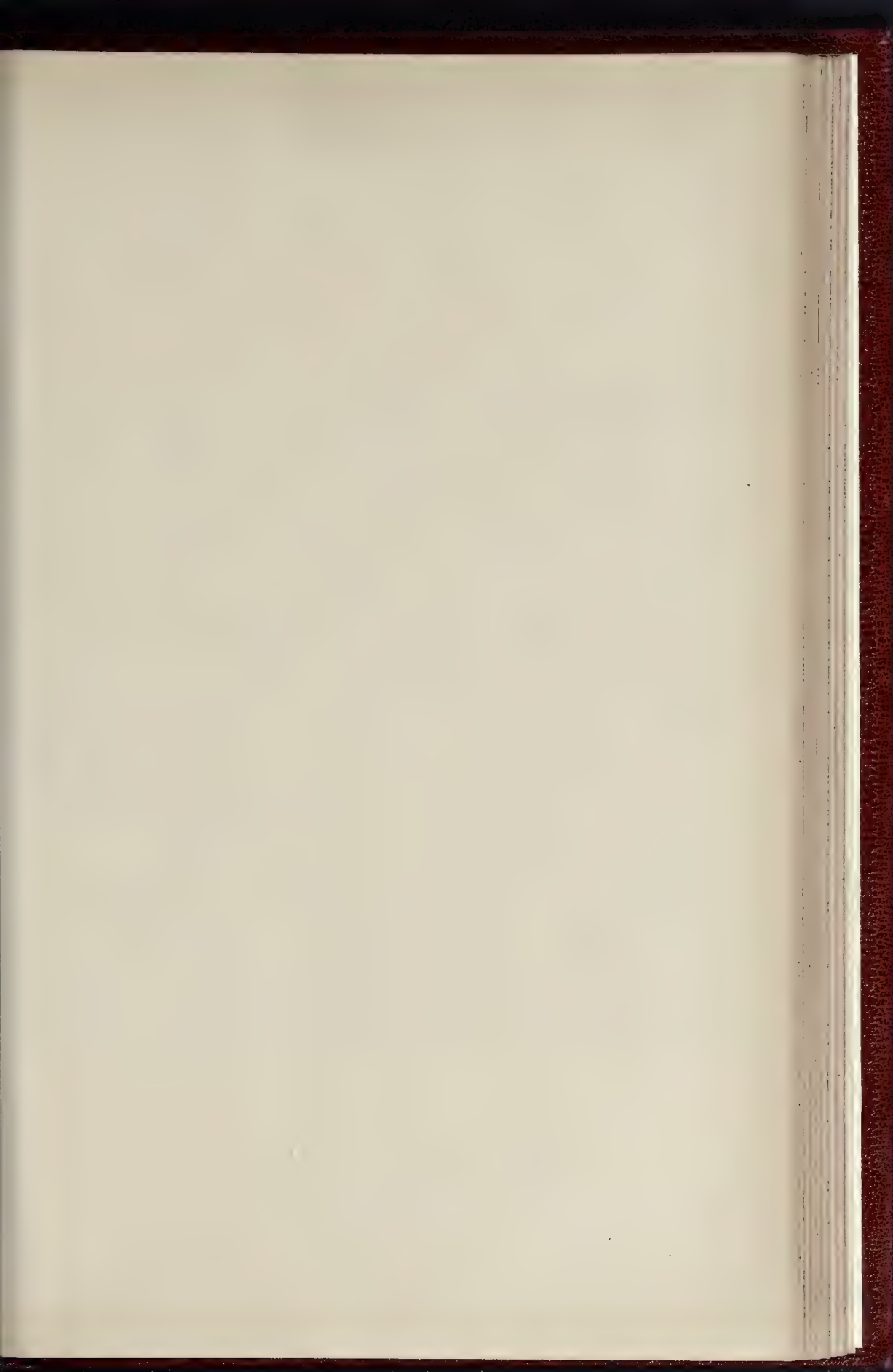
ON Wednesday morning a meeting, convened by the British Fire Prevention Committee, was held at the United Service Institution in furtherance of the proposed International Fire Exhibition to be held at Earl's Court next year.

The Duke of Cambridge, who presided, briefly addressed the meeting, and pointed out that public interest in sanitary matters had been most advantageous to the public, and he trusted that the measures to be sought for against fire would be equally advantageous. They had had some very severe instances before them of late of the necessity for improvement, and he hoped that that meeting would be the commencement of an era of improvement in this respect.

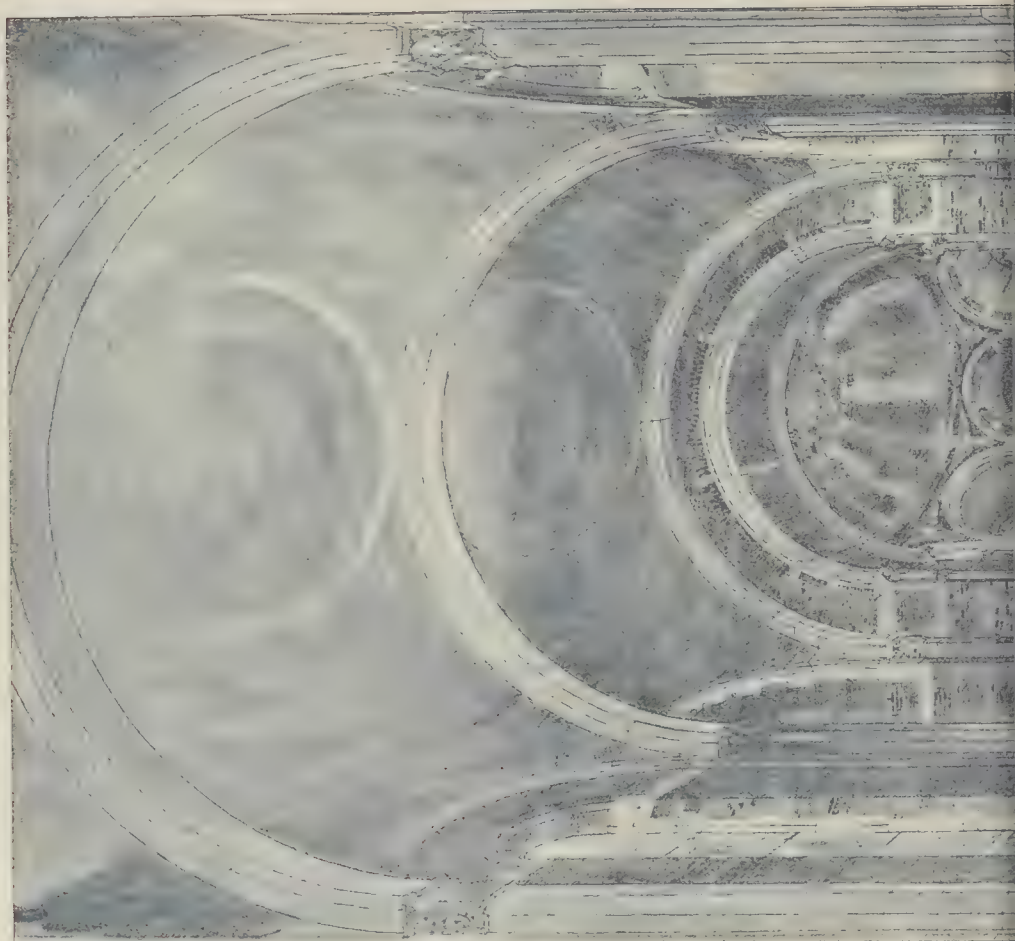
Mr. E. O. Sachs (Chairman of the British Fire Prevention Committee) said the Exhibition was to be international in the full sense of the term, and was to be a highly instructive Exhibition, not only to the technical expert, but to the general public. Until recently the general public had not had any active interest in fire protection, although they had in many other technical branches taken a great interest. In sanitary work especially the public had taken an interest, but whilst a man would go and take a house or a shop in which he intended to spend his life, and would ask most carefully about the drains, it was ten chances to one that he would never give a thought to the safety of life from fire in the building which he intended to inhabit. London had been the scene of many serious fires, and some five years ago they had a catastrophe in the Cripplegate fire, which was an exceedingly serious one. The mass of property destroyed there was enormous, and the result of that conflagration was that many proposals were made to better their present position with regard to fires; but he believed that the only really useful thing which was done, as distinct from mere talking, was the formation of the Fire Prevention Committee, which, after five years of hard work, had doubtless got a great deal further in showing what fire-resisting materials and appliances would really do. Whatever the scientific work of that Committee might be, it only applied to the very few, but the exhibition such as was being now organised was an exhibition which would popularise, they hoped, the subject amongst the public, and thus create that interest in fire protection which not only London, but the whole of the provinces, was so much in need of. They knew that at an exhibition of this kind there was always a great deal to be learned, and they would welcome the foreign exhibitor who would show them means of fire protection, all the more because many of them thought there was a great deal to be learned in fire protection and fire appliances, but, at the same time, when those foreign gentlemen came to the exhibition they, as Englishmen, would be able to teach the foreigner a great deal. They would teach them the smartness which was to be found in the English fire-brigades, and although there was, no doubt, something to be learned in the way of fire appliances from the foreigner, yet they considered the British fireman second to none in activity and bravery. With regard to the organisation of the Exhibition they had been favoured with the assistance of a very practical and eminent advisory committee which comprised men of engineering and technical fame, and those gentlemen had kindly consented to work in the form of sub-committees. Then they would have sections dealing with fire prevention, fire fighting, fire calls, salvage work, ambulance service, water supply, insurance, municipal section; history, literature and art, scientific and social, combustibles and explosives, and furniture, fabrics, and general exhibits pertaining to fire protection. Section I, which was called fire protection, contained everything that related to the better building and the better construction of property. Fire fighting was the fighting of a mutual foe, for Americans, Frenchmen, Germans, and Englishmen were all anxious to fight fire and to prevent the loss of life and property. They all trusted it would be a useful exhibition in the interests of humanity.

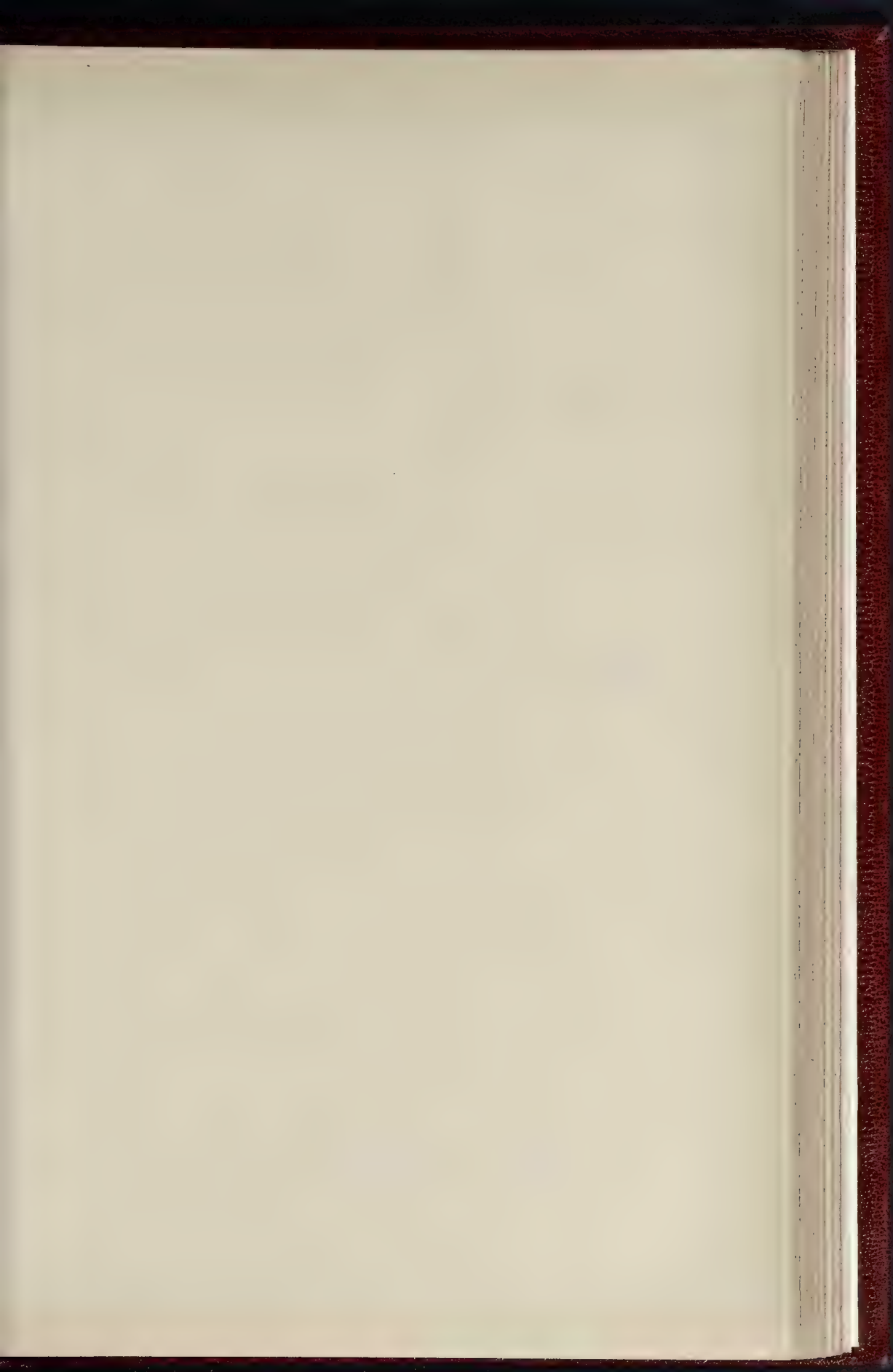
Major Fox, of the London Salvage Corps, and Vice-President of the National Fire Brigades Union, spoke as to the advisability of doing everything possible to assist fire prevention. There was no doubt that the necessity for improvement was growing greater and greater as the buildings in all parts of the world got higher and higher, and they had to look at it more from the life-saving than the property-saving point of view.

Mr. Thomas Blashill (late Architect of the London County Council) said he had been induced to lend his name to the Exhibition in the hope that something would be done to promote the safety of life and property from fire. It had happened to him to have seen a great deal of the disasters to property from fire in the last few years—for some of the greatest fires ever known in London had happened in the last few years in spite of the greatest precautions. He had taken a great interest in the use of non-combustible and slow combustible material, and the first thing he hoped they would attend to in the exhibition and at that gathering, would be the prohibition of the use of combustible materials in places where they were likely to



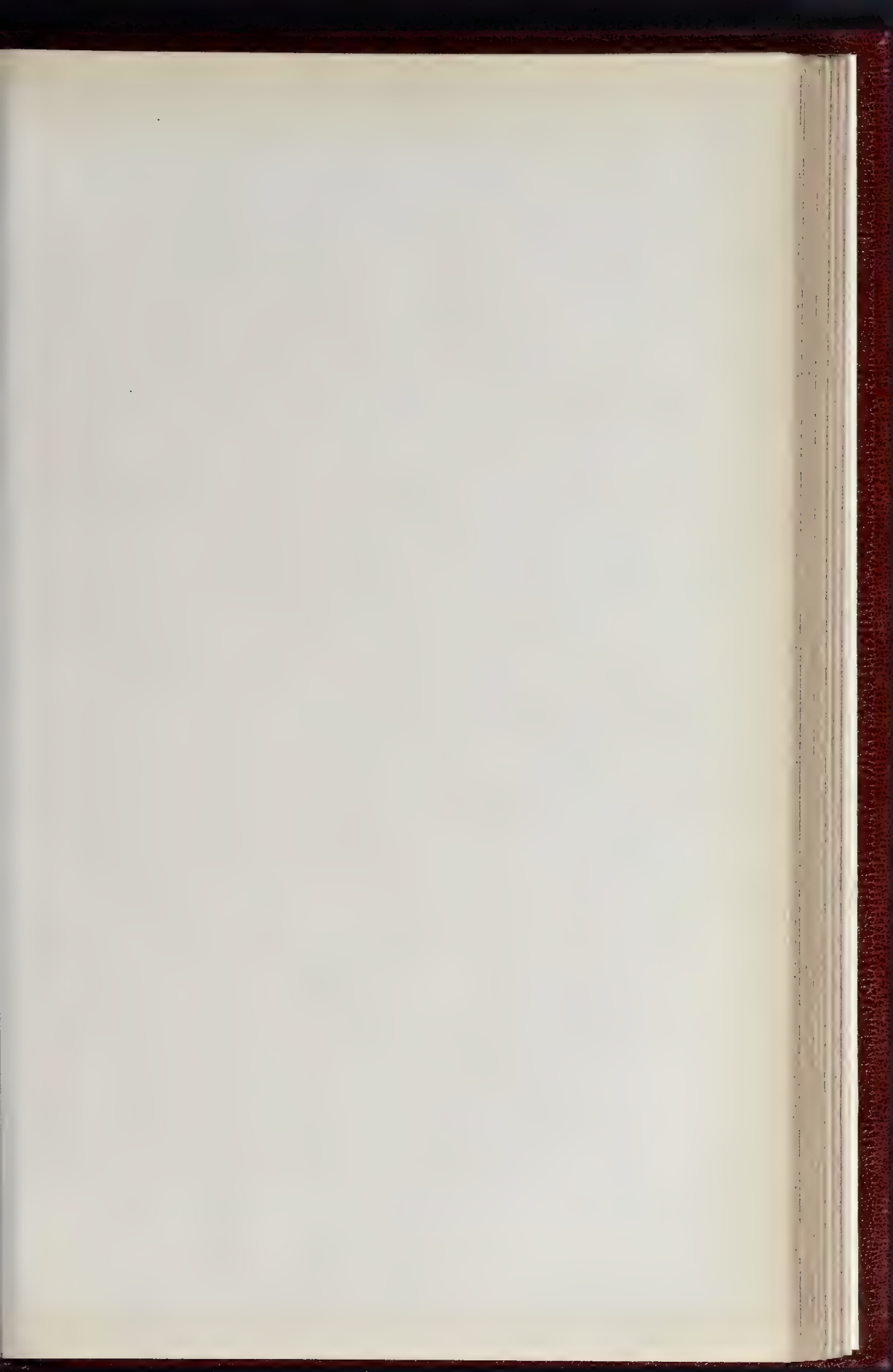
THE BUILDING NOVEMBER 24 1907

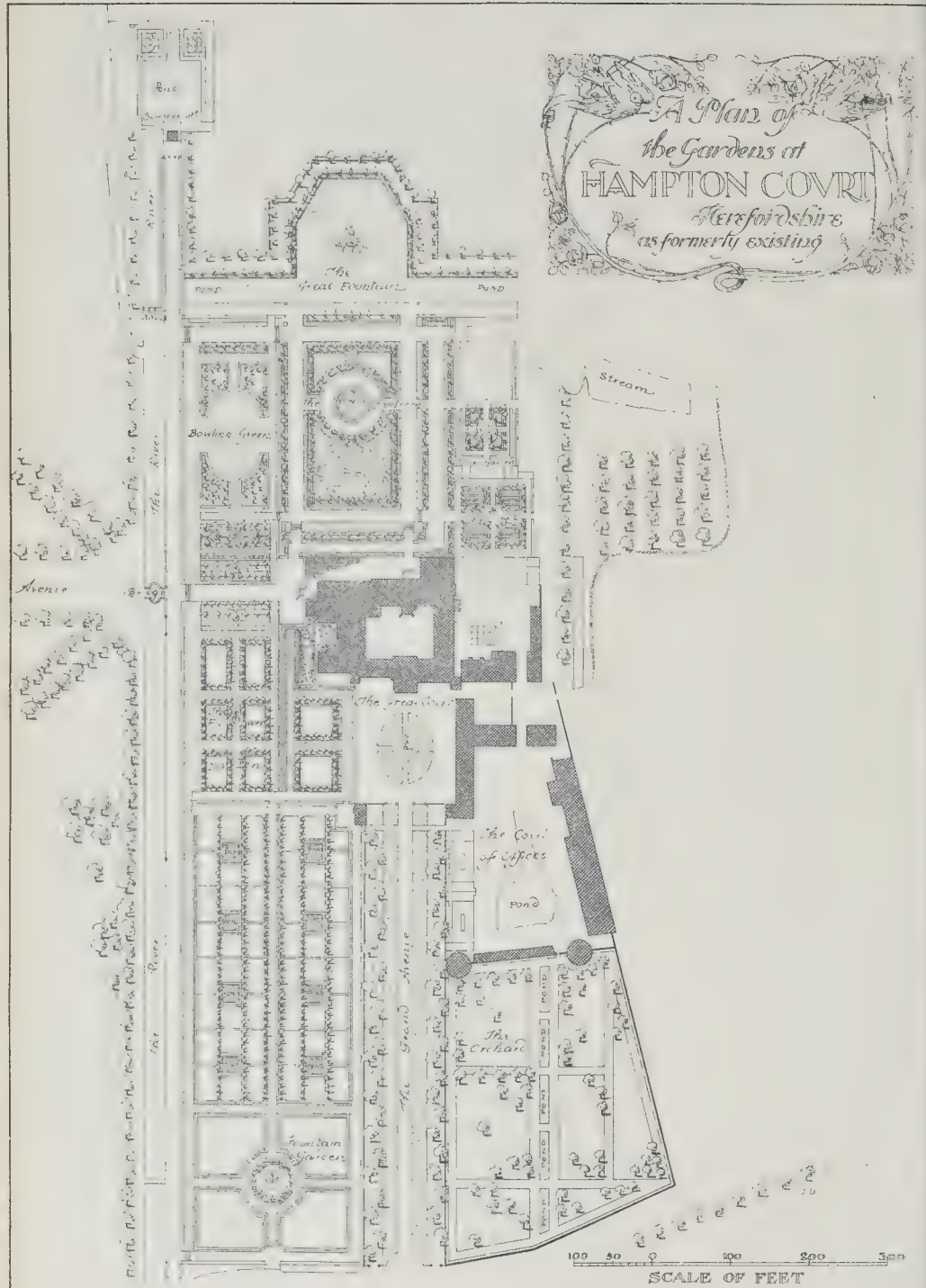


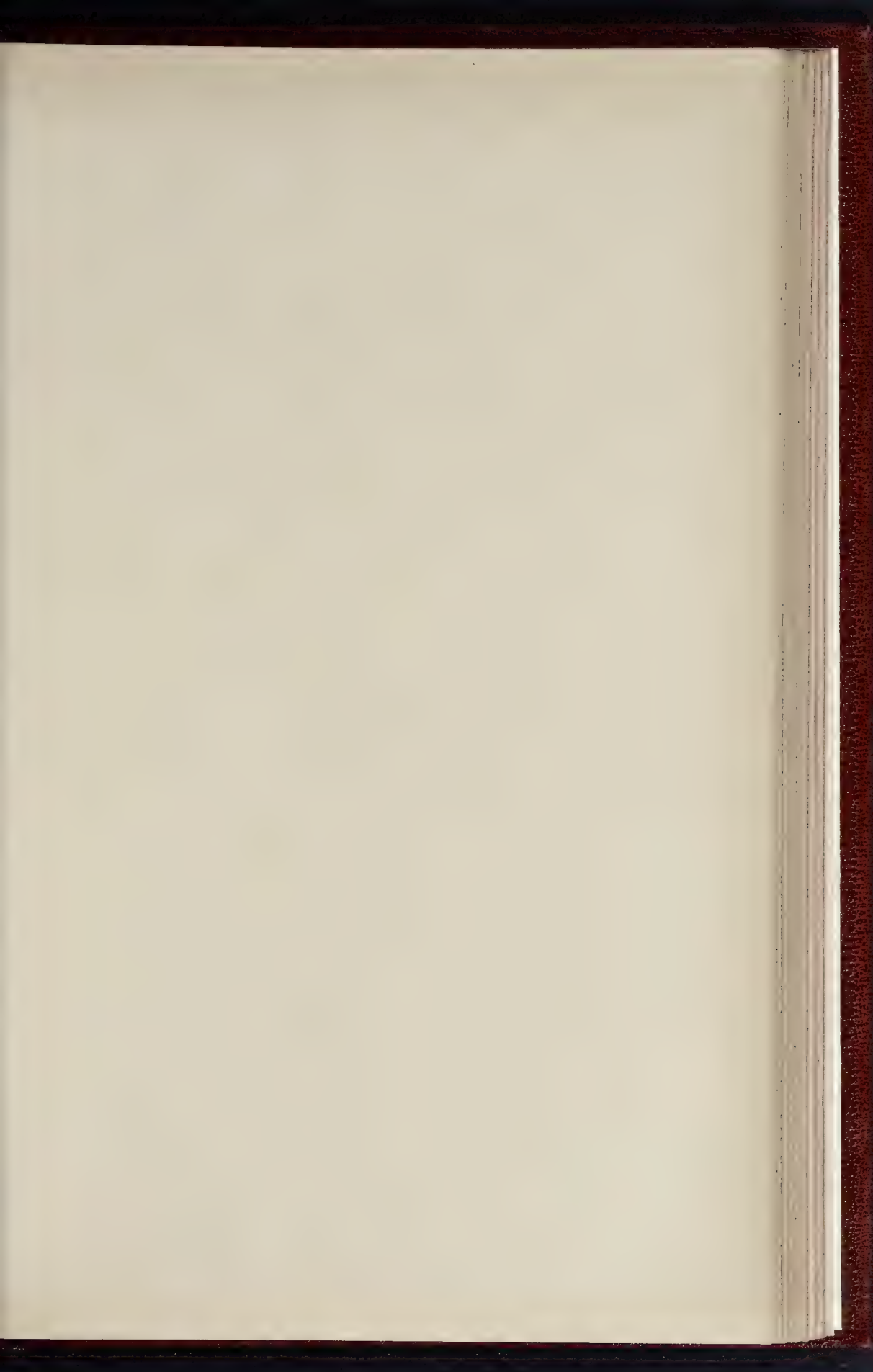


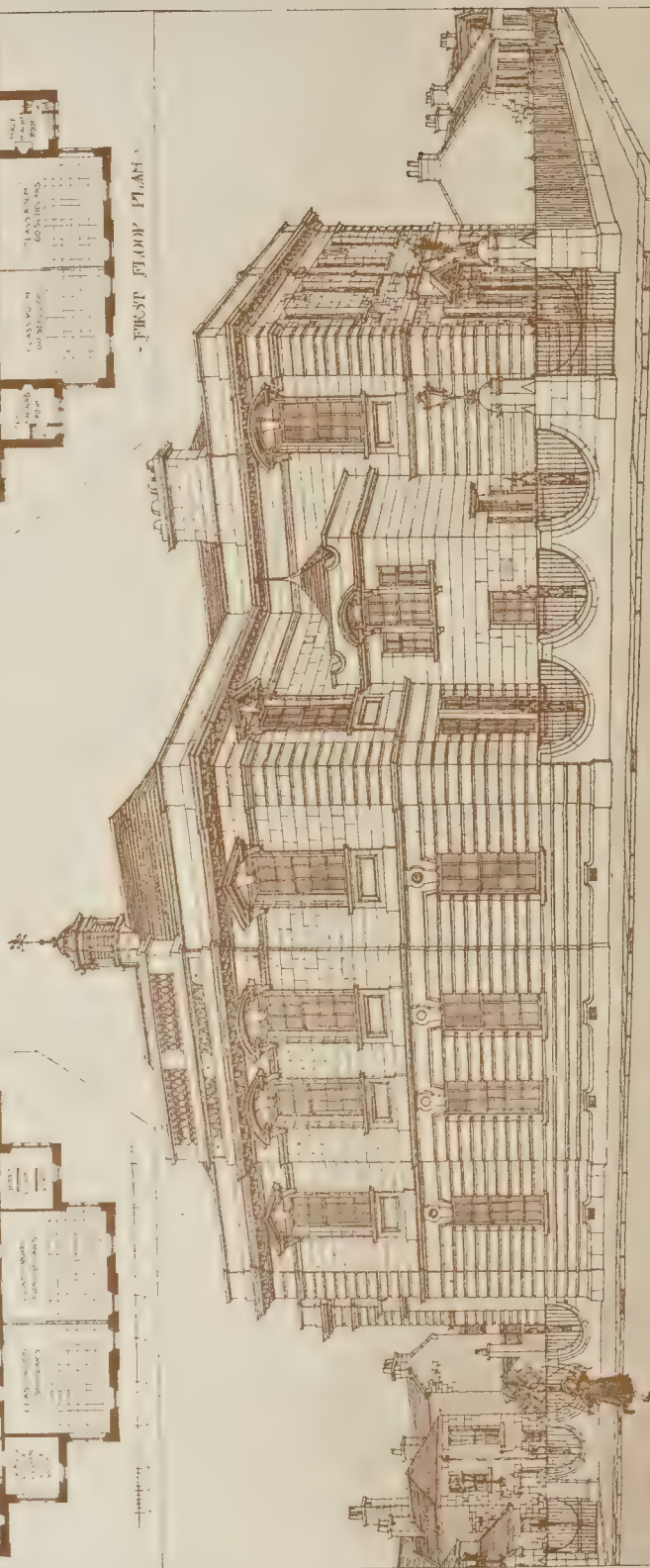
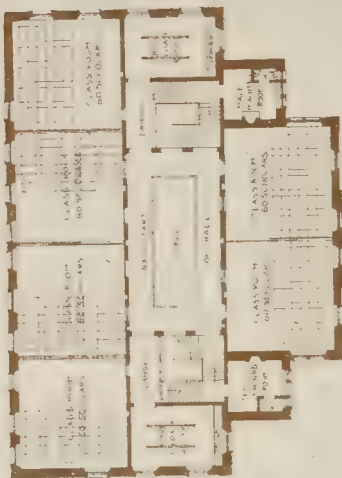
THE BUILDER, NOVEMBER 29, 1902











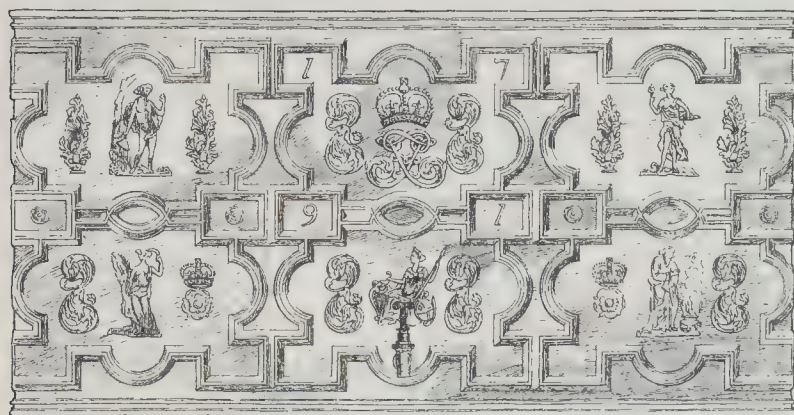


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"WOOD RISING," RYE, SUSSEX.—MR. PHILIP TREE, F.R.I.B.A., ARCHITECT.

LEAD CISTERNS *From Enfield Old Park.*

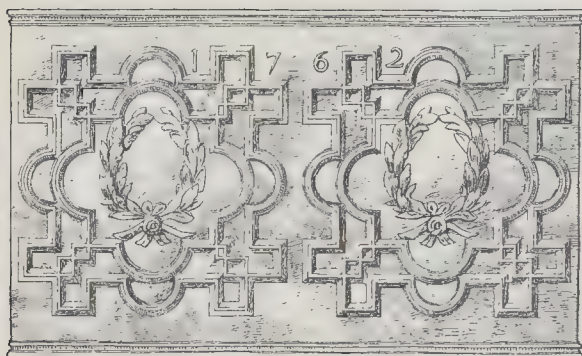
2 FEET 8 INCHES



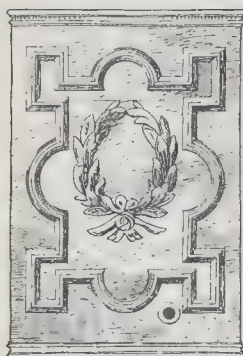
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THE FIGURES ARE EMBLEMATICAL OF THE FOUR SEASONS

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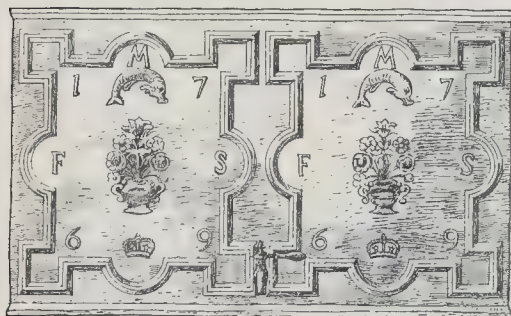


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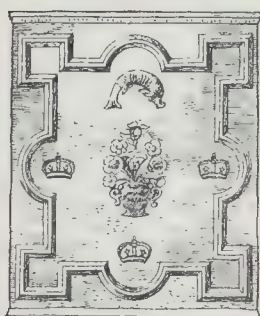


1 FOOT 8 INCHES

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3 FEET 8 INCHES



1 FOOT 10 INCHES J. DAY SON MFRS

lead to injury to life and property by fire. He hoped the efforts of the Committee would be to show that non-combustible materials or slow combustible materials were not so expensive as people thought them to be. He trusted they would recognise that from this time forward no combustible floors ought under any circumstances to be constructed in the metropolis or in any place where injury and risk to life and property could arise. He had himself found in the construction of artisans' dwellings, with which he had been largely connected, it was quite unwise and quite unnecessary on the ground of cheapness to construct combustible floors. Steel and various kinds of concrete were at their disposal to prevent the construction of combustible floors. At the same time, he felt it would be almost childish to prevent a man building a combustible house while they left the hundreds of thousands of houses already built in a dangerous condition, they would simply be trifling with the matter if they limited themselves to the construction of new buildings. He fervently hoped that the precedent set by the Factory and Workshops Act and in regard to theatres would be followed, and that in the case of all buildings under reasonable circumstances and in a reasonable time, they should insist on those responsible for them bringing them into line.

Sir H. Perrott, Bart., supported the exhibition from the point of view of the ambulance service.

Mr. P. Cremieu-Javal (chairman of the executive of the International Fire Exhibition) in proposing a vote of thanks to the Duke of Cambridge, mentioned that promises of support had been received from America, Russia, France, Germany, and other countries.

The Duke of Cambridge, in reply, remarked that the subject was one which required great attention, and should be dealt with speedily because, unfortunately, serious fires were occurring almost daily.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir J. McDougall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Stepney Borough Council 6,000l. for buildings for storage of plant; and Fulham Borough Council 3,200l. for purchase of freehold interest in depot.

Vauxhall Bridge.—The following adjourned report of the Bridges Committee gave rise to considerable discussion:—

The question of the rebuilding of Vauxhall Bridge has before the Council for the last twelve years, although it was not until 1895 that Parliamentary powers were obtained to undertake the reconstruction. After the passing of the Vauxhall Bridge Act, some three years elapsed before the contract for the demolition of the old structure and partial construction of the new piers and abutments was let. Messrs. Pethick. The Council will remember that the proposal in 1897 was to construct a five-arched steel bridge with granite-faced piers and abutments, but that when the sketch was submitted it was rejected upon the grounds that it did not possess those features which it was thought a crossing of such importance should exhibit. Some eighteen months later, as the result of much deliberation a design was submitted and adopted by the Council showing a granite bridge backed with concrete, which not only had an appearance of stability and massiveness but which, it was believed, gave general satisfaction. Having regard, therefore, to the time and talent which has been spent upon the design and proposed construction of the bridge in a manner which has been regarded as so satisfactory, and which would have embodied the principle upon which the Thames embankments were constructed, we greatly regret to find that circumstances have arisen which will necessitate the Council having to revert to its original conception, and build a steel bridge with stone piers.

By section 37 (2) of the Vauxhall Bridge Act, it is provided that 'the temporary works in the river in connexion with the said bridges and the taking down and removal of the existing Vauxhall Bridge and the temporary bridge aforesaid shall be executed and performed to the reasonable satisfaction of the engineer for the time being of the Conservators, so that the traffic of the river shall not be interfered with more than may be absolutely necessary: provided that there shall at all times during the construction of the new Vauxhall Bridge be at the site thereof at least three openings, each having a clear waterway of 70 ft. in width, and one of such openings having a clear headway of 18 ft. and the others

of such openings having respectively clear headways of 15 ft. above Trinity high water mark.' In 1898, when a concrete bridge was substituted for the original form of construction it was pointed out that the headway of the arches, owing to the centreline required for the support of the concrete arch during construction, would have to be temporarily reduced, and a clause authorising the lowering was accordingly inserted in the General Powers Bill of that session, but was subsequently withdrawn, as it was represented to us that a method of construction had been discovered which would obviate the temporary headways at the centre of the arches being less than the prescribed 18 ft. and 15 ft. Accordingly, in the following year a scheme for carrying out the work, showing headways respectively of 18 ft. and 15 ft. at the centre of the openings and lessening on each side towards the piers, were submitted to the Thames Conservancy Board, and received general approval. The question as to whether the headways referred to in the above clause are to be 18 ft. and 15 ft. throughout the whole width of the waterways has since been raised by reason of the result of an action which Messrs. Pethick brought against the owners of the tug *Frank* for damage done to the protective works at the bridge. The decision of the Admiralty Court, which was endorsed by the Court of Appeal, was given against Messrs. Pethick, solely upon the ground that the waterways were not at the time of the accident of the width specified in the Act. It was stated that, whilst the owners of the tug were guilty of negligence, there was no protection to the contractors from the fact that the openings had been approved by the Thames Conservancy Board. It will be observed that the importance to the Council of the decision lies in the fact that, although the width of the waterway was the only matter touched upon, any variation from the headway specified in the Act might equally, when the arches were in course of construction, be regarded as legal negligence on the part of the Council. Having regard therefore to the fact that, acting in accordance with a plan sanctioned by the Thames Conservancy Board, Messrs. Pethick were guilty of legal negligence in deviating from terms of clause 37 (2) of the Act, we directed the solicitor to obtain counsel's opinion in the matter of the headways. The opinion is that the headways to the three openings shown upon the plan submitted in 1899 to the Conservancy Board do not comply with Clause 37 (2) of the Act. These openings, it is pointed out, are for navigation purposes, and must be 70 ft. wide and have a 'clear headway' of 18 ft. and 15 ft. respectively throughout the whole width of 70 ft. Such being the case, the Engineer has reported to us that he cannot carry out the construction of a concrete bridge to allow of this. To obtain the required depth for centring, and at the same time to give the clear headway, would necessitate the arch of the bridge being raised 6 ft., the maximum upward deviation allowed by the Act being only 3 ft. He has further pointed out that, in the construction of a concrete arch bridge, it is absolutely essential that the centres should be much more solid and much less liable to any movement than is necessary in the case of a stone bridge, and for this reason alone he considers the upward deviation insufficient to give room for the satisfactory centring of a concrete arch. If this were obtained, the gradient would have to be altered from 1 in 40 to 1 in 32½, which we consider excessive.

It appears, therefore, that whilst the Thames Conservancy Board are empowered under Clause 37 (1) to consent to alterations in the number of openings, the height of the headway of the centre opening at crown, and also the span of the centre opening as regards the new Vauxhall Bridge, they have no power to sanction any variation from the works specified under Section 37 (2).

According to present arrangements the Council will in all probability be in a position to let the contract for the superstructure in the early part of next year. We have lost no time in having had prepared designs of the only type of bridge, viz., a steel one, which, under the circumstances, we could recommend the Council to construct. The erection of a steel bridge faced with granite has received our careful consideration, but has been abandoned for the following reasons:—(1) the difficulty in tying both kinds of work together and of meeting the effects of expansion, which is different in the respective materials; (2) that the cost of a bridge of this kind would approximately exceed by 45,000l. that of one wholly made of steel; (3) that the weight of the superstructure, and consequently the pressure on the foundations, would be increased, which, in this particular instance it is desirable should be kept as low as possible. The elevation which we consider shows the most satisfactory bridge is that for a superstructure to be wholly constructed of steel with elliptical arches and with ornamental facings. The cost for engineering works of such a structure, including the approaches, is estimated at 70,000l. making, with the amount already voted, about 350,000l.

We have had hung up in the chamber the design of the bridge which, in our opinion, the Council would do well to adopt as being satisfactory in appearance and not unworthy of the position it will occupy. The Council will appreciate the importance of an early decision in the matter

so as to avoid any interval arising between the termination of the existing contract and the letting of one in respect of the superstructure, not only with a view to meeting the demands of the traffic, but also to afford the earliest opportunity of connecting the existing lines of tramway upon each side of the bridge. . . . We recommend—

(a) That the resolution of the Council of February 22, 1898, directing that the new Vauxhall bridge be a granite bridge backed with concrete be rescinded.

(b) That the estimate of 170,000l. submitted by the Finance Committee for the building of the superstructure of the new Vauxhall Bridge be approved, and that an expenditure up to the amount be sanctioned; that the design submitted showing a steel elliptical arch structure be adopted, and that the engineer be instructed to prepare the necessary contract, plans and specification. . . .

Lord Monkswell, on behalf of the General Purposes Committee, asked that the Chairman of the Committee should take the Report back with a view to giving the Council further information as to the reasons which induced them to recommend the substitution of a steel for a granite bridge. The reason given was that the plans as originally proposed for a granite bridge would not comply with the Act of Parliament; but he understood that, even if Parliament was induced to reconsider the Act, the Bridges Committee would not have a granite bridge.

Mr. Sears (of the Bridges Committee) said the matter had been carefully considered by the Committee, and they had come to the decision they had with very great regret. There were two grounds upon which the decision of the Committee had been arrived at. The first was that stated by Lord Monkswell; but there was a more material reason, viz., the difficulty with regard to the foundations. When the original borings were taken, the engineers thought they would have arrived on hard blue clay, and then they would have been able to have got sufficiently strong foundations for carrying a heavy granite bridge. It had now been discovered that the clay was of a softer nature than expected, and could not carry the weight, and it was too late now to make alterations and increase the width of the foundations in order to carry a heavier bridge. The present Engineer was not responsible for this, but they had to act entirely on the advice of their present Engineers. The opposition arose entirely from artists, who believed the design of the bridge would not be so artistic as one constructed of granite. He quite agreed that granite would be better than steel, but that was not to say that a steel bridge was not capable of artistic treatment. They had only a first sketch of the bridge before them, and the details of the ornamentation had to be considered, and their Engineer was prepared to consult with the architects of the Council with regard to the artistic finish of the bridge. What they had to consider was that the Engineer refused to construct a heavy granite bridge on the piers in the river.

Mr. Henry Ward said he thought that the Council should be taken a little more into the confidence of the Committee on one or two points. Some architects thought that an architect should be associated with the Council's Engineer in order to produce a joint design and to satisfy all parties. There was only one case in which that had been done in the erection of a bridge over the Thames, and that was in the case of the Tower Bridge, and no recent work had been more subjected to the criticism of architects than that bridge. Dual control or responsibility nearly always led to failure. Four or five years ago a deputation from the Royal Institute of British Architects came before the then Bridges Committee and made two complaints, one in reference to the design of Vauxhall Bridge as then settled, and the other as to the colour the various iron bridges under the control of the Council were painted. Mr. Alfred Waterhouse, speaking for the deputation, said it was a mistake to paint the iron bridges across the Thames in any bright colour; the dull, leaden sky of London required a neutral tint or a dull, grey colour to harmonise. Even while Mr. Waterhouse spoke there were murmurs of dissent on the part of some of the members of the deputation, but the Committee asked the deputation to say what colour they would advise for painting two of the bridges about to be dealt with. The deputation promised to send, and did send, samples of the colour which they suggested should be tried on various panels of

Albert Bridge. The panels were accordingly so painted, but though the deputation inspected the panels, the Bridge Committee were unable to get any answer for some time. Finally, in reply to an application for a decision, the Bridge Committee were informed that the deputation differed so much in opinion amongst themselves that the Bridges Committee had better follow out their own ideas. The deputation was asked to give some idea of the design they proposed for Vauxhall Bridge, and the gentleman in charge said the first thing he thought was that the architectural treatment required that the piers should be considerably increased in width beyond what the Engineer proposed—the slender piers of Westminster Bridge being inartistic. That was put before them, although old Vauxhall Bridge was pulled down partly because the piers were so wide that it was difficult to navigate craft against the currents caused by the old broad piers and narrow openings. That was a sample of the ideas the architects had to put before them. The utilitarian aspect of the question had to be considered before any other—the question of erecting a bridge across the river with a flat suitable gradient for road traffic above, and with slender piers which would not interfere with the river traffic below. The case of London Bridge had been mentioned as a suitable bridge for Vauxhall, but any one who knew the south gradient there would know how great the strain was on horses in pulling a load up from Tooley-street. Waterloo Bridge, too, had been referred to—and one could not help agreeing that Waterloo Bridge was an excellent one, but again the question of gradients made it impossible to have a bridge like that at Vauxhall, where it was necessary to connect with the level of the embankment. The utilitarian side of the matter should be considered first, and the artistic side should have immediate attention after utilitarian requirements had been dealt with. He did not think Westminster Bridge was the ugly bridge that some architects thought it, and certainly its flat gradients made it very easy for road traffic. Apparently the only thing that was objected to in the design of the Engineer was the ornamentation, but that was a very small thing; it had not been fully considered, and no doubt necessary alterations could be made in that respect. A recent writer considered the curve of the arches of the bridge graceful, but proposed that the ornamentation should be altered so as to produce a more artistic bridge. The Council also had to consider its Engineer. Two eminent engineers had designed bridges for the Council and they had both been objected to. Sir Alexander Binnie designed a concrete bridge, but the foundations had been found to be unsuitable. The Committee wished to stand loyally by its officers, but at the same time they wished to take advantage of artistic recommendations and the present Engineer was willing to consult with the Architect of the Council. The segmental arch design for the bridge had not been put before the Council before that week, because the Committee thought that the elliptical design would be better.

Mr. Straus was of opinion that the foundation question settled the whole matter. If they had a body composed of the most artistic designers in the world they would never get them to agree. The Engineer had no objection to altering the flagstone work of the design, but he objected to having an architect foisted upon him to assist in designing the bridge. Their Engineer was a competent man, and he should either be left to do the work himself or have nothing to do with it at all. A more beautiful bridge might, perhaps, be erected than the one proposed, but it would be at the cost of the poor horses, and that was as undesirable as that the design should suffer.

Mr. Beachcroft moved that the Report be referred back. He asked what they had been doing for five and a half years, if at the end of that time they suddenly found they were mistaken in the composition of the bed of the river. No other municipal body in the world would, *sub silentio*, allow the matter to pass without the fullest information. The statement made by Mr. Ward would not satisfy. The Engineer, they were told, had agreed to consult the Architect of the Council as to the architectural features, and that fact showed that grounds existed for the outside criticisms. The Report of the Committee was totally inadequate.

Mr. R. A. Robinson seconded the amendment.

Mr. Burns, M.P., said Mr. Beachcroft had been influenced by outside criticism, which was undeserved and unfounded. The delay was owing to the contractor and the Thames Conservancy. He knew no body which had deferred more to artistic opinion than the Council. They had listened too frequently with bated breath to the views of so-called culture, and whenever they departed from their primitive common sense and abandoned their own ideas of what was beautiful, either in bridges or parks, at the instance of artists, it always led them into a bog of difficulties and entanglements infinitely worse than they were moved to adopt before they consulted artists. The City Corporation had been but faintly criticised for interfering with London Bridge, which was a beautiful structure. In his opinion the City Corporation had laid violent hands on the bridge in carrying out the present widening. But then the Corporation was 700 years old, and it could steal a regiment of horses while the County Council could not look over the hedge. He appreciated Sir William Richmond as an artist, and in his work in trying to make London more healthy and comfortable, but Sir William had taken up a bad case. He had heard with pain and regret, as an old member of the Bridges Committee, that they were to have a granite and concrete bridge, but he gave a sigh of relief when he found that, owing to the levels, &c., the bridge was to be of steel. No country in the world could show such splendid combinations of granite and iron, of granite and steel, for bridges as this country. As an instance of a beautiful structure of the kind, he would mention Westminster Bridge. They all followed Page's beautiful design for the bridge, and he had never heard an artist give an adverse opinion on that, and there had not been an iron or steel bridge built on the Thames, and many other rivers, that had not taken Page's design in the rough where physical reasons would allow. Vauxhall Bridge, making allowance for difference of levels, &c., was practically a replica of Page's Westminster Bridge. Some one said, "Look at the niggling decoration." The same could be said of the spandrels of Page's bridge, and the same people who said that praised the new Pont Alexandre III. Bridge in Paris, and held it up as a model for the Council to follow. But for the levels, he would have liked to see a bridge like Waterloo Bridge put up at Vauxhall. Waterloo Bridge ought to be a model for every bridge over the river.

Mr. W. Emden said architects were not the proper persons to be called in to design bridges—it was not their proper province. It was a question for an engineer. This was just one of those questions of taste v. utility. There were a number of people who thought they could postpone everything on the ground of taste. The deputation from the Institute of Architects, when they saw the difficulties the Council were faced with, were quite willing to reconsider the matter; their view previously had been based on insufficient information. Westminster Bridge was an example of what could be done in steel; the bridge was one of the best in London.

Mr. W. H. Dickinson said it ought to be made very clear to the public that the Council could not build a granite bridge. He thought that, even if the Engineer had secured the best design, the Council should be given further time to consider it.

Mr. Wightman appealed to the Council to get on with the bridge, and let architects and artists take a back seat.

Mr. S. Collins and Mr. Parkinson supported the Committee's recommendation.

The amendment was then rejected, and the recommendations agreed to.

Telephones.—The adjourned Report of the Establishment Committee dealing with the telephone arrangements at the central offices was submitted. It was recommended that the offer of the National Telephone Company to provide additional telephones and lines, &c., for 327/135 be accepted.

Mr. W. H. Dickinson moved that the Report be referred back, and said that, having regard to what had taken place at Turnbridge Wells, they ought to be very careful before giving business to the Company in preference to the Government.

Mr. Radford seconded the amendment, on the ground that he wished to encourage the enterprise of his Majesty's Government.

The amendment was carried, on a division, by 65 votes to 35.

Differential Rating.—On the recommendation of the Local Government and Taxation Committee, it was agreed that in the opinion of the Council a system of graduated rate, according to the amount of rateable value, could not be advantageously adopted in London.

The Housing Question.—A lengthy Report was submitted by the Housing of the Working Classes Committee on the Report of the Joint Committee of Parliament, which sat this year to consider the revision of the Standing Orders of Parliament requiring the insertion in Private Bills of clauses providing for the rehousing of persons of the working classes displaced in pursuance of the powers conferred by those Bills upon their promoters.

Mr. Beachcroft drew attention to the fact that the proposed Model Clause would give the Secretary of State power to fix rents. He thought there should also be power conferred on the Secretary of State to prescribe the class of persons who should occupy the dwellings. He also considered that the Council should push forward the subject of the Council having power to agree with railway companies to relieve them of their obligations to rehouse.

Sir W. J. Collins (Chairman of the Committee) said that while the Model Clause would, on the one hand, tend to bring the obligations of railway companies more closely home to them, on the other hand, it gave greater elasticity to the Secretary of State.

Improvements.—The following recommendations of the Improvements Committee were agreed to:—

"That the estimate of 2,500l. submitted by the Finance Committee be approved, and that the Improvements Committee be authorised to take the necessary steps to secure, upon the terms named in the foregoing Report of the Committee, the widening of Burntwood-lane, Wandsworth, to 54 ft., at the Magdalen College Estate, the Wandsworth Borough Council having agreed to make a contribution of one-third of the net cost, or a contribution of 833l. if the net cost exceeds 2,500l."

"That the estimate of 440l. submitted by the Finance Committee be approved, and that, subject to the Council approving the surrender of the portion of Wimbledon-buildings needed for the widening of Newton-street to 30 ft., a contribution be made by the Council, on the usual conditions, of half the net cost of the improvement proposed to be undertaken by the Council of the Metropolitan Borough of Holborn, provided however that if the ultimate net cost of the improvement exceeds 880l., the Council's contribution will be limited to 440l."

The Council adjourned at 7.30 p.m.

COMPETITIONS.

NEW CENTRAL REFERENCE LIBRARY, BRISTOL.—Mr. E. W. Mountford, the assessor, has made his award in this competition. Premiums were awarded as follows:—1st, Mr. H. Percy Adams, 28, Woburn-place, Russell-square, W.C.; 2nd, Messrs. Knott & Collins, 66, Oakley-street, Chelsea; 3rd, Mr. A. T. Butler, Cradley Heath.

HOSPITAL, STROOD.—In the competition for Infectious Hospital, Strood, the first premiated design was sent in by Mr. E. Godfrey Page, A.R.I.B.A., 4 and 5, Warwick-court, Gray's Inn, London, W.C.

WORKMEN'S HOUSES, LIVERPOOL.—A special meeting of the Housing Committee of Liverpool Corporation was held on the 21st inst. to consider the designs, forty-five in number, submitted by architects of houses for the working classes to be built on the Hornby-street area. The report of the assessor, Mr. T. Blashill, was considered, and the Committee, upon his recommendations, made the following awards:—First premium, 250l., Mr. Jas. Dod, Exchange-buildings, Liverpool; second, 150l., Messrs. Brocklesby, Marchmont, & East, Merton, Surrey; third, 100l., Mr. A. Mitchell Torrance, London; commended, Mr. H. A. Matear and Messrs. Worthington, Simon, & Crawford, Manchester; fifth, Messrs. Spinks & M'Jarrow, London; sixth, Messrs. Grover, Halford, & Cutler, London.

ITALIAN ASPHALT.—According to a Report just received at the Foreign Office from Mr. Tomassini, British Vice-Consul at Ancona, the exports of asphalt from that port are continually on the increase. In 1901 over 15,000 tons were exported to Germany, the United States, Egypt, and Greece, whilst 3,000 tons of crushed asphalt in bags were exported to London to be transhipped for Auckland, New Zealand.

ARCHITECTURAL SOCIETIES.

THE EDINBURGH ARCHITECTURAL ASSOCIATION.—The Associate section of this Association held their first ordinary meeting in the Rooms, 117, George-street, on Wednesday evening last week. Mr. J. Douglas Trail occupied the chair, and Mr. John Wilson read a paper on the "Palace of Versailles." Treating the paper from an historical, as well as an architectural, standpoint, Mr. Wilson showed how intimately the Palace and its surroundings were linked with the three Louis, XIV., XV., and XVI., and gave interesting descriptions, from personal notes, of the various apartments comprising this fine example of French Renaissance to which is often compared part of Hampton Court. The lecturer drew special attention to the chapel; the State-rooms, with their marble mosaic-covered walls and richly-painted ceilings; the glass gallery; the Queen's staircase; Louis XIV's bedroom; and the Grand and Petit Triangles, the latter of which was inhabited latterly by Marie Antoinette. Mr. Wilson gave interesting descriptions of the gardens of the Palace with their wondrous bronzes and marble. The lecture was illustrated by an excellent series of limelight illustrations. A discussion followed.

ULSTER SOCIETY OF ARCHITECTS.—The fortnightly meeting of the Designing Club of this Society was held in the Rooms, 16, High-street, on the 17th inst., Mr. W. J. Gilliland, M.R.I.A.I. (Vice-President), in the chair. The subject for the evening was a paper by Mr. W. J. Fennell, entitled "Brief Notes on Old Buildings in Antrim and Down." The lecture was illustrated by a collection of lantern slides from photographs taken mainly by Mr. Fennell himself. In the course of his paper, the lecturer said the nearest "old building" to Belfast is the diminutive ruin at Holywood, in the County of Down, which is all that remains of the once extensive monastery of the Franciscans "founded by John Whyte in the year 1200, and which flourished till the dissolution." This little church, showed some well-constructed windows as far as their internal jambs were concerned, and a trefoil-headed piscina, with one or two dog-tooth ornaments, remained to show what it once was like. It had no other feature of interest, and, small as those remains were, it was something to know that they were now carefully preserved. The chief object of interest in the town of Newtownards was the building known as the "Old Church." This ancient edifice mainly consisted of the original church belonging to the Priory of St. Columba, the only existing portion erected in post-Reformation times being the tower. About twenty minutes' walk from Newtownards in a north-easterly direction brought them to the ancient Church of Movilla, one of the oldest foundations in Ireland. Referring to Greyabbey, the lecturer said the ruins constituted the most important remains of a monastic establishment in either Antrim or Down. The Cistercians were the great master farmers of the time they lived in, and their influence for good was great and far-reaching. That abbey, like most others, grew to be of great political importance, and also became possessed of townland after townland until its wealth was great and enviable. It was suppressed about 1530, and, passing from one owner to another, it was at last sold by Lord Dufferin to the Montgomerys, who now care for it very tenderly in its old age. He might assume that they were all acquainted with the history of that great Order, and how the monks were supposed to carry the severity of their lives into the details of everything round them, but he might remind them, when they were wondering where the detail was, and looking for elaborate mouldings, gracefully-clustered columns, and stony verdure, that the rules of the Order prohibited most of these, demanding only the simplest forms in everything as a protest against luxury and sin. After referring to Downpatrick and Inch Abbey, the lecturer alluded to the old buildings in County Antrim, beginning with the little-known and seldom-visited remains of the chapter house of the White Abbey. Continuing, he said they reached the historic town of Carrickfergus, entering the ancient town by its old gate. This was once the key to the north-east of Ireland, and, in consequence, did not always enjoy an uninterrupted dream of peace and tranquillity. De Lacy, another Norman adventurer, selected it as his point of advance, walled in the town, and built the castle

there on a basaltic dyke. It was a fine example of castle building, boldly designed and skilfully placed, and bore an unbroken record of occupation from its foundation to the present time. Amongst other Antrim old buildings, the lecturer called attention to the picturesque—placed stronghold of the McDonnell's, Dunluce Castle. Viewed from the east, that castle always reminded him of Mark's fabled one in Tintagel—"half in sea and high on land, a crown of towers." He concluded by making a strong plea for the preservation of those old buildings.—A vote of thanks was passed, on the motion of Mr. Maxwell, seconded by Mr. Donnelly, and the meeting concluded.—*Northern Whig.*

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—A meeting of the Birmingham Architectural Association was held on the 26th inst., when a lecture was delivered by Mr. William Henman on "Development in Hospital Design." The lecture dealt with the general scheme of hospital construction, and not with architectural embellishment. The ordinary wards of hospitals erected at the present time, the lecturer pointed out, were built upon what is known as the pavilion plan—oblong, detached wards of one or more stories in height—the purpose being to obtain good lighting of the wards and the best ventilation. But even with such an arrangement the securing of good ventilation was very difficult at all times, the state of the outer atmosphere being subject to such constant and severe variation. It was because of this that a mechanical means of securing ventilation, such as that adopted at the Birmingham General Hospital, was now employed in most of the large hospitals. But with this means the opening of the ward windows must not take place, otherwise it would upset the arrangement of the incoming and outgoing air. Therefore, the lecturer urged, the pavilion arrangement of wards was by no means a necessity. In fact it very much increased the difficulty of securing ventilation by mechanical means. The proposal of Mr. Henman was that instead of building hospitals in pavilions the wards should be all on one floor—level, compact, lighted from the south end, and by continuous lantern lights. In addition, this arrangement would obviate the necessity of having staircases and lifts. Further, not only would the comfort of the patients be better secured, but the work and supervision of the hospital would be carried on much more easily. Most of the lecturer's illustrations were taken from the Royal Victoria Hospital, Belfast, which is now nearing completion, and is to be opened for the reception of patients early next year. The total cost of the Royal Victoria Hospital, which is to accommodate 300 beds, will not exceed 300l. per bed as compared with 400l. or 500l. in respect of most of the modern hospitals. The lecturer quoted these figures in justification of his proposal from an economic point of view.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Woolwich.—A wooden hood over the entrance to No. 33, Southwood-road, Woolwich (Messrs. Logsdail & Beale for Mr. A. J. Glock).—Consent.

Hampstead.—Retention of a one-story building erected in front of Daydown, Netherhall-gardens, South Hampstead (Mr. W. G. Shoebridge for Mr. L. Sinclair, M.P.).—Refused.

Lewisham.—A wooden and glass conservatory at the first-floor level in front of St. Margaret's, Bantling-road, Catford (Messrs. G. H. & A. Bywaters & Sons for Mr. W. Street).—Refused.

Width of Way.

Bernards.—A factory building on the southern side of Tower Bridge approach, Bernards, with the external walls at less than the prescribed distance from the centre of the roadway of Long-walk (Mr. G. Gale for Mr. J. Feavar).—Consent.

Width of Way and Line of Frontage.

Islington, North.—Three houses, with shops, on the north-west side of Tollington-park, and four dwelling-houses on the south-west side of Pinegrove, Islington (Mr. H. Branch).—Refused.

Line of Frontage and Construction.

Hackney, Central.—That, at the request of Mr. T.

Fisher, the Council do consent to the retention of a wood and glass showcase on the forecourt of No 54, Mare-street, Hackney.—Consent.

Deviations from Certified Plans.

Whitechapel.—Deviations from the plans certified by the District Surveyor, under Section 43 of the Act, so far as relates to the proposed erection of two dwelling-houses upon the site of Nos. 180, 182, and 184, Whitechapel-road, Whitechapel (Mr. W. Gladding).—Consent.

Formation of Streets.

Lewisham.—That an order be issued to Messrs. D. Smith, Son, & Oakley, refusing to sanction the formation or laying out of new streets for carriage traffic on part of the Crofton Park estate, on the eastern side of Crofton Park-road, Brockley, Lewisham (Mr. J. W. Webb).—Agreed.

* * * The recommendations marked † are contrary to the views of the Local Authority.

Correspondence.

DESTRUCTION OF THE EXE BRIDGE.

SIR,—Your pages have always been open to protests against the needless destruction of the architectural works of the past, and perhaps you will allow me to call attention to a particularly reckless example of such vandalism now proposed.

During a few days' visit to Exeter I find that the Town Council have decided to pull down the "Exe Bridge," a fine stone bridge in perfect condition and of ample width of way; and to substitute for it a straight girder of iron for which, I am informed, plans and estimates are already prepared. I append a history of the existing stone structure, as obtained from the local records. But what I would call attention to is the plea put forward for this wanton and extravagant act of folly. It is solely that "the gradients are too steep."

I forward with this letter a photograph, which will enable you to judge of the value of the reason given.

The really sharp gradient in connexion with the bridge is in the approach from the west—i.e., the side furthest from the city—which could be remedied without touching the bridge, as the Fore-street, by which it is approached on the city side, is a steep incline leading downwards from the plateau on which the cathedral stands. Any lowering of the "take off" on that side means adding so much to the hill to be surmounted. Perhaps the intelligence of the body to which this beautiful city is entrusted may be gauged by the fact that last year they whitewashed, or yellow-washed, the fine, time-stained stone front of the old Guild-hall, which is the most picturesque feature of the beautiful High-street of Exeter.

It seems little short of disastrous that the buildings which so often constitute the charm of our historic cities should be at the mercy of ignorant men, incapable of appreciating the beauty on the destruction of which they are only too ready to spend large sums of borrowed money.

J. D. CRACE.

* * * The gradient of the bridge, from a photograph sent to us by Mr. Crace, appears to be about 1 in 10, which is certainly a very heavy gradient for modern traffic; but the bridge is a very short one, and in consideration of what Mr. Crace says as to the long gradient of the road leading to it, we should think it might very well be left to live its life out. It is a very picturesque object, like most of our old stone bridges, and the substitution of a straight iron girder would ruin the look of the place. If it were even necessary to take it down, it could be rebuilt as a stone arched bridge with a lower arch in the centre. We quite agree that the proposal to substitute a girder is lamentable.

The following is the short history of the bridge sent by Mr. Crace with his letter:—

"The existing Exe Bridge, of three segmental arches, was designed by Joseph Dixon, architect, of Westminster, in 1770. The first attempt at its construction seems to have been made without due caution, for the work was well advanced when it was carried away by heavy floods in January, 1775. The care of the work was then given to John Goodwin, an assistant of Dixon's, who turned the stream by dams and obtained footing on the solid rock. The first stone of this second attempt was laid on July 15, 1776. The exact date of its opening is not recorded, but it is said to have been in use by March, 1778, and has remained unshaken to this day."

CHEAP COTTAGES.

SIR.—Mr. Moody's letter in your last issue appears to me to solve the difficulty of building cheap cottages in rural districts, if a composition block can be obtained that is cheaper than brick-work, lighter in weight, durable, and of pleasing appearance.

The construction for the walls mentioned by G. R. M. in yours of 15th inst. would be as dear as a 9-in. wall plastered inside and could not compare for durability.

Will Mr. Moody give the name, price, and any other particulars of the composition blocks he quotes?
WALTER RICHARDS.

THE WALL PAINTINGS, CLAVERLEY CHURCH.

SIR.—A slight error has crept into the summary of my paper read at the Royal Archaeological Institute on November 5, which appeared in your last issue.

Earl Roger de Montgomery is described, in connection with my account of the wall paintings in Claverley Church, as having been Constable of the Castle of Bridgnorth. As a matter of fact, the castle was not in existence in his time, but was built by his son, Robert de Belesme, in 1102, Roger having died in 1094.

This does not affect in any way the question of the subject and age of these remarkable wall paintings; but historical accuracy, even in little matters of fact, is worth aiming at, and induces me to trouble you with this correction.

PHILIP M. JOHNSTON.

"FENSTERLAUBUNG."

SIR.—In your issue of November 15, under "Magazines and Reviews," you mention the word "Fensterlaubung," which seems not to be known to you. It may interest you to hear that "Laubung" is commonly used in the building line in Germany, and denotes the side of any window or door recess opening.

F. GREEN.

* We are obliged to Mr. Green for his note, though his explanation does not exactly answer to the illustration referred to in the *Berliner Architektur-Welt*, which appears to represent a screen of some kind across a window-surface.

BOOKS RECEIVED.

EGYPT EXPLORATION FUND: Archaeological Report for 1901-1902. Edited by F. L. Griffith. (Kegan Paul, Trench, Trübner & Co.)

OBITUARY.

MR. HICKS.—We regret to announce the death on the 21st inst., in his fifty-fourth year, of Mr. William Searle Hicks, of No. 3, Roseworth-villas, Gosforth, and senior partner of the firm of Messrs. Hicks & Chadwick, of No. 42, Grainger-street, Newcastle-on-Tyne. Mr. Hicks enjoyed an extensive practice, chiefly in the designing, fitting, and restoration of churches, in the northern and eastern counties of England; he was Architect and Surveyor to the Diocese of Newcastle and Surveyor of Ecclesiastical Dilapidations for the Archdeaconry of Northumberland. Among the more principal architectural works carried out by him and his firm we may instance the following:—In Newcastle-on-Tyne: the Church of England Institute; the completion of the church of St. Matthew, as begun in 1879 after the late R. J. Johnson's designs, and the reredos of the church of St. Mary, both illustrated in the *Builder* of October 8, 1898 (No. XVIII. of our Series, "The Architecture of our Large Provincial Towns"); the reredos, St. Cuthbert's Church; parochial buildings, comprising clergy-house, mission hall, five clubrooms, gymnasium, &c., at a cost exceeding 5,500*l.*, for All Saints' Church in Pilgrim-street; also some restoration work in succession to Sir G. G. Scott at the Cathedral and Barnabas Church, in Gosforth-village, with sittings for 700 persons. The parochial hall and Sunday-schools for Walker, Co. Northumberland; St. Oswald Church, West Hartlepool; the restoration of the ancient church of St. Bartholomew, Newbiggin-by-the-Sea, previously repaired in 1888; of the interior of the church of St. Helen, Bishop Auckland, and with additions, of St. Cuthbert's Church, Haydon Bridge, built in 1797. In Yorkshire: A new church at Carlin How, in the parish of Brotton-in-Cleveland; a new church in the Boosbeck district, Skelton-in-Cleveland, for 400 sittings; the church of St. John, Driffield; a new church at Thornaby, for the parish of St. Luke; St. Matthew's Church at Gragetown, in Cleveland; a new church for Dalton parish, Kirby Ravensworth; a new church in the east part of Cleveland, N.R.; and the restoration of Deighton parish church, near Northallerton. In Norfolk: the restoration and enlargement of North Creake parish church; restoration of the parish church and its tower of All Saints, Shottesham, near Norwich; the reredos for Letheringsett parish church. The mission church of St.

Paul's, Catton, Allendale; the church of St. Andrew, Cambos, Co. Northumberland; the gymnasium, Durham Grammar School; the Church Institute, Hexham; the Men's Club and Recreation Rooms, West-avenue, Gosforth; restoration of the parish church at Croft, near Darlington; and, together with the new reredos, of St. Cuthbert's parish church, Blaydon-on-Tyne; of the whole interior of St. John's Church, Sunderland, built in 1760; and the restoration of the ancient parish church of St. Michael, Felton, Northumberland. A large town church for St. Chad's, Bessham, near Gateshead, noticed in our article, "Architecture at the Royal Academy," of May 3 last; the choir-stalls for Jesmond parish church; memorial chapel, Washington parish church, Chester-le-Street; the Queen Victoria Memorial Church, erected in the public gardens, Sedburgh; church of St. John, Crewe; remodelling and improvement of the parish church of Holy Trinity, Berwick-on-Tweed, originally built in 1648 (and enlarged in 1853), after the pseudo-Italian manner. About sixteen months ago Mr. Hicks was deputed, as we understand, to the important charge of the reparation and reinstatement, at an estimated outlay amounting to 20,000*l.*, of the well-known old parish church at Wymondham, in Norfolk, for which he had designed a new stone reredos.

GENERAL BUILDING NEWS.

CHURCH, ANDBANK, AYRESHIRE.—A new U.F. church has just been opened at Anbank Station. Externally, the front is of red sandstone, the walls being buttressed and rough-cast. The architect was Mr. Eaglesham, Ayr. The contractors for the work were as follows:—Builder, Dick; joiner, McIntyre; plasterer, Miller; plumber, Dalrymple; painter, Fraser—all of Ayr.

ENLARGEMENT OF NORMANTON CHURCH, DERBYSHIRE.—The foundation-stone of an enlargement of this church was laid recently. The work, which will cost 3,500*l.*, includes a new chancel, new south aisle, vestry, and organ chamber. The architects are Messrs. Naylor & Sale, Derby, and the contractors are Messrs. Walker & Slater, also of Derby.

METHODIST CHAPEL, PENMAENMAWR.—The Penycue Calvinistic Methodists are building a new chapel on a plot of land adjoining the English Congregational Chapel at Penmaenmawr. The new chapel will have seating accommodation for 650, and will cost 4,500*l.* The architect is Mr. J. S. Coverley.

CHAPEL, DEWSBURY WORKHOUSE.—At Dewsbury Union Workhouse, Staincliffe, recently, the foundation stone was laid of the chapel which is being built in commemoration of the Coronation of King Edward VII. The architect is Mr. G. A. Fox, Dewsbury. The contemplated cost is about 1,500*l.* The contractors are—Mr. George Whitehead, Dewsbury, mason; Messrs. John Richardson & Sons, Kilpin Hill, joiners; Messrs. Jonas Thornton & Sons, Heckmondwike, slaters; Mr. Frank Newsome, Dewsbury, plumber; Mr. S. Crawshaw, Batley, plasterer; and Mr. Porritt, Dewsbury, painter.

BIBLE CHRISTIAN CHAPEL, PRISMOOTH.—The new Embankment-road Bible Christian Chapel, Plymouth, is approaching completion. It is situated at the corner of South Devon-place and Cattedown-road, and is being erected from plans prepared by Mr. H. J. Saell. Mr. J. Paynter, Mutley, is the builder. The new chapel will seat 750. The gallery is carried entirely round the organ loft, being at the top of the gallery, and the organ is in the rear. The rear seats in the well of the chapel will be elevated.

EXTENSIONS AND IMPROVEMENTS TO THE CITY HOSPITAL, SHEFFIELD.—At Sheffield Town Hall on the 18th inst., Dr. R. W. Johnstone, an inspector of the Local Government Board, held an inquiry into an application by the Corporation of Sheffield for sanction to borrow 11,500*l.* for extensions of the Lodge Moor Hospital, and 550*l.* for new stables at Winter-street Hospital. There were present the Deputy Town Clerk (Mr. W. E. Hart), the City Surveyor (Mr. C. F. Wike), Mr. E. M. Gibbs, the architect of the work, and others. Mr. Gibbs, in reply to the inspector, said that practically the work was done.

MEDICAL INSTITUTE, BELFAST.—A new Medical Institute has been erected in Belfast, situated in College-square North. It has a frontage of 45 ft. to the street, is about 46 ft. high, and built of light-brown stone from the Scarab quarry in co. Down, with red Dumfriesshire sandstone dressings. Entering through an outer and inner porch, the gallery opens off to the left, the lecture-hall, which is about 21 ft. by 16 ft. Separated from it by a stone arcade, filled in with folding glass doors, is the library, 30 ft. by 34 ft. Behind these rooms is a small office for the librarian, a council-room, cloakroom, and lavatories. On the first floor is the lecture-hall, about 43 ft. by 30 ft., and 10 ft. high, with a musicians' gallery opening off to the left. Behind the lecture-hall are kitchen and serving-rooms. On the second floor is the billiard-room. On the same floor are the caretaker's apartments and another lavatory. The whole building is lighted by electricity. The architect is Mr. William J. Fennell. On the front of the building are four heads, life size. They are Professor Redfern and the late Professors Andrews and Gordon, and Dr. Henry MacCormac.

HOSPITAL AND SANATORIUM, WEYMOUTH.—On the 19th inst. this building was opened. It is situated at Greenhill, and faces the south-east. It is symmetrical in design, with a main central entrance and hall, with waiting-room and matron's room, a central staircase and corridor leading right and left to the wards. The four large wards, each 48 ft. and 24 ft. and 12 ft. high, containing twelve beds, have windows on either side, and in addition a bay window at the south end. The fireplaces are in the centre of the wards, and the floors are of polished wainscot oak. Adjoining each ward is a nurse's duty room. The lavatory and bathroom blocks are isolated by a cross-ventilated passage, the walls lined with white glazed bricks. In the central part of the building on the first and second floors are small wards with duty-room adjoining, and rooms for the matron, nurse, and domestic servants, with separate bathroom and lavatory accommodation. The operating theatre, with aesthetic and sterilising apartments communicating, are on the first floor. The kitchen department is centrally situated on the ground floor at the back of the main corridor in a one-story building, and up light. On the ground story building, and up light, are day and dining-rooms for convalescents, with easements leading direct into the gardens, and with cloakroom and lavatories. Accommodation is also provided for outpatients, consisting of waiting-room, private-room, and dispensary. The exterior walls are faced with red bricks relieved with stone, and the roof covered with Breckley tiles. The builders are Messrs. Cusston & Co., Lancaster-gate, W.; the hot-water work was carried out by Messrs. Rosser & Russell, Charing-cross, S.W.; and the architects are Messrs. Crickmay & Sons, of Weymouth and Westminster.

INSURANCE OFFICES, BELFAST.—New offices for the Ocean Accident and Guarantee Corporation, Limited, have been built at the corner of Clarendon-street and Donegal-square, East, Belfast. The street is Tudor in style, rising to the height of 12 ft., and containing five stories and an attic. Its walls are composed of Ballochmyle sandstone. As seen from the street a feature of the building is the tower, terminating in a finial bearing the figure of a ship. The frontage in Donegal-square East is about 70 ft., and that in Clarendon-street 60 ft. Massive mullioned projecting windows, fitted with steel casements, relieve the general outer view, whilst the skyline is diversified by means of turrets and gables. On each side of the doorway the arms of the Company, supported by mermaids, are placed, and the balcony is supported by bracket busts of their Majesties the King and Queen and the late Queen Victoria. The roof is covered with Pease's "Perfecta" red roofing tiles, supplied by Messrs. W. D. Henderson & Sons, Belfast, who were also responsible for the asphalt work in the basement. There are on the ground floor of the building three shops, the entrance being by a double-recessed doorway leading into a vestibule whose walls are lined with marble. Approach to the vestibule is by means of a large lift nearly 7 ft. square, and worked by electricity supplied by the Corporation. In addition, there is a fireproof staircase rising to the top of the building. The company's own offices are panelled in mahogany to a height of 8 ft., the ceiling being similarly treated in Old English style, being similarly panelled. The secretary's and inspectors' offices adjoin. The strong room, situated in the basement, is formed of steel, and has a length of 30 ft. by 15 ft. wide and 9 ft. high, resting on a series of steel bars. The entire work was carried out by Mr. Robert Corry from the plans and specifications drawn by Messrs. Young & Mackenzie, Belfast. The plumbing was entrusted to Mr. John Dwyling, Belfast; the tiling to Messrs. Riddell & Co., Donegal-place, who also supplied the wrought-iron banisters for the staircase; and the stained glass to Messrs. Ward & Partners. The carving was carried out by Messrs. Winter & Thompson, Belfast, and Mr. W. T. Coates, agent for the Waygood and Olds Company, was responsible for the lavatory lift. The marble flooring came from Mr. J. F. Ebner's works, for which Mr. W. J. Shaw is the local agent.—*Irish News.*

EDINBURGH AND DISTRICT WATER TRUST NEW OFFICES.—The Edinburgh and District Water Trust have recently removed into new premises in St. Giles-street. The offices formerly occupied by the Trustees in the Royal Exchange being required for other purposes, and the business of the Trust having very greatly extended, it was found necessary to acquire other premises. The Trustees have secured the properties some time ago occupied by the *Courant* newspaper, and these buildings have been reconstructed to suit their requirements. On the ground floor, with entrance from St. Giles-street, is a large office for rate collecting and other business of the Trust, along with accommodation for the staffs of the Treasurer, Collector, and Surveyor. Separate entrances and exits are provided. Adjoining is the office of the works department, situated for the general public and tradesmen who are frequently in communication with this office. The first floor is adapted as a boardroom, 28 ft. by 10 ft., for the general meetings of the trustees, and adjoining is a committee-room communicating by folding doors, enabling these

rooms to be thrown into one apartment on special occasions. There is also provided rooms for the treasurer, collector, and superintendent of works, besides an office for clerks and draughtsmen, and cloakroom accommodation. On the second floor is the caretaker's house, typists' room, and stores. The alteration and reconstruction of the buildings have been carried out from plans prepared by Messrs. David and John Bryce, architects. Messrs. J. Kinnean, Son, & Co. were the general contractors for the works.

PUBLIC LIBRARY, Tooting.—A new public library has been opened in Mitcham-road, Tooting. The building is of red bricks with terra-cotta facings, and includes a reading-room with newspaper stands. The reading-room is separated by a deal and glass partition from the leading department, which has shelving accommodation for some 10,000 volumes. The work has been carried out by Mr. Walter Wallis, from plans provided by Councillor Wm. Hunt, the architect for the work.

HOTEL, WEST KENSINGTON.—The Three King's Hotel, which adjoins the West Kensington District Railway Station, in the North End-road, has been reconstructed and reopened. The principal elevations are of red brick, with Portland stone dressings. There are five wings and a grand saloon. From the grand saloon the dining saloon (with accommodation for eighty diners) is reached. The kitchen is over the first floor, and communicates with the dining saloon by means of a lift. The grand saloon also communicates with the billiard-room. The lighting throughout is by means of electricity. The installation of which has been carried out by Mr. C. Thornton, of Chiswick. The builder is Mr. A. E. Flexman, of Shepherd's Bush; and the architects are Messrs. Richardson & White, of Hammersmith.

PAROCHIAL HALL, HALIFAX.—The opening ceremony of the New Parochial Hall in connexion with St. Michael's and All Angels' Church, Southowram, Halifax, took place recently. The building, designed by Messrs. Walsh & Nicholas, together with the adapted old school premises, new furniture, &c., will cost about 1,463l.

STAINED GLASS AND DECORATION.

WINDOW, CLEWER ST. ANDREW'S CHURCH, WINDSOR.—The Bishop of Reading recently dedicated a stained glass window in Clewer St. Andrew's Church, Windsor, erected by his son, Mr. W. Glover, F.R.I.B.A., in memory of the late Mr. William Glover, who held office as Chaplain-in-Ordinary to Queen Victoria when he died in 1894, and to whose memory her late Majesty caused to be placed on his tombstone the inscription, "For many years a faithful, devoted servant to Her Majesty Queen Victoria."

NEW REREDOS.—The altar of the chapel of the Sacred Heart in St. Charles' Church, Upper Ogle-street, London, commenced in 1893, has now been completed by the erection of the reredos, from the designs of Mr. S. J. Nicholl, the architect of the entire work. The reredos forms a screen extending across the chapel, and rising to the springing of the vaulted ceiling, and comprises the arms of our Lord, and of four angels carrying the emblems of the Passion, enclosed in niches, with tabernacle work and other accessories. The work was executed by Mr. A. B. Wall, of Cheltenham.

MEMORIAL WINDOW, HALIFAX.—In the south aisle of St. Augustine's Church, a memorial window, paid to the memory of Mr. Rowley, has just been unveiled. The window consists of two lights, one of which contains a figure of St. Paul, the subject of the other being St. Augustine, the patron saint of the church. Under the window there is a brass plate bearing an inscription. The window has been executed by Messrs. Powell Bros., of Leeds.

FOREIGN.

FRANCE.—M. Marcheix, assistant curator of the library and museum of the Ecole Nationale des Beaux-Arts, has been appointed curator in place of the late M. Muntz. Three new rooms are to be opened at the Versailles Museum, in the north attic; they will be devoted to works of the reign of Louis XIV.—battle pieces, genre subjects, and statues by Rigaud and Laguerre, &c.—The municipality of Coulommiers has opened a competition for the construction of a new theatre. Important works are to be commenced in the Maritime Alps, to bring to Cannes the water of the Siagne and the Loup.—The Municipal Council of Bordeaux has decided upon opening out an important new street from the Midi railway-terminus to the Place de la Comédie.—The town of Cete is about to erect a municipal theatre at a cost of about 1,700,000 fr.—The statue of Balzac, by Falguère, was inaugurated on Saturday last at Paris.—In the course of the excavations for the third section of the metropolitan railway, the piles have been discovered which formed part of the foundations of the ancient Porte du Temple, of the time of Charles V.—M. Feraud has been elected President of the Société Nationale des Architectes de France for 1903.—The exhibition of the Société des Artistes Lyonnais will be held in the Place de la République from May 10 to May 20. The International Art Exhibition at Marseilles will open at the Alhambra, Marseilles, on January 31.—The official opening of the Petit Palais is fixed for

December 11.—M. Frémiet, the sculptor, has offered to the city of Paris the model of his statue of Du Guesclin, the bronze of which has been erected at Dinan. The model will be set up in the Petit Palais along with the same sculptor's "Héraut d'armes."

MISCELLANEOUS.

STUDENT'S COLUMN.—Our "Student's Column" article is unavoidably held over until next week.

GUILD OF HANDICRAFT.—The exhibition of the Guild of Handicraft at the Woodbury Gallery in New Bond-street, previously noticed in our columns, is to be kept open till December 10. New exhibits have been added, including jewellery, enamels, silver work, furniture, mahogany, &c.

WORKHOUSE EXTENSION, CHELSEA.—At a recent adjourned meeting of the Chelsea Board of Guardians, a communication was read from the Local Government Board approving the plans relating to the extension scheme proposed to be carried out at the workhouse of the parish of St. Luke, Chelsea. The Chairman said it was extremely gratifying to them to think that the plans should have been returned to them without the slightest alteration, and asked permission to call the architects in and signify the Board's approval of their work. Permission having been granted, Mr. Lansdell (Messrs. Lansdell & Harrison) was called in, and the Chairman said the Board wished to express their pleasure at the success of the plans. In the whole of his career he (the chairman) had not known a case where the plans submitted to the Local Government Board for such a scheme as that had been returned without some alterations being asked for. Mr. Lansdell briefly thanked the Board and withdrew.

INCORPORATED CHURCH-BUILDING SOCIETY.—This Society held its usual monthly meeting (the first of the year) on Thursday, the 27th inst., at the Society's house, 7, Dean's-yard, the Rev. Canon J. Erskine Clarke in the chair. Grants of money were made in aid of the following objects, viz.:—Building new churches at Alexandra Park, St. Saviour, Wood Green, Middlesex, 100l. for the first portion; Kighley, A. Saints, Yorks, 60l. for the first portion; and Old Trafford, St. Hilda, Manchester, 100l. for the first portion; and towards enlarging or otherwise improving the accommodation in the church at Cudworth, St. Michael, near Ilminster, Somerset, 25l.; Lower Guiting, St. Michael, near Cheltenham, 25l.; and Saintbury, St. Nicholas, Gloucester, 10l. Grants were also made from the special Mission Buildings Fund towards building mission churches at Ayresome, near Louth, 20l.; and Gosberton, near Spalding, Lincolnshire, 30l. The following grants were also paid for works completed:—Little Oakley, St. Mary, near Harwich, 50l.; Morecambe, St. Barnabas, Lancashire, 80l.; Albury, St. Michael and All Angels, near Shrewsbury, 25l.; Highbury, St. Oswald, Durham, 45l.; Snettisham, St. Stephen, near Birmingham, 150l.; Worlington, All Saints, near Soham, Cambridgeshire, 25l., making in all 401l.; Battersea, St. Bartholomew, Surrey, 300l.; Horton, St. Anne, Cambridgeshire, 10l.; Chilchester, St. George, 25l.; Compton Martin, St. Michael, near Bristol, 30l.; Gunness, St. Barnabas, near Doncaster, 51l.; Weston-super-Mare, St. Saviour, Somerset, 60l.; Cley-next-the-Sea, St. Margaret, Norfolk, 30l.; Shotton, St. Ethelwold, near Hawarden, Flint, 10l.; Weeke, St. Paul, near Winchester, 50l.; and Walthamton, St. Luke, Essex, 50l. In addition to this, the sum of 1,057l. was paid towards the repairs of twenty churches from trust funds held by the Society. The Society likewise accepted the trusts of sums of money as repair funds for the churches of St. John the Evangelist, Kenilworth, and St. Paul, Walkden Moor, Lancs.

METROPOLITAN STREET TRAFFIC.—A correspondence has recently passed between Mr. W. Rees Jeffreys, Hon. Secretary of the Roads Improvement Association, and the Chief Commissioner of Police of the Metropolis, in which the latter's attention was drawn to the fact that the collection of statistics of street traffic was quite a neglected branch of public administration, and put forward a proposal that in London, where the street traffic problem is so acute, a periodical census of traffic should be taken by the police. The Chief Commissioner was asked whether it would be possible to arrange for the collection and publication of such statistics by the police at regular intervals, and also whether another copy of the circular, dated August, 1898, addressed to railway companies, carmen, and others, could be issued; and, finally, the Roads Improvement Association desired information as to the number of drivers of slow-going vehicles who had been prosecuted by the police, since the issue of the circular in 1898, for obstructing the traffic by not keeping to the left or near side of the road. In his reply, the Commissioner expressed his willingness to reissue the circular in question, but pointed out that this circular is more of the nature of an invitation, the police not having power to enforce the suggestions contained therein. In the concluding letter of the correspondence the Association expressed the opinion that the police authorities should have the assistance of an advisory committee appointed by the Secretary of State and representing the various classes of traffic, in order to reconcile conflicting interests.

THE LATE MR. BENTLEY.—We are glad to hear that there is an intention on the part of some architects who are admirers of the genius of the late Mr. Bentley, to combine together to secure the erection of a fitting monument to him in the interior of his great church at Westminster.

POLLUTION OF THE RIVER LEA.—In reference to the polluted condition of the River Lea between Stansted Lock and Hertford, an "urgency inspection," it is reported, took place recently by a party of gentlemen representing the Lea Conservancy, the East London Water Company, and other interested persons, the result of which was to confirm the reports. The Manifold Ditch is connected with the Hertford Sewage Works, and the Corporation of that town seems to have been regarded as the cause of the pollution, although some time back one of the High Court judges failed to coincide in this view. The East London Water Company is directly concerned, its intake being at Ponders End, below the polluted area, and for some time past the directors have been endeavouring to arrive at an arrangement with the Hertford Corporation. It is stated that an agreement has been entered into under which a much desired improvement will be carried

APPOINTMENT OF SANITARY INSPECTORS.—The Local Government Board has sanctioned the appointment of the following sanitary inspectors:—Messrs. A. Wheaton and J. Dunworth, City of London; Mr. J. H. Fowles, Kensington.

SLATE TRADE.—The Festivity price-lists for the calendar year have been issued, showing an advance, especially in mediums and seconds. The Bangor and Carnarvon lists may be expected next week. Demand is very brisk, and the importation of foreign slates very small.

THE CARPENTERS' COMPANY.—The examination in sanitary building construction, held annually by the Carpenters' Company, took place at their hall last week. Among the examiners who supported the chairman, Professor Roger Smith, were Professor Henry Robinson, Mr. John Slater, Messrs. A. Wynter Blyth, John Willson, and Bartlett. The number of candidates presenting themselves was the same as last year, and one came from such a far distant colony as Hong Kong, while others came up from Worthing, Portsmouth, &c. The average number of marks obtained was rather higher than that in previous years. The following is the list of successful candidates arranged in order of merit:—Silver Medals: Messrs. G. H. Griffiths, A. J. Carter, and Jas. Lawrence. Bronze Medals: Messrs. J. H. Sills, C. W. Woodhouse, and James C. Wall. Certificates: Messrs. W. H. Wood, J. A. Chubb, A. Stewart, A. L. Carter, F. E. Glover, F. Fisher, F. Harris, and S. Savill.

HAMILTON ARTS AND CRAFTS ASSOCIATION.—The opening address by the President of this Association, Mr. James Lockhead, was delivered on the 17th inst. The programme for the session includes papers on "Shoring, Scaffolding, &c.," on "The Law and the Builder," "Tenements for the Working Classes," "Aesthetics," "Sanitation," and other important subjects.

SEWERAGE SCHEME, LICHFIELD.—Mr. R. H. Bicknell, Local Government Board Inspector, has held an inquiry at Lichfield into the application of the City Council for sanction to a loan of 7,000l. in connexion with the sewerage scheme. The application was the result of a memorial presented to the Local Government Board about a year ago by the Bishop, Dean, residents of the Close, and other prominent citizens, alleging serious defects in the sewerage system, and the various matters. The Corporation thereupon instructed Mr. J. R. Elliott, A.M.Inst.C.E., of Nottingham, to thoroughly investigate and report generally upon the matter, with the result that the complaints were found to be justifiable, and various works were recommended to put the city into a good sanitary state. The chief works necessary are a new low-level intercepting sewer to effectually drain the low-lying districts, the taking up and relaying of the sewers that have backfalls or insufficient falls, and the provision of manholes, lampshafts, and ventilators; in some cases the existing manholes being about a mile apart. The Inspector went thoroughly into the details of the various proposals, and at the conclusion of the inquiry said that he thought the Corporation had met the memorialists very thoroughly, and he wished particularly to compliment Mr. Elliott upon the excellence of his report, and the careful and fearless manner in which he had brought all the matters he considered necessary before the Council. There was no opposition to the application.

CAPITAL AND LABOUR.

PLUMBERS' LOCK-OUT, LIVERPOOL.—Some time ago a small dispute arose between Messrs. Tomkinson & Sons, builders, and some of their plumbers respecting the amount of money due to the latter. The board of arbitration, consisting of four masters and four employees, appointed to interpret the rules affecting such a case as the one in question, was not called upon to act, the operatives employed on Messrs. Tomkinson's jobs and at their shop being, instead, called out. This has led to an extension of the trouble, the Master Builders' Association of Liverpool having issued a forty-eight hours' notice, expiring on Saturday last, to lock out

he whole of the operative plumbers in the Liverpool district unless the men at Messrs. Tomkinson's returned to work. This they had not done up to Saturday, and consequently the lock-out notice took effect. Upwards of 300 plumbers are affected.

LEGAL.

BUILDER'S COMPLAINT AGAINST A CONVICTION BY JUSTICES.

On the 21st inst. Mr. Abinger moved before a Divisional Court of King's Bench, composed of Mr. Justice Wills and Mr. Justice Bruce for a rule nisi calling upon the Justices of the County of Middlesex sitting at Brentford, to show cause why a writ of *certiorari* should not issue directing them to bring up for the purpose of being quashed a conviction which they had entered against Mr. Smith, a builder, of Hanwell. Mr. Abinger stated that Mr. Smith had recently erected forty-two houses in the neighbourhood of Hanwell, and he was summoned before the Justices of Brentford under one of the by-laws of the Hanwell District Council, for not having given notice to the Local Authority within reasonable time of the completion of a building. When the defendant appeared before the Justices, the Chairman, Mr. Montague Sharp, directed him to go into the dock. The defendant hesitated, and the Chairman again requested him to go into the dock. The Surveyor of the Local Authority was called, and, in reply to the defendant, he admitted that the house in question had not been completed. The defendant submitted that the reply of the witness was an answer to the summons; whereupon the Chairman remarked that it was not an answer, as the defendant had allowed the house to be occupied. The defendant protested that he had not, and said he had documents showing that he was endeavouring to get rid of the man who had entered into possession without his permission. A letter written by the defendant to the man who had gone into the house without permission was read, and it showed that the defendant desired to get the man out because the house was not fit for occupation, and that he threatened to apply for an ejectment order. That letter, the chairman said, convicted the defendant, and in the result the defendant, without being allowed to call his evidence, was convicted and fined. The learned counsel submitted that there was no evidence on which the justices could convict the defendant, and that there had been a miscarriage of justice.

In the result, the Court granted a rule nisi for a *certiorari*.

MANDATORY INJUNCTION GRANTED AGAINST A DISTRICT COUNCIL.

MR. JUSTICE JOYCE, in the Chancery Division on the 20th inst., concluded the hearing of the case of *Leyman v. the Hestle Urban District Council*, an action by the plaintiff—the owner and occupier of a house and grounds at Hestle, near Hull, situated on the south side of the high road leading from Hestle to Hull—for a mandatory injunction to compel the defendants to remove a public urinal the defendants had erected in August, 1901, and had since maintained, on the southern side of the highway close to the northern boundary of the plaintiff's property, and within 12 ft. of his entrance gates the entrance of the urinal facing the highway. The plaintiff's case was that the urinal, in consequence of its position at his entrance gates and its use by the public, constituted a serious nuisance and injury to him in the enjoyment of his house and grounds.

The defendants denied that the urinal had created a nuisance, and pleaded that they had erected it under the provisions of Section 39 of the Public Health Act, 1875. They further said that the situation had been chosen after careful consideration, and that it was a necessity to the neighbourhood.

His lordship, after hearing a great mass of conflicting evidence as to whether the urinal, in fact, was a nuisance to the plaintiff, held, as a fact, that it was by reason of its position and construction a serious annoyance to the plaintiff and those inhabiting his house. He thought that it materially interfered with the ordinary comfort and convenience of the plaintiff in the enjoyment of his property. There was no legal necessity for the defendants to put the urinal in this road at all, and if they could not put it anywhere without creating a nuisance, then they could not do it at all. There would be a mandatory injunction against the defendants to remove the urinal within six weeks.

Order accordingly.

Mr. Hughes, K.C., and Mr. Bovill appeared for the plaintiff; and Mr. Younger, K.C., and Mr. Cozens-Hardy for the defendants.

APPEAL BY AN ENGINEER AND MANUFACTURER OF CARPENTERS' TOOLS.

The hearing of the case of *Reynolds v. William Ashby & Son, Ltd.*, was concluded in the Court of Appeal, composed of the Master of the Rolls and Lords Justices Romer and Mathew, on the 21st inst., on the application of the plaintiff for judgment or new trial on appeal from a decision of Mr.

Justice Lawrence in the King's Bench Division at trial with a special jury.

The short facts were as follows:—In the year 1900 the lessee of a piece of land at Reading, who was building a factory upon it, mortgaged the premises, together with the fixtures thereon, to a person who subsequently assigned the mortgage to the present defendants. Between the time when the mortgage was executed and the assignment, the defendants, the plaintiff, an engineer and manufacturer of carpenters' tools, let on hire to the mortgagor, the lessee of the factory, certain carpenters' machinery and apparatus, viz., saw-benches, a tenoning machine with cutters and self-contained counter-shaft, and a panel-planing and thicknessing machine. The lessee, by the hiring agreement, agreed to make periodical payments for the hire, and when the payments were completed the machinery and apparatus were to become the sole property of the lessee, but until the last payment the machinery and apparatus were to continue to be the sole and absolute property of the plaintiff. By the agreement the plaintiff had power, on the happening of certain events, to put an end to, and to hire and to take possession of the machinery and apparatus. The machinery and apparatus was fixed or set up in the factory in this way. Each machine had a concrete bed laid for it, and was secured with upright iron bolts fixed in the concrete. There were holes in the plates to fit the bolts, and the bolts were secured by nuts screwed on to them, the machine being thus placed in position. The machines were worked by power conveyed by means of a band, and the evidence was that the machines could be removed by removing the nuts. Events happened which gave the plaintiff power to put an end to the hiring agreement and to demand the return of the machinery and apparatus. Prior to this, however, the original lessee took possession of the premises and of the plaintiff's machinery and apparatus, and declined to give them up, on the ground that they had been so affixed to the freehold that they became part of the land and passed under the mortgage. The present action was then brought by the plaintiff to recover the machinery and apparatus, their value, and damages for their wrongful detention. At the trial Mr. Justice Lawrence held on the authorities that there was no question for the jury, and that the machinery and apparatus were fixtures and passed to the mortgagee and from him to the defendants by assignment. He accordingly entered judgment for the defendants. Hence the present appeal of the plaintiff.

At the conclusion of the arguments of Counsel the Master of the Rolls, in giving judgment, held that Mr. Justice Lawrence was right in withdrawing the case from the jury. His lordship (the Master of the Rolls) said the rule seemed to be that articles not otherwise attached to the land than by their own weight were not to be considered as part of the land unless the circumstances were such as to show that it was intended all along to continue a chattel, the onus lying on those who contended that it was a chattel. Therefore that being the presumption arising from the fact of attachment, the onus was cast on the plaintiff of showing that it was not a fixture. The plaintiff gave no such evidence in the present case. He thought the learned judge's decision must be affirmed and the appeal dismissed.

The Lords Justices concurred, and the appeal was accordingly dismissed with costs.

Mr. H. Reed, K.C., and Mr. Rowlatt appeared for the appellant, and Mr. Hamilton, K.C., Mr. Arthur Powell, K.C., and Mr. J. H. Keeling for the respondents.

EMPLOYERS' LIABILITY ACT.

LOOSE BRICKS UPON A WALL—QUESTION AS TO TRADE CUSTOM.

At the Brompton County Court (London) on Monday, before Judge Stonor, Walter Henry Derbyshire, a bricklayer, 156, St. James' road, Holloway, N., brought an action, under the Employers' Liability Act, against Messrs. Leslie & Co., Ltd., builders and contractors, Kensington-square, W., claiming damages in respect of personal injuries, said to have been caused through negligence on the part of the defendants or their servants.

Mr. Chester Jones, counsel, appeared for the plaintiff; and Mr. E. F. Lever, counsel, for the defendants.

Plaintiff's counsel explained that his client had been employed by the defendants upon some building operations at the Science and Art Department, South Kensington. On July 11 last the man was building a circular wall in an excavation, above which was a high wall in the course of construction, and near the top of which a carpenter was laying timber for concrete flooring. Upon the top of the unfinished wall some bricks had been temporarily and loosely laid, and one of these, it appeared, was knocked so that it fell upon the plaintiff's head, inflicting serious injuries. The negligence, which they complained of was in sending the man to work below a wall upon which loose bricks were laid as described, and not erecting a covering of some kind to protect him in case a brick should fall.

The plaintiff bore out counsel's opening statement. He added that it was usual in the trade to

board over workmen if brickwork was being done above them, as in the case in question.

In cross-examination, the plaintiff admitted that there was nothing unusual in bricks being placed temporarily upon a wall in course of erection, and that it was usual to leave a space of about 9 in. between a scaffold and a newly-built wall.

Henry Offord, another bricklayer who was working on the job, maintained that, although it might not be right to place bricks upon a partly-built wall while the scaffolding was being shifted, such was often done.

Counsel for the defence submitted that there was no evidence of negligence, for it appeared that the brick was knocked off inadvertently. The evidence was that to place bricks on a wall while the scaffolding was being shifted was a custom of the trade, or at least a trade expedient.

The Judge: Why should the loose bricks be left on the wall in such a way?

Counsel for the defence: They were left there in view of subsequent building. The learned counsel went on to say that no one was working on the wall in question at the time of the accident. The whole question was whether the leaving of loose bricks upon the wall amounted to negligence, or whether leaving the bricks unguarded amounted, under the circumstances, to a defect in the ways, works, and means. The plaintiff's own witnesses had admitted that bricks were not infrequently upon a wall in the case in question, and it was trusted to this old-established custom of the trade, for where they found such a custom it was fair to assume that it was not a dangerous one.

For the defence, William Dodds, foreman bricklayer on the job in question, stated that it was a custom of the trade to put bricks temporarily upon a wall in the case in question, and that a scaffold was being taken down or raised, and it was not usual to place a guard or anything to prevent the bricks falling.

Cross-examined: Ordinarily, when bricks were so placed, there would be no men working beneath. When men were working below such a wall upon which loose bricks were placed, it was a usual "sheet" them over in some way; and if he had known that there was any danger in the way or position that the plaintiff was working he would have put up something to protect him.

Re-examined: There was, however, no one working on the wall at the time of the accident.

The Judge: That may be, but men were working near the brick got knocked off. It is evident that it could not go over of itself. I do not know about the custom of the trade, but I think that this man ought to have been protected. I find for the plaintiff for 15s., as claimed, with costs.

ACTION BY AN ARCHITECT.

The case of *Homer v. Atleek* came before Mr. Justice Darling and a common jury in the King's Bench Division on the 25th inst. Mr. Spinks appeared for the plaintiff; and Mr. Pickford, K.C., and Mr. Sanderson for the defendant.

Mr. Spinks, in opening the case, said the action was brought by Mr. Chas. Edward Homer, an architect in the City, against Sir Robert Atleek, Bart., for remuneration for work done by the plaintiff for the defendant. Sir Robert Atleek was the owner of a very large estate near Bournemouth, and he was desirous of having it developed by erecting houses upon it so as to obtain ground rents. He had heard that Mr. Homer had been very successful in developing a similar estate in Essex, and the defendant's solicitors got into communication with the plaintiff and asked him to let him see the plans of the houses that had been erected at Clacton-on-Sea. On November 24, 1900, defendant himself called upon the plaintiff at his office in the City, and introduced himself. He said he wanted twenty houses put up before the summer season, and he wanted the plaintiff to get on with the designs as soon as possible. Defendant asked plaintiff particularly to get builders who would enter into agreements for the purpose of erecting the houses. He also asked the plaintiff what were the terms of the work at Clacton-on-Sea. Plaintiff replied that for every builder he introduced he usually got a certain commission. He also got 5 per cent. on contracts for superintendence. Plaintiff told defendant that he would take out of the money due to the builder the commission due to plaintiff. Sir Robert said he would arrange with the Birkbeck Bank to advance him 20,000l.

The plaintiff and Sir Robert went down to Bournemouth three times and inspected the site, and Sir Robert's name was put on the plans, so there could be no dispute as to the defendant accepting responsibility for them. The plaintiff had interviewed at least a dozen builders. Three of them agreed to take plots and a Mr. Gibson and a Mr. Bent actually signed agreements. The other builder, a Mr. Birch, would have been willing to sign the agreement, but it was put off owing to the action of, or through the fault of, defendant's solicitor. Sir Robert afterwards said he threw up the whole scheme, and would not go on with it, and the present action was brought by the plaintiff to recover the amount due to him.

In answer to his Lordship, Mr. Sanderson said he disputed the plaintiff's charges as well as the defendant's liability.

Mr. Spokes said that he did not mind referring the items, but on the question of whether his client was to be paid or not he wished to go to the jury. His Lordship said that he should not let the matter go to the jury, as it would be inconvenient. If the parties could not agree on some one to whom the whole matter could be referred he should send the case to an Official Referee.

After a short consultation between counsel, Mr. Spokes said it had been agreed that the case should go to Mr. Versey, the Official Referee. He wished his lordship to note that the reference was to be taken as a compulsory reference.

ACTION BY ARCHITECTS.

THE CASE of Owen & Ward v. Davison came before Mr. Justice Ridley and a common jury in the King's Bench Division on the 24th inst. In this case the plaintiffs, Messrs. Owen & Ward, a firm of architects and surveyors, carrying on business at No. 71, Colmore-row, Birmingham, brought their action against the defendant, Mr. A. W. Davison, a London licensed victualler, to recover 101*l.* for work done as architects in compliance, as it was alleged, with the instructions of the defendant.

The defendant denied that he gave the instructions or that the work was done. He also alternatively pleaded that if the instructions were given and this work done it was agreed that he and the plaintiffs were to form a syndicate and to share everything on a 50-50 basis.

The plaintiff's case was that the defendant on June 21 last year instructed them to prepare plans for the building of a new hotel at Benfleet, Essex, to be known as the Thundersly Park Hotel. The plans were prepared and submitted both to the defendant and the Local Authorities, and by both approved. The local authority, however, subsequently insisted upon the local authorities, who insisted upon the surrender of a licence prior to the granting of a new licence for the hotel, and the defendant deferred the proposed construction of the building.

The plaintiff, Mr. George Frederick Ward, gave evidence in support of the claim, and denied any arrangement as to the formation of a syndicate, in which his firm was to take part, with the object of financing the concern.

The defendant's evidence was to the effect that, through a man named Bell, whom defendant regarded as plaintiff's agent (but which agency plaintiff denied), the arrangement was that defendant should purchase the site and manage the hotel for twelve months, after which it was to be disposed of. Defendant denied that on a visit to Benfleet with Mr. Ward he had instructed that gentleman to prepare the plans in question.

In the result the jury, after two and a half hours' deliberation, returned a verdict for the defendant.

Judgment accordingly.

Mr. P. S. A. Hickey and Mr. Buzzard appeared for the plaintiffs, and Mr. Lewis Thomas for the defendant.

THE MANUFACTURE OF ACETYLENE GAS.

In the Court of Appeal, composed of Lords Justices Vaughan-Williams, Stirling, and Cozens-Hardy, in the 26th inst., the hearing was concluded of the case of the Acetylene Illuminating Co., Limited, v. the United Alkali Co., on the appeal of the plaintiff company from a judgment of Mr. Justice Buckley in the Chancery Division, dismissing the action brought to restrain the alleged infringement of Willson's patent of 1894, relating to the manufacture of carbide of calcium, a substance which has come largely into use during recent years.

Mr. Fletcher Moulton, K.C., Mr. Roger Wallace, J.C., and Mr. A. Colefax appeared in support of the appeal; and Mr. Cripps, K.C., Lord Robert Cecil, J.C., Mr. A. J. Walter, and Mr. Bucknill represented the respondents.

Mr. Moulton, in opening the case, said that the plaintiffs were the owners of a patent, No. 16,705 of 1894, for the manufacture of calcium carbide, a substance which had come into very large commercial use during the last few years. Nothing would turn specially upon the chemical points in this case, but, shortly, the nature of the substance, and its use was as follows: It was a very extraordinary body, which had the property when water was thrown upon it of giving off a highly inflammable gas—probably the finest illuminant known—which was called acetylene. It was a very curious instance of well-known phenomena in chemistry. It was a combination of carbon and the metal which were the basis of lime, and its curious properties were due to the fact that at a low temperature the avidity of calcium for oxygen was much greater than that of carbon. The consequence was that when water was thrown upon it, so great was the avidity of the calcium for oxygen that it tore apart the water into its constituents and left the carbon to combine with the hydrogen. It was a body that had been known for many years as a chemical curiosity, but this was the first time it was put to use in manufacturing.

It was done by passing a very powerful electric current through it and so to generate an enormous degree of heat. Although at a low temperature the avidity of calcium for oxygen was greater than that of carbon, at a very high temperature the avidity of

carbon was much greater than that of calcium, so carbon and lime were put together and heated to a tremendous temperature in the electric current. The carbon took all the oxygen. It was an instance of the changes in the avidity for oxygen according to the temperature. That had given a practical method of manufacturing calcium carbide.

Lord Justice Williams: Why was it called acetylene, and what does it mean?

Mr. Moulton was quite unable to say, but perhaps it was because it was supposed to be connected with the acetic acid series, or something of that kind. The parent of a chemical product had a perfect right to name that child; but it was difficult to say how the product got its name. The enormous advantage of calcium carbide was that gas could be conveyed in a solid form. The process was of the greatest commercial value, and one of the very largest water powers in the world in Canada was now harnessed to grinding out this calcium carbide.

Lord Justice Vaughan Williams asked if the calcium carbide had been obtained by other methods?

Mr. Moulton said that it was arrived at before, but he could not say how.

Lord Justice Vaughan Williams: It has no connexion with water gas?

Mr. Moulton: Oh no.

Lord Justice Vaughan Williams: I am not surprised that you disclaim all connexion with water gas.

Mr. Moulton said that the curious thing was that in this action the case of both sides was that Mr. Willson, by whom the patent was taken out in 1894, was the inventor of this process. The question really turned on whether or not he allowed his knowledge to slip out before the patent or whether the patent ought to be dated at such a date that some one coming behind him as to time came before him by way of anticipation. The two anticipations relied on were an earlier patent of Willson's in America, which was said to anticipate the patent of 1894, and a French publication, that publication coming before the date of the American patent and the patent in question. In December, 1892, a Frenchman named Moissan announced a series of papers on the subject, in which he pointed out that the essential thing in order to obtain crystalline carbide was to obtain sufficient heat. The material was subjected by him to the thermal action of the electric arc, and his idea was to dispense with the passing of the current through the material. On the other hand the patentee said—

"In carrying out my invention I employ a suitable electric furnace, such as a Siemens's arc furnace, and in its chamber I place lime and carbonaceous matter, and pass a powerful electric current through it in order to generate an enormous degree of heat." He was the first person to tell the world that a current of electricity passing through the material would produce calcium carbide. There might be other means of producing it, but the patentee's method was the only way economical enough to make the product of commercial value. Moissan's was what was known as the "toasting" method, and in that a commercial current was used to produce a laboratory specimen. The learned counsel contended that the defendants had infringed Willson's 1894 patent, and the fact that defendants used an incandescent furnace and not an arc furnace made no difference on the question of infringement.

Mr. Cripps, on behalf of the respondents, contended that Mr. Justice Buckley's judgment was right in every particular. He submitted that there was no subject matter of a patent in the plaintiff's process, and that even if there were, the patent had not been infringed by the defendants. The production of calcium carbide was not new, and the use of an old, well-known form of electric furnace, namely, Siemens's arc, to produce it was not a discovery which justified a patent. There was no suggestion of the slightest difference between the commercial and the laboratory process, and, according to the patent laws of this country, when a scientific discovery had been disclosed any one was entitled to use it for all purposes.

In the result their Lordships held that the patent was bad, on the grounds both of anticipation and want of subject matter, and dismissed the appeal, with costs.

CHELMSFORD ANCIENT LIGHT DISPUTE.

THE CASE of Mayhew v. Green came before Mr. Justice Farwell in the Chancery Division on the 25th and 26th insts, an action brought by John Newton Mayhew, a fishmonger, carrying on business at No. 33, High-street, Chelmsford, which he holds under a lease, claiming a mandatory injunction or, in the alternative, damages against the defendant in respect of the alleged infringement of ancient lights.

It appeared that the defendant is an outfitter, residing and carrying on business at No. 34, High-street, Chelmsford, of which premises he was, as well as of No. 35, High-street, the owner in fee simple. On the north side and in the rear of these premises was a yard, known as Jeffrey's-court, over which both plaintiff and defendant had a right of way, but which did not form a part of either property. The plaintiff complained that in February, 1901, the defendant erected partly on the yard in

the rear of No. 34 and partly on the yard over which the plaintiff has a right of way a building higher than an 8-ft. wall alleged to have formerly been there, and thereby diminishing the light coming to the plaintiff's windows. The plaintiff accordingly asked for a mandatory injunction compelling the defendant to pull down and remove the said building erected above the level of the old wall before mentioned.

Mr. Ruegg, K.C., and Mr. R. G. Davis appeared for the plaintiff; and Mr. C. E. Jenkins, K.C., and Mr. Maclaren for the defendant.

During the course of Mr. Ruegg's opening statement, his lordship remarked that it was a strong thing to ask for a mandatory order after so long a delay, the building complained of having been built in February, 1901.

Mr. Jenkins said that the defendant's building was completed not only before the issue of the writ in the action, but before complaint.

Mr. Ruegg said that the plaintiff on January 12, 1901, wrote complaining that defendant's building would interfere with the access of light to No. 33, High-street.

In the result the parties agreed on a settlement of the case. By consent judgment was entered for the plaintiff for 6*0*l.** with the costs of the action.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

15,060.—AN ELECTRICAL FUSE PLUG: *F. H. Krebs.*

—The plug has a middle cavity, and its lower part is perforated to a determined gauge. Spring arms of the bottom conducting-plate grip the conical lower end of the plug. The plate has a part raised at the middle, to which the fuse wire is connected, for lengthening the wire, and to prevent arcing the upper portion is put into a circular or spiral groove, and is clamped to the terminal. A detachable tubular portion of the plug provides for a variation of the gauge. The fuse plug is arranged so that one can easily replace the lead wire, and the insertion of a wire of larger gauge is obviated.

15,074.—AN APPLIANCE FOR WINDOWS: *J. A. Brooks.*—For maintaining sashes at any height desired without weights or cords, and for preventing the rattling of sliding and other sashes, the inventor secures rubber or similar wheels to the sash that press against the beads or solid frame; the stiles carry sockets, of which the caps hold springs and balls, the latter being forced forwards by the springs into recesses in the frame.

15,098.—A CONTRIVANCE FOR USE WITH FLUSHING APPARATUS: *M. Brook.*—The inventor devises means of closing a gully-trap before flushing. He inserts an elbow which a screw clamp presses against the outlet, a packing-ring and fastening pins being provided. A cover, which is clamped or bolted down, is used for gullies that have seal-plates.

15,112.—AN ATTACHMENT FOR CRANES USED IN EXCAVATING, &c.: *H. O. Balfry.*—The outer end of the bucket-ladder is sustained from the jib-end with a sling fastened at two points, whilst it is pivoted at its inner end to the lower end of the jib. The bearings of the pivot-pin at the inner end of the ladder slide in circular guides, which have their centre the shaft of the barrel, and a screw and nut, or a chain and worm-gearing, adjust the pin in the guides. The excavating-bucket may be mounted so as to cut either upwards or downwards on a roller-carriage, having rollers that run upon the bevelled bottom edges of the beam, or it may be mounted as specified in No. 7,219 of 1900; otherwise a chain of buckets around tumblers at the bottom and top of the ladder is substituted for the one single bucket, and chain-gearing from the shaft rotates the top tumbler. A shoot for the discharge is secured to the upper end of the ladder.

15,130.—MEANS OF WARMING AND LIGHTING ROOMS WITH ELECTRICITY: *A. E. Grenville.*—An openwork casing envelops a frame which is wound with non-oxidising and resistant wire, and thereon is mounted an incandescent lamp in a glazed lantern. The sections of the wire are covered with asbestos thread, and, together with the lamp, are connected in circuit by switches of which the handles project from the sides of the base. Connection with the supply wires is afforded by a plug coupling.

15,155.—CONDUITS FOR ELECTRICAL CONDUCTORS: *H. Hirst and F. Boys.*—The conduits consist of tubes that are joined to one another with socket pieces fashioned with interior ribs; the lengths of the conduits also may have similar ribs. The joints are adapted for turns, elbows, and T-joints, as well as for straight lengths.

15,160.—A GUARD FOR HAND FEELING PLAINING MACHINES: *H. W. Gibbs.*—Of the two plates that constitute the guard, one is joined with pins, and inclined slots to an arm which is pivoted to a bracket, and the other is pivoted to the bracket as well. Springs cause the two plates to bear against the fence. As one feeds the wood along the bench, the pivoted plate of the guard will be pushed back so as to rub against the side of the work; then the other plate will be pushed forwards so as to uncover the cutters, until the studs pass to the opposite ends of the slots, whereupon the arm turns backwards upon its pivot on the bracket.

15,176.—FASTENERS FOR "EMERGENCY-EXIT" DOORS: *H. G. Newman.*—Of the two arms that

carry a push-bar, one is pivoted on to a box or casing and the other on to a bracket affixed to the door. A pair of arms or ears of the former arm are linked to bolts that slide in guides upon the casing, which are fastened to the door, and engage with sockets in the floor and the door-frame.

15,204.—A COATING FOR GOODS OF POROUS MATERIALS: A. Wolf.—The surfaces of articles of stone, plaster, &c., are treated with a preservative and decorative composition made up of resin, stearine, bitumen, creosote, and benzoin, to which pigments may be added. The goods should be heated before treatment, and the coating is to be applied when it is hot.

15,215.—APPARATUS FOR OPENING AND SHUTTING WINDOWS: P. Hesseman.—The two strands of the working wire cord are twisted in opposed directions. One end of the cord is secured in a vertical rod that slides in a slotted guiding tube, and the other end is clamped on to a catch pivoted upon the window with a U-shaped pin that is to be drawn for liberating the window when the bent portion is turned upwards clear from the bracket. The vertical sliding-rod has a handle, and the cord, moving in a guide tube, releases the catch from a striking-plate as the handle is lifted.

15,229.—SWITCHES AND CUT-OUTS: E. E. Bartlett.—A porcelain block which, when pivoted at its one end, will serve for a switch, has at each of its ends a copper plate which is bent so as to provide tongues that will engage with terminal blocks. A fusible strip, fastened with nuts, fits into channels of the porcelain block.

15,245.—PANTOGRAPH AND ITS FITTINGS: Gaultier, Magnier, & Co.—In order that the resistance to the tracing point may be approximated to that of the scribing point during the copying of designs, charts, &c., the tracing point is caused to cut through a sheet of gelatine or celluloid that is laid over the design; otherwise, a sheet of celluloid or tracing-paper on which the design has been drawn is turned face downwards. For reproducing large-sized maps or designs is devised a table that slides upon guides which will moreover slide along other guides, and the entire apparatus may be set so as to turn about a pivot. A cross-bar may be used for the adjustment of the pantograph.

15,258.—HANGINGS FOR ARC LAMPS: S. T. Irwin and Williams & Robinson.—The arc lamp is secured to an insulator, and is electrically connected to a hook and eye on the insulator, which engage with an eye and a hook mounted upon another insulator carried by a fixed tube through which are passed the supply conductors. The wire that sustains the lamp is inserted through an inner guide tube, and is drawn around pulleys to a counter-weight which, after the lamp is lifted into place, will also be lifted and held, the hooks and eyes bearing the entire weight of the lamp.

15,284.—A SANITARY PIPE-JOINT: C. H. W. Biggs.—Relative movement of the spigot and socket is prevented by means of a spiral cavity for the interlocking of the fluid cement with the cement and the composition, the cavity being left by the narrow or broad spiral wall or ridge of the composition; corrugations on the spigot and socket take the composition.

15,316.—A PRESERVATIVE FOR WOOD: C. G. Lawrence and F. McConick.—Pockets for the composition are formed by boring holes in the wood of telegraph and telephone posts, railway ties, &c., and are then filled with an admixture of 10 parts of sodium chloride, 8 of arsenious acid, and 1 of mercury bichloride, with, on occasion, 2 of potassium nitrate and 1 of copper subacetate.

15,368.—A SAFETY DEVICE FOR ELECTRICAL LEADS: Siemens and Halske A.G.—In the case of exposed leads the inventors contrive that the breaking of the wire shall enable the support to swing into contact with a conductor which is connected to the other pole of the generator or to earth. In one form a cross wire, over which is a wire connected to earth, supports the holder; in another form a pivoted arm carries the trolley holder, and conductors at the sides are connected to earth.

15,370.—AN ELECTRICAL CURRENT METER: Siemens and Halske A.G.—Additional force that will lessen sensitiveness with an increase of deflection is provided in an instrument that measures electro-motive force or strength of current, and has a spring control, so that a more uniformly divided scale is supplied for a dynamometer or any instrument after the induction or rotary field kind wherein the deflecting force varies as the square of the current. In one adaptation a weighted arm balances the spring-controlled pointer, whilst another weighted arm tends to move the pointer over the scale from

zero, where it may be stopped with a fixed spring. For the second weighted arm may be substituted an armature attracted by a magnet, and a single intermediate arm may replace the two weighted arms.

15,432.—IMPROVEMENTS IN GRABS: F. K. Hoover and J. F. Mason.—A translating motion, with but slight rotation, is imparted to the jaws of the grab in the early portion of the opening operation, whilst towards the end they are quickly rotated for the dumping of their contents. Bent and pivoted side levers join the front of each jaw to the chain and the bends of the levers that sustain one jaw are pivoted on to other levers joined to the rear of the other jaw. The side levers are also pivoted on to arms that are joined by toggle-levers to a stirrup attached to the opening cable and by other toggle-levers to the shaft which carries a pulley, around which the closing cable passes, and so to pulleys upon the side levers. The closing cable also raises upon the shaft, which is lowered by the opening cable, and the stirrup limits the opening operation.

15,450.—CONVEYANCE AND PILING OF TIMBER: A. J. Tenow and F. E. Flodström.—The boards are raised on to and discharged from live roller ways of which certain parts are so pivoted that one can let them down in order to form a guide, up or down the grain of the boards may be carried. A shaft that is geared to the shaft on to which a movable part of the roller way is pivoted drives the rollers upon that same part.

MEETINGS.

SATURDAY, NOVEMBER 29.

Liverpool Architectural Society (Incorporated).—An excursion to the New Technical School at Wigan. Messrs. Briggs & Wolstenholme, the architects of the Schools, have consented to show the Society over the building.

Builders' 15. 11. 11. Association, Memorial Hall, E.C.—Mr. Ebenezer Howard on "The Garden City Project." 8.15 p.m.

MONDAY, DECEMBER 1.

Royal Institute of British Architects.—Business meeting (1) to announce results of November Examination; (2) Election of candidates for membership; (3) the Practice Standing Committee will make a communication respecting the book on "Dilapidations," compiled by the Committee and now preparing for publication. 8 p.m.

Society of Arts (Lecture Series).—Professor Vivian B. Leves on "The Future of Coal Gas and Allied Illuminants." 11. 8 p.m.

Society of Engineers.—Mr. C. H. W. Biggs on "Depreciation of Plant and Works under Municipal and Company Management." 7.30 p.m.

Liverpool Architectural Society (Incorporated).—(1) Special general meeting to consider and approve the revised schedule of charges, clauses 12 to 19. (2) Mr. T. Maunsell on "Gardens." 7.30 p.m.

Royal Philosophical Society of Glasgow (Architectural Section).—Mr. A. B. McDonald, City Engineer, on "The Sewage Disposal of Glasgow and adjacent Burghs." Illustrated by photographs, &c. 8 p.m.

TUESDAY, DECEMBER 2.

Institution of Civil Engineers.—Mr. T. H. Minshall on "High-Speed Electrical Generating Plant." 8 p.m.

Royal Victoria Hall, Waterloo-road, S.E.—Professor J. W. Hinchley on "Colour and Colour Printing." 8.30 p.m.

WEDNESDAY, DECEMBER 3.

Royal Archaeological Institute.—(1) Mr. C. R. Peers, M.A., F.S.A., on "Benedictine Monastery at Little Malton or 'Gardens.'" 7.30 p.m.

Institute of Sanitary Engineers, Ltd.—General Purposes and Finance Committee at 4 p.m. Election Committee at 5.15 p.m.

Society of Arts.—Mr. Alfred Watkins on "Some Aspects of Photographic Development." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

THURSDAY, DECEMBER 4.

Institution of Electrical Engineers.—Mr. Swinburne's Inaugural Address, postponed on account of his illness from November 13, will be delivered in the rooms of the Institution of Civil Engineers at 8 p.m.

Leeds and Yorkshire Architectural Society.—Mr. T. Stirling Lee on "Sculpture as Architectural Decoration." 6.30 p.m.

London Institution.—Mr. R. Kerr, F.R.S., on "Colour Photography." Illustrated. 8 p.m.

FRIDAY, DECEMBER 5.

Architectural Association.—Mr. J. S. Gibson on "Architectural Practice: Real and Ideal." 7.30 p.m.

Birmingham Architectural Association.—Miss E. Charles on "Future."

Association of Managers of Sewage Disposal Works.—Annual general meeting and dinner, Holborn Restaurant. 6.30 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. A. Reynolds on "The Erection of Steel Bridges, Sheffield Extension of the London and North-Western Railway." 8 p.m.

Institution of Junior Engineers (Westminster Palace Hotel).—Mr. W. J. Tennant, Past Chairman, on "The Planimeter, explained simply, without mathematics." 8 p.m.

Glasgow Architectural Association.—Anniversary dance.

SATURDAY, DECEMBER 6.

British Association of Waterworks Engineers.—(Seventh Winter Meeting, at the Geological Society's Rooms, Burlington House, W.C.)—(1) Ballots will be taken for the Council and Officers for 1902-3, and for new Members and Associates; (2) Mr. W. H. Humphreys on "The Coating of Cast-iron Water Pipes;" (3) Mr. T. Molyneux on "Softening Plant at Wilmslow, Stockport Corporation Waterworks;" (4) Mr. John Shaw on "The Detection and Prevention of Underground Pollution." 10.30 a.m.

The Craft School (Clare-road, Bethnal Green, E.).—Mr. F. W. Troup on "Ornamental Leadwork." Lantern illustrations. 8.30 p.m.

British Institute of Certified Carpenters.—Annual general meeting. 6 p.m.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

November 11.—By SADLER & BAKER (at Frimley).
Frimley, Surrey.—Deepcut Bridge-rd., a freehold building site, 3 a. 3 f. 2,400
November 12.—By BELLAMY & CO. (at Putney).
Putney.—80 and 84, Cheltenham-rd., f. y. r. 100 f. 1,450
Fulham.—7, Edgarley-ter., ut. 93 yds., g.r. 51. 55. y. r. 416. 125. 450
4, Cloncurry-st., ut. 95 yds., g. r. 74, e. r. 447. 395
By BENJAMIN J. SIMMONS (at Boston).
Midville, Lincs.—A freehold farm, 92 a. 2 r. 14 p. 3,000
Westville, Lincs.—A freehold farm, 134 a. 1 r. 8 p. 3,700
November 13.—By ELLIOTT, ELLIS, & CO. (at Plymouth).
Plymouth, Devon.—1, Bedford-st. (S), and 9 and 10, East-st. (S), area 5,300 ft. f., y. r. 4504. 12,500
6, The Barbican, f. y. r. 450. 775
By FULLER, MOON, & FULLER (at Croydon).
Croydon.—102, Church-st. (S), f. y. r. 594. 1,000
Grant-rd.—A plot of freehold land 370
Wallington.—1 and 2, Craham Hurst Villas, f. y. r. 674. 188. 1,400
Stifford-rd., Frank and Edith Villas, f. y. r. 544. 1,400
November 14.—By G. B. HILLIARD & SON (at Chelmsford).
Blackmore, Essex.—Church-st., Manor House, f. y. r. 144. 290
Chelmsford-rd., three freehold cottages. 250
y. r. 251. 68. 450
Stock, Essex.—Mainly Ivy Bank, f. y. r. 164. 1,000
Main-rd., two freehold tenements, y. r. 85. 55. 150
November 15.—By GRAIN, MOYSE, & WISEBY (at Cambridge).
Shepreth, Cambs.—A freehold mineral estate, 38 a. 0 r. 21 p. 1,950
November 17.—By FORBES, PAICE, & FORBES.
Notting Hill.—124, Portobello-rd., y. r. 404. 1,000
St. George's, 351. 105. ut. 41 yds., g. r. 15. 500
Holloway.—18, Hungerford-rd., ut. 394 yds., g. r. 84. 85. y. r. 504. 500
By HENRY HOLMES.
Marylebone.—9, Great Marylebone-st. (S), ut. 51 yds., g. r. 364. y. r. 2504. 2,790
78, Great Titchfield-st. (S), ut. 27 yds., g. r. 204. 1,600
y. r. 1004. 1,600
31, Ridinghouse-st. (S), ut. 21 yds., g. r. 364. y. r. 894. 480
7, South-st. (S), ut. 21 yds., g. r. 364. w. r. 1494. 105. 480
By HUNTER & HUNTER.
High Holborn.—No. 131 (S), ut. 224 yds., g. r. 304. y. r. 1504. 1,600
Regent's Park.—100 and 102, Osmund-st. (S), ut. 204 yds., g. r. 34. p. 150
70 and 72, Robert-st. (S), ut. 204 yds., g. r. 24. y. r. 774. 53
Dulwich.—864, u. t. 96 yds., g. r. 84. 108. e. r. 504. 31
By HAMPTON & SONS.
Turner's Hill, Sussex.—Mantles, with carpenter's shop, six cottages and orchard, area about 3 acres, f. and c., w. r. 874. 25. 2,200
November 18.—By DAVID BURNETT & CO.
Kensington.—48, Elm Park-gdns., ut. 72 yds., g. r. 84. 54. p. 2,600
Totterham.—86, High Cross-rd., f. p. 50
Camberwell.—13 and 17, Myatt-rd., ut. 594 yds., g. r. 94. w. r. 694. 50
By DEBENHAM, TAYLOR, & CO.
Highgate.—Hamstead-lane, Park Villa, area 1 acre, f. p. 3,500
Baltham.—Baham House, f. g. r. 954. 3,500
284 yds. 3,500
Clapham Common.—30, 31, and 32, North Side, area 1 a. 2 r. 29 p. f. y. r. 3114. 5,200
33, North Side, f. y. r. 3114. 1,700
Willesden.—Willesden-lane, f. g. r. 214. reversion in 45 yds. 9
282, Willesden-lane, area 1 r. 7 p. f. y. r. 954. 1,500
By C. W. DAVIES & SON.
City-rd.—No. 259, ut. 324 yds., g. r. 154. e. r. 804. Walthamstow.—28, 30, and 34, Chelmsford-rd., f. w. r. 1044. 1,000
By NOYES & NOYES.
Barnes.—36 and 38, Archway-st., f. w. r. 544. 128. 86 and 88, Archway-st. (S), f. with goodwill, ut. 93, Archway-st., f. w. r. 24. 88. 600
Clekenwell.—19, Claremont-sq., ut. 93 yds., g. r. 334. w. r. 1044. 148. 1,000
King's Cross.—75, Winchester-st.; 1 to 5 and 104, Tenby-pl. (houses, workshops, and stabling), ut. 32 yds., g. r. 304. y. r. 1684. 108. 1,000
77, Winchester-st., and 6 to 10, Tenby-pl. (workshops, stabling, &c.), ut. 41 yds., g. r. 124. y. r. 1674. 41. 1,000
By ERNEST OWNERS.
Horton.—17, Harman-st., ut. 40 yds., g. r. 64. y. r. 564. 1,000
Hampton.—97, Denning-rd.—2 y. r. 104. 1,000
31, Belsize-rd., ut. 42 yds., g. r. 204. e. r. 754. 1,000
Willesden.—High-rd., corner shop plot of land, f. y. r. 104. 1,000
Attleborough, Norfolk.—Freehold gasworks (as a going concern) 1,000
By PROTHORPE & MORRIS (at Stratford).
West Ham.—8 and 20, Alderthorpe-rd., ut. 89 yds., g. r. 44. w. r. 444. 45. 1,000
63, Vernon-rd., ut. 89 yds., g. r. 74. w. r. 24. 88. 1,000
Stratford.—33, 35, and 37, The Rectory, ut. 704. 45. 1,000
37 to 43 (odd), Holness-st., f. w. r. 934. 128. 1,000
Forest Gate.—119 to 125 (odd), Ramsay-rd., f. w. r. 1194. 128. 1,000
November 19.—By W. A. BLAKEMORE.
Pimlico.—87, Tachbrook-st., ut. 26 yds., g. r. 84. y. r. 504. 1,000

PRICES CURRENT (Continued).

TILES

	s. d.		
Best plain red rooing tiles...	42	0 per 1,000, at	ly. depdt.
Hip and valley tiles...	3	7 per doz.	" "
Best Brocely tiles...	50	0 per 1,000	" "
Do. Ornamental Do.	50	0 per doz.	" "
Hip and valley tiles...	4	0 per doz.	" "
Best Rusbon Red, brown or brindle Do. (Edwards)	57	6 per 1,000	" "
Do. Ornamental Do.	58	11	" "
Hip tiles...	4	6 per doz.	" "
Valley tiles...	3	" "	" "
Best Red or Moss Col. Ref. fordshire Do. (Peakes)	59	9 per 1,000	" "
Do. Ornamental Do.	54	6	" "
Hip tiles...	4	1 per doz.	" "
Best "Rosemary" brand	3	8	" "
plain tiles...	48	0 per 1,000	" "
Do. Ornamental Do.	50	0	" "
Hip tiles...	4	0 per doz.	" "
Valley tiles...	4	0	" "

WOOD

BUILDING WOOD.—YELLOW.

	At per standard.	
	\$ s. d.	\$ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	15 10 0	15 10 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 11 in. and 8 in., and 5 in. by 7 in. and 8 in.	11 10 0	12 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 12 10 0
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	" "
8 in. by 4 in. and 8 in. by 6 in.	9 0 0	9 10 0
8 in. by 4 in. and 8 in. by 5 in.	8 10 0	9 10 0
Ferner Sawn Boards:— 7 in. and 12 in. by 7 in.	0 10 0	more than battens.
8 in.	1 0 0	" "
Fit timber: Best middling Denzang or Memel (average specifica- tion)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks (8 in. to 8 in.)	3 0 0	3 10 0
Pitch-pine timber (30 ft. average) ..	3 5 0	3 15 0

JOINERS' WOOD

White Sea: First yellow deals,				
3 in. by 13 in.	23	0	0	24
3 in. by 9 in.	21	0	0	22
Second yellow deals, 3 in. by 11 in.	17	0	0	18
3 in. by 9 in.	18	10	0	19
3 in. by 7 in.	17	10	0	18
Third yellow deals, 3 in. by 11 in.	13	10	0	14
3 in. by 9 in.	12	10	0	13
3 in. by 7 in.	15	10	0	16
Battens, 3 in. and 3 in. by 7 in.	11	10	0	12
Petersburg: First yellow deals, 3 in.				
by 11 in.	21	0	0	21
Do. 3 in. by 9 in.	18	0	0	19
Battens—Second deals, 3 in. by				
11 in.	13	10	0	15
Do. 3 in. by 9 in.	16	0	0	17
Battens—Second deals, 3 in. by				
11 in.	14	10	0	16
Do. 3 in. by 9 in.	17	10	0	19
Thinnings—Second deals, 3 in. by				
11 in.	13	10	0	14
Do. 3 in. by 9 in.	13	0	0	14
Battens—Second deals, 3 in. by				
11 in.	10	0	0	11
White Pine: First white deals, 3 in. by 11 in.	14	10	0	15
3 in. by 9 in.	13	10	0	14
Battens—Second deals, 3 in. by 11 in.	13	0	0	13
3 in. by 9 in.	13	10	0	14
3 in. by 7 in.	12	10	0	13
Battens—Second deals, 3 in. by 11 in.	9	10	0	10
3 in. by 9 in.	10	10	0	11
3 in. by 7 in.	10	0	0	10
Pittsburg: Deals—Under 2 in. thick—				
Yellow Pine—First, regular sizes.	33	0	0	33
Oddments	28	0	0	28
Stained, regular sizes	24	10	0	26
Yellow Pine—Oddments	20	0	0	20
Kauri Pine—Planks, per ft. cube.	0	3	6	4
Danzing and Stettin Oak Logs—				
Large, per ft. cube.	0	5	0	3
Small, do. do.	0	3	0	3
Waincoat Oak Logs, per ft. cube.	0	5	0	5
Dry Waincoat Oak, per ft. sup. as				
inch	0	7	0	8
do. do. do.	0	6	1	7
Dry Mahogany—				
Hooduras, Tabasco, per ft. sup.				
as inch	0	9	0	11
Selected—Figure, per ft. sup.				
as inch	0	1	6	2
Dry Walnut, American, per ft. sup.				
as inch	0	10	0	11
Teak, per ft. sup.	0	10	0	11
American Whitewood Planks—				
Per ft. cube.	0	4	0	5
Per square.				
1 in. by 7 in. yellow, planed and				
shot	0	5	6	17
1 in. by 7 in. yellow, planed and				
matched	0	14	0	18
1 in. by 7 in. white, planed and				
matched	0	6	0	11
1 in. by 7 in. white, planed and				
shot	0	11	0	14
1 in. by 7 in. white, planed and				
matched	0	12	0	16
1 in. by 7 in. white, planed and				
matched	0	4	6	16
1 in. by 7 in. yellow, matched and				
beaded or V-jointed boards	0	11	0	13
1 in. by 7 in. do. do. do.	0	14	0	18
1 in. by 7 in. do. do. do.	0	11	0	13
1 in. by 7 in. do. do. do.	0	11	6	16
6-in. at 6d. to 9d. per square less than 7-in.				

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Designs for University Buildings, Cape of Good Hope	Agnt.-Gen. for Cape of Good Hope	400l., 200l., 100l.	Jan. 31

CONTRACTS.

Nature of Work or Materials.	By whom Advertised	Forms of Tender, &c., Supplied by	Tenders to be delivered
House, Stabling, &c., near Wearhead, Co. Durham	Devonport School Board	Clark & Moscrop, Architects, Durham	Dec. 2
Schools, Exmouth-road, Stoke	Southend-on-Sea School Board	J. P. Goldsmith, School Board Offices, Devonport	do.
Two Cottages, &c., Ythan Lodge, Fotherham	Stabane (Ireland) S.D.C.	Wilson & Duffus, Advocates, Aberdeen	do.
Schools, Southchurch Hall	Bangor (Ireland) U.D.C.	Burke & Harris, Architects, Southend-on-Sea	do.
Shed, &c.	Barkisland (Yorks) U.D.C.	J. E. Sharkey, Council Offices, Strabane	do.
Additions, &c., to Station, Melksham, Wills	Great Western Railway	E. L. Woods, Civil Engineer, Iowa Hall, Bangor, Co. Down	do.
House and Office, Maldenhead	do.	R. Clements, Surveyor, Council Offices, Barkisland	do.
Footbridges, Whitland and Tavitock	do.	G. K. Mills, Faddington station, W.	do.
Stables, near West Ealing, Middlesex	do.	do.	do.
Stabling & Coach House, Dynevor Arms, Tynphyl, Wales	do.	do.	do.
Business Premises, Broad-street	Sheerness Economical Soc., Ltd.	T. Rolnick, Architect, Merthyr Tydfil	Dec. 3
Well, &c., Cannon-street	Wellington U.D.C.	J. H. Burrows, 32, High-street, Sheerness	do.
Additions, &c., to Business Premises, Newcastle-on-T.	N. E. Railway Company	J. T. Parker, 39, Church-street, Wellington	do.
Service Reservoir, Northend Woods	Great Marlow Water Co., Ltd.	W. Bell, Architect, Central Station, Newcastle	do.
Telescopic Gasholder	Yevill Town Council	W. V. Graham, Civil Engineer, 5, Queen Anne's-gate, S.W.	do.
Cast-iron Pipes, and Laying, Plas Dwylo	Llandudno U.D.C.	H. B. Batten, Municipal Buildings, Yevill	Dec. 4
Water Mains, &c.	do.	E. P. Stephenson, Engineer, Town Hall, Llandudno	do.
Cottages, Treston, near Rotherham	Islington Guardians	T. A. Brightmore, Treston, Rotherham	do.
Band and Strengthening Base of Chimney Shaft	Corporation of London	Steward at Infirmary, Highgate Hill, N.	Dec. 5
Additions to University College, Sheffield	Colchester Guardians	Gibbs & Flockton, Architects, 15, St. James-row, Sheffield	do.
Construction of Sewers, &c.	do.	Engineer to the Corporation, Sheffield, &c.	do.
Additions to Workhouse	do.	Gudley & Cressall, Architects, Victoria Chambers, Colchester	Dec. 6
Alterations to Wesleyan Chapel, Llanawel, Wales	Governors of Carr's School	D. Jenkins, Architects, Llandilo	do.
Additions, &c., to St. Luke's Ch., Cuminestown, N.B.	Walsall School Board	A. Clynne, Architect, 123, Union-street, Aberdeen	do.
Enclosing Cemetery, Barnack, Northants	Panteg U.D.C.	J. B. Corby, Architect, 15, All Saints-place, Stamford	do.
Alterations, &c., to Chapel, Llanawel, Wales	Hornsey U.D.C.	D. Jenkins, Architect, Llandilo	do.
Additions to Infirmary, Preston, Lancs.	Bexley Heath (Kent) U.D.C.	L. Coates, Architect, Waterhouse-street, Halifax	do.
Cast Iron Piping (30 tons), Kyleakin, Skye	Margate Town Council	E. H. Dixon, Civil Engineer, 49, Lime-street, Preston	do.
Schools, Sleaford, Lincs.	Croydon Town Council	J. A. H. Mackenzie, Architects, Portree, N.B.	do.
School, Elmora Green, Hoxwich	Mid Hantsbrough Corporation	J. Clare, Architect, Sleaford	do.
Sewers, Grindshottown	Borough of Kingston-on-Thames	H. E. Lavender, Architect, Bridge-street, Walsall	Dec. 7
Sewering, Leveling, &c., Greenwood, &c., Road	Borough of Fulham	T. F. H. Watkins, Club Chambers, Pontypool	Dec. 8
Car Sheds, &c.	Sheerness Economical Society, Ltd.	Engineer to the Council, Southwood-lane, Highgate, N.	do.
Engine and Boiler House, &c., Uington	Commissioners of H.M. Works, &c.	T. J. Haynes, Public Hall, Bexley Heath	do.
Car shed Replacements, Parley-road	Northampton Corporation	A. Latham, Civil Engineer, Town Hall, Margate	do.
Additions to Hospital, Hemlington	House Committee, Guy's Hospital	K. Mawdesley, Town Hall, Croydon	Dec. 10
2000 tons of Quenest, Quernay, or other Granite	Wandsworth Borough Council	Borough Surveyor, Clatterton House, Kingston-on-Thames	do.
Making-up, &c., Gloucester-street	Tottenham U.D.C.	Borough Surveyor, Town Hall, Fulham, S.W.	do.
New Bakery in Broad-street	Maldon Joint Hospital Board	Society's Office, 32, High-street, Sheerness	Dec. 11
Superstructure of Museum, South Kensington	Clacton-on-Sea U.D.C.	A. Alder, Borough Surveyor, Northampton	do.
Surveyor's Materials	Trowbridge & Dis. Jt. Hosp. Com.	The Superintendent, House Committee, Guy's Hospital	Dec. 13
Annual Contracts	Folkingham Parish Council	Surveyor's Office, 41, High-street, Wandsworth, S.W.	Dec. 16
Blacksmith's shop, &c., Ashmore-rd., Putney Embankment	Mountain Ash Cottage Co.	Engineer to the Council, 712, High-road, Tottenham, N.	Dec. 17
Making-up Badbury, &c., Roads	Mr. C. Melville	P. M. Beaumont, Maldon, Essex	Dec. 22
Yard Block, Administrative Block, &c.	Southampton Corporation	W. H. Trencham, Engineer, 39, Victoria-street, S.W.	Jan. 5
Electrical Plant	Mr. T. F. Harris	J. Hugh Goodman, Town Hall Chambers, Reading	No date
Isolation Hospital	Haxby (Yorks) School Board	W. E. Williamson, Butley-in-Wharfedale	do.
Sinking a Well, Little Escroft	Whitby U.D.C.	H. J. Rose, Council Offices, Folkingham	do.
Pipe and Pipe Laying	Messrs. J. Newby & Co., Ltd.	Morgan & Rifford, Architects, Mountain Ash	do.
Thirty-six Cottages		Sutherland & Fife, Architects, Aberdeen	do.
House, Murtle, near Aberdeen		Borough Engineer, Town Hall, Southampton	do.
Foundation at Electricity Works, Western Shore		W. R. Low, Architect, Clarence-street, Staines	do.
Six Cottages, West Chillington, near Farnborough		E. T. Felgate, Architect, 3, St. George's, York	do.
Additions to Schools		T. R. & E. Council Offices, Whitby	do.
Alterations to Shelter		Bland & Bown, Architects, Harrogate	do.
Additions to Business Premises, James-st., Harrogate			do.

PUBLIC APPOINTMENTS.

Nature of Appointment	By whom Required.	Salary	Applications to be made
* Clerk of Works	Norwood (Middlesex) School Board	3l. 3s. per week	Dec. 4
* District Road surveyor and Sanitary Inspector	Wigmore S.D.C.	140l. or 150l.	Dec. 6
* Clerk of Works	Metropolitan Borough of Fulham	3l. 3s. per week	Dec. 8
* Architectural Assistant	Borough of Lancaster	150l. per annum	Dec. 12
* District Surveyor of Roads	Lancashire County Council	250l., increasing to 300l. per annum	Dec. 13

Those marked with an asterisk (*) are advertised in this Number.

Competitions, —

Contracts, pp. vi. vii. & x.

Public Appointments, xvi. & xvii.

PRICES CURRENT (Continued).

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton.	£ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	6 5 0	7 5 0	
Compound Girders	8 5 0	9 5 0	
Angles, Tees and Channels, ordinary sections	7 17 6	8 17 6	
Plitch Plates	8 5 0	8 15 0	
Cast Iron Columns and Stanchions, including ordinary patterns	7 2 6	8 5 0	

METALS.

	Per ton, in London.	£ s. d.	£ s. d.
Common Bars	7 15 0	8 5 0	
Staffordshire Crown Bars, good merchant quality	8 5 0	8 15 0	
Staffordshire "Marked Bars"	10 10 0	-	-
Mild Steel Bars	9 0 0	9 10 0	
Hoop Iron, basis price	9 5 0	9 10 0	
Galvanised	16 0 0	-	-

(* And upwards, according to size and gauge.)

Sheet Iron, Black—			
Ordinary sizes to 20 g.	10 0 0	-	-
" " 20 to 24 g.	11 0 0	-	-
" " 24 to 26 g.	12 0 0	-	-
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes 6 ft. by 2 ft. to 3 ft. to 20 g.	12 15 0	-	-
" " 22 g. and 24 g.	13 5 0	-	-
" " 26 g.	14 5 0	-	-
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	16 0 0	-	-
" " 22 g. and 24 g.	16 10 0	-	-
" " 26 g.	18 0 0	-	-
Galvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 15 0	-	-
" " 22 g. and 24 g.	13 5 0	-	-
" " 26 g.	14 5 0	-	-
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g.	12 0 0	-	-
" " 22 g. and 24 g.	13 0 0	-	-
" " 26 g.	14 5 0	-	-
Cut nails, 3 in. to (under 3 in. usual trade extras.)	9 5 0	9 15 0	

LEAD, &c.

	Per ton in London.	£ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	13 17 6	-	-
Pipe in coils	13 17 6	-	-
Soil Pipe	16 7 6	-	-
Compo Pipe	16 7 6	-	-
ZINC—Sheet	25 0 0	-	-
Silesian	24 10 0	-	-
COPPER—			
Strong Sheet	0 10 0	-	-
Thin	0 11 0	-	-
Copper nails	0 11 0	-	-
BRASS—			
Strong Sheet	0 9 0	-	-
Thin	0 10 0	-	-
Two-English Ingots	0 1 3	-	-
Southern—Plumbers'	0 0 9	-	-
Tinners'	0 0 8	-	-
Shovelpipe	0 0 9	-	-

ENGLISH SHEET GLASS IN CRATES.

	24d. per ft. delivered.	£ s. d.	£ s. d.
15 oz. thirds	11d.	-	-
" " fourths	11d.	-	-
17 oz. thirds	11d.	-	-
" " fourths	11d.	-	-
19 oz. thirds	11d.	-	-
" " fourths	11d.	-	-
21 oz. thirds	11d.	-	-
" " fourths	11d.	-	-
Flat sheet, 15 oz.	11d.	-	-
" " 21	11d.	-	-
Harley's Rolled Plate	11d.	-	-
" " 18	11d.	-	-
" " 20	11d.	-	-
" " 22	11d.	-	-

OILS, &c.

	£ s. d.	£ s. d.
Raw Linseed Oil in pipes or barrels	0 2 2	-
Boiled " in pipes or barrels	0 2 2	-
" " in drums	0 2 7	-
Turpentine, in barrels	0 3 3	-
" " in drums	0 3 5	-
Genuine Ground English White Lead	21 0 0	-
Red Lead Dry	20 0 0	-
Best Japan Gold Size Putty	0 8 6	-
Stockholm Tar	1 12 0	-

VARNISHES, &c.

	Per gallon.	£ s. d.	£ s. d.
Fine Pale Oak Varnish	0 10 6	-	-
Fine Copal Oak	0 10 6	-	-
Superfine Pale Elastic Oak	0 10 6	-	-
Fine Extra Hard Church Oak	0 10 6	-	-
Superfine Hard-drying Oak, for Seats of Churches	0 14 0	-	-
Fine Elastic Carriage	0 12 0	-	-
Superfine Pale Elastic Carriage	0 15 0	-	-
Fine Pale Maple	0 16 0	-	-
Finest Pale Durable Copal	0 16 0	-	-
Best Black Oil	0 12 0	-	-
Best Black Japan	0 16 0	-	-
Oak and Mahogany Stain	0 9 0	-	-
Brunswick Black	0 8 6	-	-
Berlin Black	0 16 0	-	-
Knottin	0 10 0	-	-
French and Brush Polish	0 10 0	-	-

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the Editor, when written by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR, those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursday, N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under-quoted, unless in some exceptional cases and for special reasons.]

* Denotes accepted. † Denotes provisionally accepted.

ACTON.—For the steel roof work of the new swimming-baths, &c., for the Acton District Council:—
Kowling & Co., 7, Quality-court, Chancery-lane £244

BELFAST.—For the supply of Welsh setts (800 tons), for the Harbour Commissioners. Mr. G. F. L. Giles, Engineer, Harbour Office, Belfast:—

	Per ton.
Welsh Granite Co., Ltd.	£1 0 6
Kneeshaw, Lupton, & Co.	1 8 6
Brundrit & Co.*	1 8 0

BROMSGROVE.—For Barnsley Hall Asylum, for Worcestershire County Council. Mr. G. T. Hine, architect, 35, Parliament-street, S.W.:—

Fincher & Co., £201,450 8 1	Kerridge & Shaw, £175,925 0 0
Davey, Ltd., 198,502 0 0	Barnsley & Sons, £74,776 0 0
Howe & Co., 194,630 0 0	Lee & Son, 171,059 0 0
Parrell & Son, 183,286 0 0	T. Rowbotham, 171,210 0 0
Kellett & Sons, Ltd., 191,702 1 8	Gowing & Ingram, 170,468 0 0
McCormick & Sons, 190,678 0 0	C. G. Hill, 167,100 0 0
Stephens, Bassett, & Co., 190,202 0 0	W. Hopkins, 167,000 0 0
Guest & Son, 188,725 0 0	Crane, Ltd., 166,135 0 0
D. W. Davies, 181,000 0 0	Willcock & Co., 164,448 0 0
Parrell & Son, 183,286 0 0	F. L. Jones, 161,950 0 0
W. Walkerden, 182,850 0 0	J. & A. Brazier, 161,700 0 0
J. Tilt, 179,920 0 0	T. Johnson, 161,220 0 0
Sapcote & Sons, 179,686 0 0	F. Evans, 156,576 0 0
H. Lovatt, 178,940 0 0	Smith & Pitt, 154,880 0 0
J. Herbert, 176,650 0 0	Whitehouse & Sons, Birmingham* 151,475 0 0
J. Dalrow, 176,350 0 0	

CHELMSFORD.—For a cottage on the Mildmay-road. Mr. Rd. Mawhood, architect, Chelmsford:—

W. Fincham £408	J. Gowers £420
W. Samms 420	F. Weight, Springfield* 385

CREWE.—For additions to isolation hospital, for the Town Council. Mr. G. E. Bolshaw, architect, 189, Lord-street, Southport:—

W. J. Freeman, £2,080 0 0	Micklewright & Sons, £2,460 17 9
H. Fairclough, 2,018 0 0	Alison & Sons, 2,358 0 0
G. G. Smith, 2,779 9 11	Jas. Herbert, 2,350 8 0
Hamilton & Son, 2,674 0 0	A. E. Lee, 2,310 0 0
Mr. Morrey, 2,585 4 0	Garnier & Son, 2,296 3 1
Jas. Gethin, 2,501 0 0	Crews* 2,296 3 1
J. Williams, 2,493 17 10	[Architect's estimate, £2,350.]

HATFIELD.—For new offices for County Surveyor's department, at Hatfield. Mr. Urban A. Smith, C.E., 41, Parliament-street, S.W.:—

S. Werboys, £2,593 15 1	Shroder & Matthews, £2,181 13 7
A. V. & Brooker, 2,557 0 0	C. Brightman, 2,171 0 0
Miskin & Son, 2,475 0 0	Spiers & Son, 2,163 4 8
Spiers & Son, 2,435 0 0	F. Newton, 2,158 0 0
J. T. Wingo, 2,376 1 9	General Builders, Ltd., 2,099 0 0
Willmott & Sons, 2,332 0 0	Ernest West, 2,072 0 0
Hampton Bros., 2,290 0 0	South & Co., 2,047 0 0
Misbawite & Sons, 2,231 13 0	R. L. Tongue, 1,993 0 0
J. Gutteridge, 2,280 2 9	Elkins & Co., 1,995 0 0
Geo. Wiggs, 2,201 0 0	Hertford* 1,995 0 0

HIGH EASTER.—For a house at Stagtons Cross. Mr. Rd. Mawhood, architect, Chelmsford:—
J. Gowers, Chelmsford £1,650

LONDON.—For machinery for overhaul and repair of sluice vessels, Crossness outfall, for the London County Council:—

(a) Two Sliding and Screw-cutting Lathes.	
Hetherington & Sons, Ltd., £342 0	Smith & Coventry, Ltd., £566 0
Muir & Co., Ltd., 313 0	Tangye Tool and Hulse & Co., Ltd., 295 0
Kendall & Gent., 274 0	Electric Co., Ltd., 227 10
(b) Horizontal Boring Machine (48 in. by 16 in.).	
Kendall & Gent., £397 0	Hulse & Co., Ltd., £361 0
Hetherington & Sons, Ltd., 392 0	Muir & Co., Ltd., 330 10

LONDON.—For switchboards for sub-stations in connection with the reconstruction, for electrical traction, of Tooting to Westminster, &c., tramways, for the London County Council:—

Heaton & Smith, Ltd., Salford	£6,044 3 0
The Holland House Electrical Manufacturing Co., Ltd., Glasgow	5,458 11 0
The British Thomson-Houston Co., Ltd., Rugby	4,311 15 0
Ferranti, Ltd., Hollinwood, Lanc.	4,108 12 0
Edison and Swan United Electric Light Co., Ltd., London	2,985 8 0
Maisher & Platt, Ltd., Manchester	2,710 6 6
W. J. Fryer & Co., Harrow-road, W.	2,340 2 6
The Electrical Transmission Co., Hammersmith	2,345 3 0
Johnson & Phillips, Old Charlton, Kent	2,294 5 0
Siemens Bros. & Co., Ltd., Westminster	3,216 4 0
Berran Thomas, Manchester	3,077 0 0
The Electric Construction Co., Ltd., Wolverhampton	2,771 0 0
The British Westinghouse Electric and Manufacturing Co., Ltd., London	2,754 0 0
Kelvin & James White, Ltd., Glasgow	2,599 9 0
The Consolidated Telephone Construction and Manufacturing Co., Ltd., London	2,582 18 0
Cox-Walkers, Ltd., Darlington	2,500 0 0
Arnold Kramer, London	2,499 0 0
Cowans, Ltd., Manchester	2,448 8 0
Algemeine Electricitäts-gesellschaft, Berlin	2,310 0 0
The Electric and Ordnance Accessories Co., Ltd. (Messrs. Vickers, Sons, & Maxims), Birmingham	2,260 0 0
J. G. Statter & Co., Birmingham*	2,260 9 0

LONDON.—For hinge forgings, Western Pumping Station, for the London County Council:—

Benjamin Goodfellow, Ltd., £165 0 0	Simpson & Co., Ltd., £87 15 0
Clayton, Goodfellow, & Co., Ltd.	Hunter & Eng. £81 0 0
Ed. 96 2 6	Fisher & Co., Ltd., 80 0 0

LONDON.—For valve-girds for Abbey-mills pumping station, for the London County Council:—
Clayton, Goodfellow, & Co., £120

MAIDENHEAD.—For making-up The Crescent and Waldeck-road and street, for the Town Council. Mr. P. Johns, C.E., Guildhall, Maidenhead:—

Waldeck-road.	Waldeck-road.
Wimpey & Co., £504 13 6	£504 4 0
F. Talbot, 503 8 2	79 7 7
Free & Son, 490 9 6	75 8 0
Mott & Sons*, 444 10 3	75 8 0

(Surveyor's estimates, Waldeck-road, £460 10s. 7d.; Waldeck-road, £465 0s. 8d.)

Lawrence & Thacker	£1,558 0 0
D. N. Porter	980 0 0
Free & Sons	874 3 4
Mott & Sons, Staines*	749 5 9
[Borough Surveyor's estimate, £936 0s. 8d.]	

MANSFIELD.—For the execution of road-works, Rosemary-street, for the Town Council. Mr. R. F. Vallance, Borough Surveyor, Town Hall, Mansfield:—
H. Ashley, £1,352 0 0
Lane Bros., £1,058 0 0
Fisher Bros., 1,105 0 0
H. Bennett, 926 9 0
J. Greenwood, 1,109 0 0
A. F. Houston, 1,106 13 6
Mansfield* 915 0 0

POOLE.—For making up Alexandra-road, &c. Mr. John Elford, Borough Surveyor, Poole:—
Grounds & Newton, £1,394 0 0
T. C. Rigler, 1,325 0 0
J. Saunders, 1,385 0 0
G. T. Budden, 1,233 12 0
W. P. Saunders, 1,300 0 0
H. C. Buxey, 1,252 14 0

REIGATE (Surrey).—For the erection of a residence on Wray-lane, Reigate Hill, for Mr. F. Vigers. Mr. A. Waring Venner, architect, Reigate:—
Max. Parsons, £4,850
Alfred B. Wiles, £2,580
Arch. Waycott, 2,755
A. M. A. Bickman, 2,544
McKean & Lewis, 2,718
Wm. Wickham, 2,495
Ashby & Sons, 2,719
E. Worsell, 2,486
* Amended and accepted.

[See also next page.]

ROYDON.—For the erection of a house and lodge at Roydon, Essex, for Mr. C. A. Christie, of Hoddesdon, Herts. Messrs. Newman & Newman, architects, 31, Tooley-street, London Bridge. Quantities by Messrs. Selby & Saunders, of 39, Victoria-street, Westminster, S.W.:

	House.	Lodge, &c.
Bex	£4,680	£690
Sharnpton	4,770	770
Lawrence & Son	4,404	34
Hugh	4,481	682
Holloway Bros.	4,366	673
Webster & Cannon ..	4,323	748
Horricks	4,275	670
Goddard & Sons	4,196	696
Bentley	4,178	668
J. Hunt, Hoddesdon ..	3,958	638*

SOUTHAMPTON.—For alterations and decorative repairs to fish shop, No. 99, East-street, Southampton, for Mr. F. Letten. Messrs. Youngs & Thomas, architects, 74, Above Bar, Southampton. Quantities by the architects:—

G. Britten	£185 16	Potts & Ward	£154 18
F. Stiles	160 10	J. Dowdall	148 6

[All of Southampton.]

SOUTHMINSTER.—For rebuilding the White Horse Hotel. Mr. Rd. Mawhood, architect, Chelmsford:—

Smith & Son	£1,445	H. Bishop, Southminster	£1,198
J. Rayer	1,335		

WALSALL.—For the erection of cart-sheds, stabling &c., Dav End, Rushall, for the Rural District Council. Mr. F. W. Mager, C.E., Aldridge, Walsall:—

W. D. Oakley	£819 12 5	J. Holder	£661 5 0
W. H. Gibbs	775 0 0	J. Bates	659 7 0
D. Smith	752 18 0	W. H. James	600 0 0
J. Herbert	729 0 0	W. Tilleley	
W. Clare	701 18 9	Portobello, Wol.	
J. Mallin	680 0 0	verhampton	555 0 0

WATFORD (Herts).—For reinstating premises in the St. Albans-road, for the Paper Price Plate Co. Ltd. Mr. C. P. Ayres, architect, Watford. Quantities by the architect:—

R. L. Tonge	£2,507	Clark Bros.	£2,211
Swain	2,495	Murray	2,197
Judge	2,154	Webster & Cannon ..	2,100
H. Brown	2,131	C. Brightman	2,108
C. Eames	2,097	Watkins	2,159
Dupont & Co.	2,069	Wiggs	2,154
G. & J. Waterman ..	2,074	Clifford & Gough ..	2,114
Turner & Co.	2,056		

WATFORD (Herts).—For pulling down and rebuilding premises, Nos. 161 and 163, High-street, and No. 4, Water-lane, Watford, for Messrs. E. Rodwell & Co. Mr. C. P. Ayres, architect, Watford. Quantities by the architect:—

G. & J. Waterman	£2,133 0 0	C. Brightman	£1,948 0 0
Taylor & White	2,000 0 0	Watkins	1,947 0 0
C. Eames	1,990 0 0	Judge	1,928 0 0
Clifford & Gough	1,875 0 0	Wiggs	1,923 0 0
Dupont	1,834 15 10	H. Brown	1,875 0 0
Webster & Cannon	1,975 0 0	Co.	1,768 0 0

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At the last meeting of the London School Board, the Works Committee submitted the following lists of tenders. Mr. T. J. Bailey is the Board's Architect:—

* Recommended for acceptance.

LOWER CHAPMAN-STREET (Girls).—Reversing stepped flooring in Class-room E, and altering position of doorway in connexion with same; also providing skylight in same room and a borrowed light in wall between cloakroom and hall:—

T. L. Green	£183 0	Barrett & Power ..	£152 0
Vigor & Co.	162 10	J. T. Robey	147 10
A. E. Symes	155 0	G. Barker	145 0
Gibb & Co.	154 0	F. & F. J. Wood ..	139 0

THE "BRECKNOCK."—Special school (mentally defective) four classrooms of 50; total, 200; and enclosing, draining and tarpaving additional land:—

Simpson & Son	£4,797 0 0	Patman & Fothering	
Dearing & Son	4,573 2 3	Ham, Ltd.	£4,267 0 0
W. M. Dallos	4,403 0 0	Gough & Co.	4,223 0 0
Grover & Son	4,352 0 0	McCormick & Sons	4,178 0 0
Willmott & Sons	4,358 0 0	Wall & Co.	4,177 0 0
Marchant & Sons	4,338 0 0	C. Cox	4,170 0 0
Hirst	4,280 0 0	Treasure & Son	4,018 0 0
T. L. Green	4,280 0 0	Lawrence & Sons	3,949 0 0
Williams & Son	4,285 0 0		

TOOTING GRAVENEY.—Fitting boys' and junior mixed boys' urinals with sparge pipes, asphalted dado, &c., and providing new lavatory basins and slop sinks inside building with new waste; refitting schoolkeeper's water-closet, fixing new ventilating-pipe and connecting it to existing drain, fixing new sink in scullery, and connecting waste to gully outside:—

Maxwell Bros., Ltd.	£330 0 0	Triggs	£334
Lorden & Son	359 0 0	W. Hammond	300
Johnson & Co., Ltd.	363	Lathey Bros.	279
Rice & Son	362	Leney & Son	275

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VOL. LXXXIII.—No. 5125.

DECEMBER 6, 1902.

ILLUSTRATIONS.

Electra House: Interior of Board Room	Mr. John Belcher, A.R.A., Architect.
St. John's Church, Byfleet	Mr. W. D. Caroe, F.R.I.B.A., Architect.
A Bungalow, Proposed to be Built at Walmer	Mr. A. E. Vigers, Architect.
Four Houses, Scally Park Estate, Yorks	Messrs. Hall, Cooper, & Davis, Architects.
Houses for Gas Company, Scarborough	Messrs. Hall, Cooper, & Davis, Architects.

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The History of the Adelphi.



WITH the gradual decline and demolition of the riverside mansions, palaces, and Bishops' "inns" between the Temple and Whitehall, the road at their rear became a rival of the Thames as a highway from the City to Westminster, and, as Dr. Johnson observed, the full tide of human existence was to be found at Charing Cross. Those mansions were severally separated by lanes descending from the Strand to stairs and "bridges" at the waterside, whereof Milford, Strand, Carting (formerly Dirty), and Ivy Bridge-lanes, together with Fountain-court, remain to this day. Their sites were taken for some new streets, of which Cecil-street (1695), and Salisbury-street (1692, and rebuilt by James Paine), have lately given way to the Hotel Cecil.* Sir Edward Hungerford replaced his house in 1683 with a market, rebuilt in 1830 by C. Fowler, and pulled down for the South-Eastern Railway terminus in 1860. Denmark, or Somerset House, from the Strand front of which the fish-stalls were removed in May, 1630, survived until 1778; Northampton, afterwards Suffolk, and since Northumberland House, of which the gardens extended to Great Scotland-yard, was pulled down in 1874-5, having been purchased by the late Metropolitan Board of Works for 500,000*l*.

One of the last of the riverside mansions was Durham House, between the sites of Norwich, afterwards York House, of which only the water-gate now stands, and Salisbury House. (Fig. 1: see next page.) It had been the "inn" of the Bishops of Durham from the middle of the thirteenth century. Norden (1593) and Camden

record its building by Anthony de Beck, who was Bishop of Durham in 1283-1311; Stow says it was built by Thomas de Hatfield, who occupied the see in 1345-81. Spelman tells us in the *Reliquia* that Bishop Tunstall exchanged the house to Henry VIII. in 1535 for Coldharbour and other property in London; it was there it then served for a while as a mint. Edward VI. granted the house to his sister Elizabeth; it afterwards became the residence of Dudley, Earl of Northumberland, and, after her marriage, of Lady Jane Grey, whose nuptials, as well as those of her sister Katharine to Lord Herbert and of Lady Katharine Dudley to Lord Hastings, were celebrated there. Queen Mary reinstated Tunstall at Durham House; her successor on the throne evicted him in favour of Devereux, Earl of Essex, and afterwards of Sir Walter Raleigh, who there passed twenty prosperous years, but in 1603 surrendered it to Tobias Matthew, Bishop of Durham. The main building stood, it is believed, opposite the present house of the Society of Arts. On the site of the stabling and some outhouses fronting the Strand Lord Salisbury, by an arrangement with Bishop James (1606-17), built a pawn or bazaar, consisting of four "walks," which King James I. and his Queen opened on April 11, 1609, and named the Bourse of Britain, but which was generally known as the New Exchange (see plan, fig. 2). Whilst it is commonly stated that the New Exchange was pulled down in 1737, we find that building, as detached, both drawn and named in many later maps, including those by Sutton Nicholls (1756), Robert Sayer (1760, 1768, and 1775), R. Withy (1759), and a parish map of 1755. Nos. 54-64, Strand, now occupy the site. At the sign of the Three Crowns lived George Campbell, goldsmith and banker, who in 1754 took as his partner James Coutts (obit 1778), a son of Lord Provost John Coutts, founder of the bank in Edinburgh. In his recently published history of the House of Coutts Mr. Ralph Richardson writes that Thomas Coutts had opened, with his brother Patrick, the London branch in Jeffrey's-square, St. Mary Axe, and then, in

1761, became a partner of his brother James in the Strand. Robert and James Adam rebuilt the banking-house, which Thomas Coutts (obit 1822) occupied as his residence during a long period; Thomas Hopper altered and enlarged the banking-house in 1838-9 for the firm that in June, 1892, was reconstituted as Coutts & Company.

Meanwhile Philip Herbert, fourth Earl of Pembroke and first Earl of Montgomery, had acquired what was left of Durham House in pursuance of an Act of 16 Charles I.:

"For the assuring of a message called Duresme House and certain stables part of the possessions of the Bishop of Durham . . . and of a yearly payment of 20*l*. per annum to the said Bishop . . . and his successors in lieu thereof."

He employed Webb to make designs for a large house on the site, of which the elevation is included in the collection of Inigo Jones's drawings preserved at Worcester College, Oxford. Philip Herbert's son covered the site with tenements or houses, "being—*teste* Strype—a handsome street descending down out of the Strand"—called Durham-yard (see plan, fig. 3) with Bishop's-court. A Huguenot congregation quitted Durham House for old Somerset House temp. Charles I.: its association with the episcopal see was revived in that No. 1A, Adelphi-terrace used to be the town house of the Bishops. The water-works erected temp. Charles II. at Durham-yard should not be confused with those known as "the Duresme" constructed by Savery at the adjacent York-buildings, in or after 1712, and disused in 1731; of the lofty octagonal tower there is a drawing by Turner in the National Gallery.

That site did not escape John Gwynn's notice. In one of the experimental plans which he published with his "London and Westminster Improved," 1766, he divides Durham-yard into streets leading to the Thames, which he says

"will answer the ends of the proprietors better than if it was formed into a square, as less room will be lost . . . But supposing the market . . . in Covent Garden was to be removed it could be carried no where with more propriety than to Durham-yard, the situation of which is most conveniently adapted for the purpose of such a market."

The brothers Adam took up the project; the

* Salisbury House, built in 1602 by Sir Robert Cecil, afterwards Earl of Salisbury, was converted by his son and successor into two,—Little Salisbury House and Great Salisbury House. The site of the former was leased in 1694 for Salisbury-street; in 1695 the site of the latter, and of the Middle Exchange over the Long Gallery, which ran southwards to the river, was leased for Cecil-street.



DURHAM HOUSE

SALISBURY HOUSE

WORSTER HOUSE

Fig. 1.—From a Drawing by Hollar (1630).

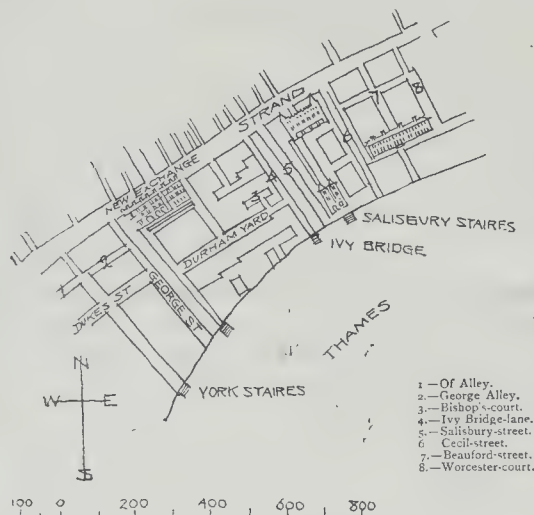
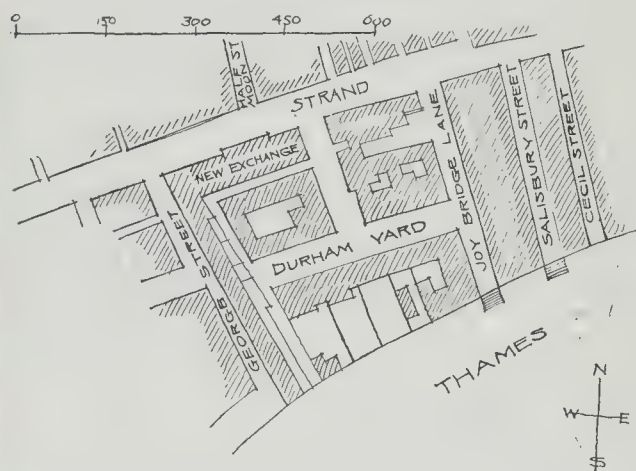


Fig. 2.—From a Plan of the Parish of St. Martin-in-the-Fields, undated, but earlier than 1692.

Fig. 3.—From a Plan of the Parish of St. Martin-in-the-Fields, circa 1710 (Crace Collection).
(George-street is now York-buildings: Half Moon-street is now Bedford-street.)

Duke of St. Albans granted them a ninety-nine years' lease from Lady-Day, 1768, at a ground rent of 1,200*l.* per annum. When the leases expired thirty-five years ago, Messrs. Drummond, the bankers, acquired the property from the trustees of the late Duke of St. Albans.

Having recently drawn public attention to the design and planning of the Adelphi, we will now describe what was the nature of the ground upon which the Adams raised

a substructure of brick arches (some of them forming two tiers), with groined vaulting and having "lower" streets underneath those with which we are more familiar. The work in that respect may be compared with what Sir William Chambers accomplished a few years afterwards at Somerset House. The whole area is a rectangle measuring 465 ft., east to west, by 400 ft., north to south. The levels at various points are given in the plan, fig. 4, from an ordnance survey plan of the

middle of last century, on which also the subterranean streets are dotted. It will be seen from these that the architects had to deal with a steep incline on each side, as well as the considerably lower levels of Duke-street, George-court, and the former George-street. The wharves in front of the Arcade were 60 ft. wide, with a roadway that is still there and is exactly level with the road of Victoria Embankment, which was begun in February, 1864, and opened to the public on July 13, 1870. The Embankment Garden has absorbed the wharves; the present river wall is distant from the Arcade roadway 402 ft., measured along the produced axis of the underground street which leads from Durham-street down to the middle point of the wharf below Adelphi-terrace.

The works were begun in July, 1768. As they proceeded the plans were changed in order to embank the river. An Act (11 Geo. III., c. 34) was passed in 1771

for enabling certain persons to inclose and embank part of the river Thames adjoining to Durham-yard, Salisbury-street, Cecil-street, and Beauford Buildings, in the county of Middlesex.

The preamble sets forth that the river widens considerably as it bends round the Surrey shore between Westminster Bridge and the New Bridge at Blackfriars, and that the consequent weakening of the rapidity of the stream contributes to the accumulation of mud and silt on the Westminster side, and the formation of a large sand-bank on the other side; it avers that the navigation, which on the northern shore is very difficult, would be greatly improved by an embankment within the hollow or bay of the bend, which, by advancing the unequal and irregular fronts of the wharves into a uniform line, would properly direct the stream and deepen its channel. The Act then declares that John, Robert, and James Adam, and James Paine, architects; Dorothy Monk, widow; Clementina Pawson, widow; and William Kitchiner, coal merchant, having very valuable freehold and leasehold interests in the houses, wharves, and grounds on the site, are willing to execute such an embankment in the front of their respective properties at their own expense. They pray, accordingly, for leave

"to inclose and embank so much of the ground and soil of the said river . . . in the front of their respective houses, wharves, and grounds . . . so as the wall . . . do run in a line nearly parallel with, and not exceeding the distance of, 80 ft. from the Terras lately begun and now nearly completed in the front, and intended to constitute a part of certain buildings at or near Durham Yard, called the *Adelphi*, from a point in the said river, over against the south-east corner of the Terras to another point over against the south-west corner . . . and from thence with a convex-circular sweep from the last-mentioned point to the south-east corner of the Terras belonging to York Buildings, and so as the wall . . . do run in a

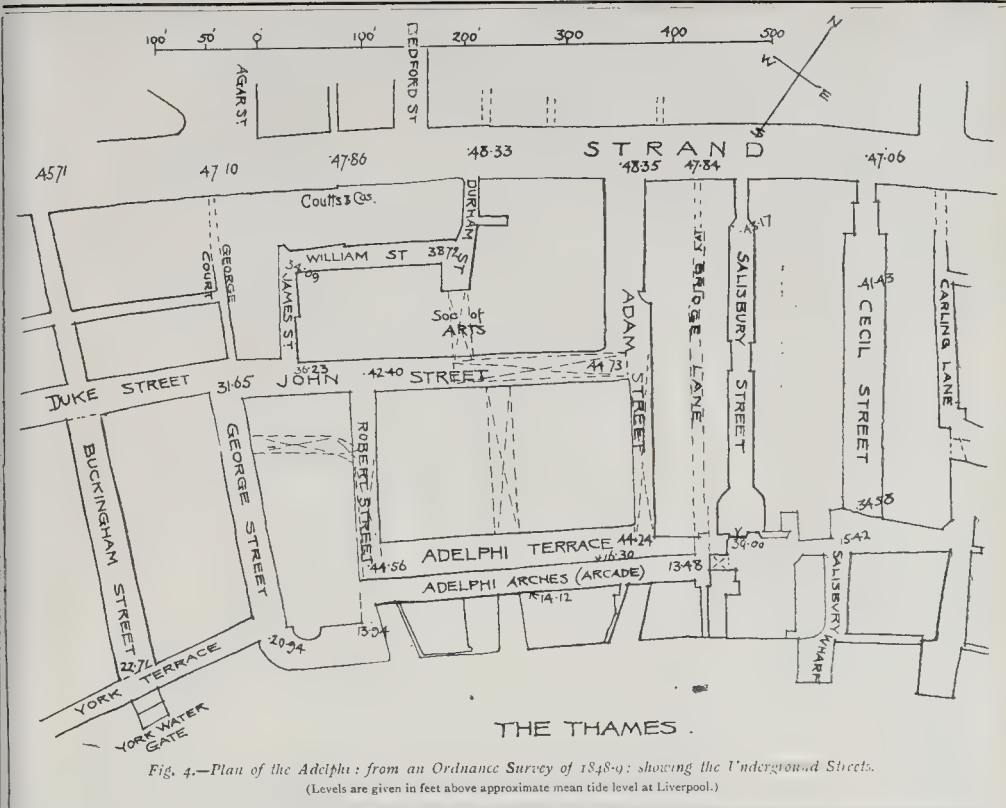


Fig. 4.—Plan of the Adelphi: from an Ordnance Survey of 1848-9: showing the Underground Streets.
(Levels are given in feet above approximate mean tide level at Liverpool.)

straight line from the first-mentioned point to a point in the river over against, and in a line with and not exceeding . . . 60 ft. from the east boundary of the ground and buildings of the said William Kitchiner, and from the last-mentioned point with a convex-circular sweep to the south-west corner of the projecting wall of . . . the Savoy; the foundations of the front wall to be made with such set-off towards the river, and the wall to be guarded with such piles and other defences as shall be thought requisite or expedient for securing the stability and duration thereof."

The Act limits to 20 ft. above high-water mark the height of buildings upon the reclaimed ground, nor must they contain any fireplace, chimney, or funnel which shall vent itself above their tops. These provisions, however, do not extend to the completion of the terrace and buildings called the Adelphi, and the continuation of the terrace to the Savoy. The rights to the soil of the Thames of the citizens of London and the Dean and Chapter of Westminster are to be tried at law. In the suit *Drummond and Others v. Sant and Others* (see the *Times*, June 26 and July 7, 1871) those rights were claimed by the defendants as through James Sant, assignee from the Adams, of the embanked land and of several of the leases granted under the formal contract for building that was signed in 1769; the Court gave judgment in favour of Messrs. Drummond. Strenuous opposition to the Bill of 1771 by the Corporation of the City availed nothing. The mention of James Paine's name in the Act should be noticed. We have not discovered what share he had in the venture, either as architect or proprietor. It is certain, however, that for nearly twenty years from 1766 he

lived in Salisbury-street, which he rebuilt during that interval, and to which, in pursuance of the Act, Robert Adam added the concave crescent and a middle flight of steps leading to Salisbury-stairs, 23 ft. 6 in. below. The western horn of the crescent stood above the end of Ivy Bridge-lane, which was overlooked and in part covered by the back bay-windows of houses on the west side of the street.

The enterprise of the brothers Adam, both in this quarter and, it seems, elsewhere, did not lead to an immediate commercial success. They had incurred heavy expenses; their debts were large; they were, it is said, disappointed in their expectations that the Government would rent the vaults and warehouses for departmental stores—so they felt constrained to realise their assets. In 1773 they obtained an Act (13 Geo. III., c. 75) for powers

"to dispose of several houses and buildings in the parishes of St. Martin in the Fields and St. Mary-le-bon, . . . and other their effects, by way of chance, in such manner as may be most for the benefit of themselves and creditors."

The petitioners represent that—

"they have by means of subterraneous streets, pointed out a new and effectual method to keep the access to the houses distinct from the traffic of the wharfs and warehouses, thereby connecting grandeur and magnificence with utility and commerce; and have also erected some great and expensive buildings in *Queen Anne-street* and *Mansfield-street* . . . and it will yet require a very considerable sum for the completion thereof; and unless some encouragement, under the sanction of Parliament, be given, to empower them to dispose of their estates and effects . . . whereby they may be enabled to continue their useful endeavours, which have for many years past found employment

for many thousand workmen and artists in different parts of the United Kingdom, the debts which they have contracted cannot speedily be discharged, and great numbers of the said workmen and artists will be deprived of employment. . . ."

For the works at the Adelphi the Adams brought, we may here mention, several men from their own native country. The Scotsmen refused to comply with a subsequent prolongation of their day's labour, and their place was taken by men from Ireland. The following epitome of the very long schedule to the Act and of the account therein of the buildings "already completed or now completing" will best show the condition at that time of the works: of the houses covered by the sale, but few were then tenanted. On the Terrace—seven houses, the fifth west from Adam-street "in the occupation of Messieurs Adam." Adam-street—five. John-street—eighteen, that belonging to the Society of Arts excepted, that on the south side at the corner of Robert-street and being the eleventh west from Adam-street "in the occupation of William Adam, Esquire, and that on the south side, being the third west from Adam-street "in the occupation of Mr. Anthony Zucchi." Robert-street—four, two consisting of five stories forming one set of chambers a-piece. George-street—one. James-street—two. William-street—five. Strand—five east, and four with two behind them west, from Adam-street. Four wharves, having a continuous frontage of 412 ft. between York-buildings and Ivy Bridge-stairs, with stabling for fifty horses under the west end of John-street and for thirty-two horses under Adam-street. Twenty "double

vaults," that is to say, each on two stories for coach-house and stable on the north and south sides of the Mews-street between Lower Adam and Lower Robert streets; ten double warehouses, on two stories, between the last two mentioned streets entering from the wharves and arcade; two large rooms or warehouses beneath Adam and Robert streets fronting the river; two double warehouses beneath those two streets and fronting the river; eleven small houses under the terrace and over the arcade, fronting the river; ten small offices under and entering from the arcade; twenty-seven vaults beneath Adam, John, Robert, and Lower John streets; and eight vaults under Adam-street entering from Lower Adam-street.

The houses in Marylebone consisted of two on the west and east sides of Mansfield-street at the corners of New Cavendish-street, the former being then in the occupation of Lord Scarsdale, and "one house with a Stone Front in Queen Anne Street . . . facing 'Chandos Street'—latterly the Austrian Embassy, and the residence of Prince Esterhazy; but now Chandos House, Chandos-street. The other assets comprise twenty shares in the stock in trade of Carron Company; fifty-one pictures, including paintings by Guido, Teniers, N. and G. Poussin, S. Rosa, P. Veronese, H. and L. Caracci, &c., twenty drawings, mostly of architectural ruins, and twenty-five "statues and pieces of antiquity." The lotteries, limited to three, were to be held before January 1, 1778, for raising a maximum sum of 224,000*l.* upon the sale, and no ticket was to be sold for less than 50*l.* Of the many advertisements, one of the latest, in the *General Evening Post* of February 24-6, 1774, announces that the prizes range in value from 50,080*l.* to 103*l.* the last ticket is to receive 25,090*l.*, and there are 4,370 tickets at 50*l.* each. Moreover, the Adams engage to repurchase the effects, being real property, "at the value put upon them from the holders of such fortunate tickets." The *Gentleman's Magazine* records the opening of the lottery for 108 prizes on Thursday, March 3, 1774, in the great room formerly Jonathan's coffee-house, Exchange-alley, with the drawing of No. 3,599, which, though a blank, was thereby entitled to 5,000*l.*; the last drawn ticket won 25,000*l.*

The schedule to the Act of 1773 cites six houses in John and William streets which "are eventually intended to be formed into a Chapel" (the chapel in William and James streets, now part of Coutts's). On E. Waters's map of the parish, 1799, the Baptist chapel is plotted at the angle, south-east, of William and James streets. Some while ago the congregation migrated to Hackney, and the building, still known as "the chapel," [was incorporated in Coutts's premises. Thomas Coutts had obtained an Act in 1799 (39 Geo. III., c. 1) "to make a communication between his buildings on the opposite sides of William-street . . . by a covered passage to be built over the said street." He had previously stipulated with Adam for the diminished height of a house on the north side of John-street and for the laying out of Robert-street, that he might not lose the prospect from his drawing-room across the river and the view beyond. In 1772 Lord Rodney, as President, laid the first stone of the house for the Society of Arts in John-street—it stands over the middle lower street—and thither the Society removed in 1774 from a house, afterwards

Dibdin's Sans-Souci, opposite Beaufort-buildings, Strand. Zucchi who, with Clerisseau, had accompanied Robert Adam on his tour through Italy and Dalmatia, was invited to England in 1766 by the latter, who employed him and his wife, Angelica Kaufmann, in the interior decoration of many houses in the Adelphi, as well as elsewhere in London and the provinces.

Of Durham House and Salisbury House (the latter rectangular on plan, with four angle turrets capped with cupolas) there are drawings by Hollar, 1630, in the Pepysian Library at Magdalene College, Cambridge, engraved, and published in 1808, by W. Herbert and R. Wilkinson. Earlier views will be found in Aggas's map, Norden's survey (1593), by Keere, Wyngaerde's drawing, and Visscher's view (1616). These do not agree in detail; still, they delineate Durham House as standing close to the water-side, with stairs, gardens, a large hall having a gable roof (Visscher and Hollar), and three towers (Aggas). J. T. Smith's "Antiquities of the City of Westminster," 1807, preserves a very curious etching, after N. Smith, of the remaining early Jacobean front, having two bays, in the Strand, as it appeared in 1790, shortly before its demolition. The drawing shows the house standing over the descent to Durham-street, and carried by a pillar. The text says a piece of the old stone wall is "still at the corner of Durham-yard." Worcester House, Salisbury House, and the New Exchange appear in one of our two illustrations, taken from old parish maps. Durham-yard, Bishop's-court, and the garden ground are clearly depicted in one of the rare set of large-scale drawings of the Thames side from Westminster Palace to London Bridge, published by S. & N. Buck on September 11, 1749. The fine perspective view of "the Royal Terras . . . with the Wharfs, Arcade, and Entrances to the Subterraneous Streets . . . of the Adelphi," engraved by B. Pastorini, and first published in 1770, is in the third (and posthumous) volume, 1822, of "Works in Architecture by Robert and James Adam," a reprint of which we lately reviewed. Amongst the water-colour drawings in the Crowle Pennant is one of Adam-street, showing the house, formerly a well-known pawnbroker's shop, which has recently been rebuilt as Adelphi House, 71-2, Strand; the return front in Adam-street was a characteristic example of the Adam style. David Turner's water-colour of the Terrace depicts the "sea-water house" at the western end of the wharf, near York water-gate. No. 11, Adam-street, is now Albion Chambers, and Nos. 6-7, The Terrace, were altered for the Savage Club in 1889 by C. J. Phipps and Mr. W. J. Ebbetts.

The gold and silver smith's shop at the corner of Adam-street possesses many interesting reminiscences. In the time of Salter, the present firm's predecessor, the shop was frequently visited by the Hamiltons, and by Nelson, Lord Exmouth, and other naval heroes. Becket, the bookseller, who had obtained the house through the kindly appeal of Garrick to the Adams, subsequently quitted it for Pall Mall: No. 73, Strand, was reinstated and the ground floor was rearranged after a fire eighty years ago. A drawing of the old interior is preserved there. Amongst the more personal memories which cluster around the Adelphi there are one or two names which stand out far above

the rest. When Garrick first came up to London from Lichfield with Dr. Johnson he, as Foote did not forget, started with his brother Peter in business as a wine-dealer in Durham-yard. In 1772 he removed from Southampton-street to the house in the Terrace that is equally memorable for the brilliant circle which he there gathered around him during the last seven years of his life. We may recall, too, that on one night, after having dined with Mrs. Garrick, Dr. Johnson and Boswell crossed the road to the railings and mused upon the view of the riverside. Boswell said to him, with some emotion, that he was then thinking of two friends they both had lost, and who once lived in the buildings behind them—Beauclerk and Garrick. "Aye, sir," Johnson replied, tenderly, "and two such friends as cannot be supplied."

No longer do the "Adelphi Arches" deserve their former reproach as a resort of the vicious and a refuge of the homeless and wretched. The streets are steep and dark, their access to the river is closed; but they are cleansed and swept, and one may traverse their cavernous gloom without pity or alarm. Robert Adam, architect to the King in 1762-8, lies in the south transept of Westminster Abbey. Walking through the massive vaults which he constructed, and comparing them with the elegant treatment and design of the houses above, we may fittingly apply to his work at the Adelphi the inscription which Milne set up to Wren at St. Paul's.

OPEN-AIR SANATORIA.

THE wonderful development of the open-air treatment for tuberculosis is, perhaps, sufficient excuse for a few notes on the recent meeting of the Architectural Association, when most interesting papers were read by Mr. Cecil Brewer and Dr. Jane Walker.

The discussion which followed was diversified by different opinions, but two fundamental facts might have been clearly deduced—firstly, that we in England have nothing to learn from German methods of construction or sanitation; and secondly, that the treatment is first and foremost an individual treatment, or, to quote Dr. Walker herself, "You must treat the sick individual, and not the individual sickness."

The first of these two deductions is apparently well understood both by the medical profession and by such English architects as have been fortunate enough to deal with this subject; but the second is apparently, at present, far from being grasped in all its full meaning. Those who have had actual practical experience of curing consumptives by the open-air treatment in England would be the first to say that the real key to sanatoria planning lies in this fact, which differentiates it at once from ordinary hospital planning as hitherto generally understood.

The whole secret of the successful planning of open-air sanatoria lies then in thoroughly grasping what the open-air treatment really is, and the term "open-air treatment" is unfortunately a somewhat misleading one. As Dr. Walker so emphatically said, it does not consist simply of open windows and super-nutrition. It is a definite medical treatment based on definite medical lines, which has to be varied and adapted to suit

the particular temperament of each individual patient.

The wonderful success of Nordrach is generally admitted to be largely due to the influence and character of the famous Herr Walter. Mr. Hall said in his speech:—"He compels his patients to get well." He himself is the chief factor in the cure by the all-powerful influence of a dominating character, coupled with the most favourable circumstances of soil, climate, and surroundings. Phthisical patients are peculiarly susceptible to external influences, and these play an important part, not only in the medical treatment, but also in the planning and disposition of the building. Here, again, we are confronted with a perfectly different state of affairs from that which obtains in an ordinary hospital.

The all-importance of the chief medical officer enforces a limitation as to the number of patients, which fact apparently has not been thoroughly grasped either in Germany or this country. It would be interesting to know the exact opinion of medical experts who have had *practical* experience as to this point, but it was a striking fact that no mention even was made of this during the discussion; though afterwards, in response to the question as to how many patients an ideal sanatorium should contain, Dr. Jane Walker gave as her opinion "not more than fifty." We know of other specialists who hold the same opinion. It is obvious that men of the forceful character of Herr Walter are comparatively rare, but even given an unlimited number, there is a limit to the number of patients such a man can successfully control.

The mind must picture the daily routine as sketched out by Dr. Walker at the end of her paper; and it must be remembered that subordinate doctors cannot have the same importance in the eyes of the patient as the man or woman at the head of the sanatorium. It seems, therefore, that, from a medical point of view, there must be a limit, and that a narrow one, to the size of an ideal sanatorium. From the architect's point of view, when all the numberless details of treatment are considered, this limit is soon found, and the difficulties of planning increase out of all proportion, as the number of patients exceeds forty or fifty.

If the general opinion of the speakers be granted as correct, that a two-story building is in this country the most suitable, it is at once seen that, with a larger number of patients, either too great an extent of ground must be covered, necessitating the traversing of long distances for patients to reach the dining-room or food to reach patients confined to bed; or else some form of building in the nature of a cross must be devised. This latter arrangement at once strikes the expert as being bad. Free and adequate circulation of air is impossible, and all aspects cannot be equally good. This is one of the points on which all the medical authorities seem agreed. Aspect and prospect play such an important part in the cure that the voluntary surrender of the best position needs careful consideration. Moreover, the hospital or institution feeling is too much in evidence, and patients are probably not sufficiently distributed during the daytime.

If then the practical necessities of housing 100 patients compel the architect to devise his building in the form of a cross, it is apparent that this is in direct conflict with the

advice tendered by most sanatoria writers who have written from actual experience. The plan, therefore, is not an ideal one, and the reason probably is that 100 is not the right number for the ideal sanatorium. There are many points which might be adduced in favour of treating only fifty patients in one sanatorium, but they do not come within the scope of these notes, which are merely to emphasise the two points first mentioned, the second of which is really the burden of Dr. Walker's paper. It is for architects to realise the importance of them, and to gain that intimate knowledge of the actual life of the phthisical patient which is so absolutely necessary before successful planning can be achieved; and the more this is realised, the more striking becomes the difference between sanatoria and general hospitals.

Let us take warning by the universal experience to be gained all around. New inventions or processes frequently suffer from having been evolved on the lines of a previous process, without due regard to the changed circumstances under which they have been conceived. The introduction of steam produced railway carriages designed on the model of stage coaches; and it has taken many years to arrive at a more suitable and reasonable mode of construction, based on the real requirements of steam travelling. Architecture is full of such instances, but it is not necessary to quote more than the servile imitation of wood details in cast-iron work.

In Germany the treatment of sanatoria has been evolved upon hotel lines, and this is generally recognised and condemned by English experts. In England, unless due care is taken, the evolution will be upon hospital lines, to the great detriment and loss of the patients. It cannot be too generally insisted that the requirements of sanatoria patients are altogether at variance with the requirements of patients in general or fever hospitals; and this is only fully realised when the architect studies the life of the patient and grasps the medical needs of the case.

It is not suggested that architects have already fallen into the fallacy that open windows and supernutrition are enough; but the danger is that they may do so, even as the other people in authority have done, to whom Dr. Walker referred in the opening sentence of her paper. We have, therefore, good reasons, both from the medical point of view of supervision, and the architectural point of view of good planning, why sanatoria should be restricted in size.

It must not be forgotten that in the sudden development of an entirely new system faults may be committed, and the evolution may take a wrong turn on either the medical or constructional part of the scheme; and, as Dr. Wethered said, "if architects and doctors worked together jointly, fewer mistakes would be made on each side."

It is well, therefore, for architects to bear this in mind, and lay to heart the central fact of Dr. Walker's paper, that the open-air treatment "is a minute and elaborate system made up of endless details, all of which are important." It is the careful consideration of all these details by the architect which finds its expression in the skill and care with which he plans and arranges his building.

Consumption is our national disease. It

accounts for more than 10 per cent. of all the deaths that occur. It is curable and preventable. A great moral responsibility attaches, then, to the men who assist in its prevention and cure. That the system by which this is possible will develop to an almost unbounded extent is certain, and architects will assuredly play an important part in this development. Careful study and the intelligent application of common sense will do a great deal; but more than this is needed, and men who plan sanatoria for consumptives must be prepared to cast tradition aside, and work with an open mind upon the new facts and data which this marvellous discovery has so recently disclosed.

NOTES.

As some of our readers will have doubtless noticed, there has been a very large increase of late in pauperism, and there is every appearance that during the coming winter there will be more unemployed than during the last twenty years. If the artisans employed in the building trade contribute much to the number of paupers it will tend to show that there has not been as much thrift among them as desirable. By the recent report on "Changes in Rates of Wages and Hours of Labour," issued by the Board of Trade for the year 1901, it is stated that in England and Wales the steady rise which has for some time characterised wages in the building trade continued throughout 1901. Over 29,000 operatives received advances, and less than 1,000 sustained decreases. This does not however, apply to Scotland, where over 9,000 workpeople had their wages reduced, but even allowing for the decrease in the North, there was among bricklayers in the United Kingdom a net average weekly increase per head of 1s. 9d., and among painters a net increase of 2s. 0½d. per head; joiners and carpenters gained 1s. 3½d., and other artisans in the same proportion. The decrease, however, among masons was 1s. 3½d. per head. If we eliminate Scotland from this return it represents in England and Wales a slight increase in net return for masons, and a large increase for other workmen in the building trade. In such a state of prosperity, building workmen should be able to face the winter under much better circumstances than has hitherto been the case. It is, perhaps, as well to point out that with this increase of wages in the building trade there has been a decrease in the hours of labour which has been going on continuously since 1893. This decrease which was 140 per head in 1893, was in 1901 only 83, but the total amount in the ten years was very considerable. It may be, therefore, that while the actually employed have gained, both in wages and leisure, it has been at the expense of what may be called the residuum of the trade; and it is possible that these causes, which have contributed considerably to the increased cost of building, may have in some senses injuriously affected a great many workmen.

THAT very large class of persons who are insured against liability under the Workmen's Compensation Act will do well to note the case of Williams and Thomas v. Lancashire and Yorkshire Accident Insurance Company

Conditions in Policies Insuring Workmen.

and, moreover, to carefully read the conditions in their policies, and then observe them. In that case the policy provided that the insured must give "immediate notice" to the insurers of any accident causing injury to a workman, and, further, that notice of any claim made on the employer was to be given within three days of its receipt. The insured had complied with this latter condition; but, as regards the first condition, had only given notice eight days after the occurrence of the accident. The contract expressly defined time to be the essence of these conditions, and the Court upheld the finding of the arbitrator that eight days was not "immediate notice" in the circumstances of this case, and as this condition was a condition precedent to the employer's right to indemnity, held that the insured could not recover under his policy.

A HIGHLY technical point, but one of considerable importance to landlords and tenants, was decided in the case of *Jones v. Lavington*. The defendant held certain premises on lease from the Governors of the Foundling Hospital, and his lease contained a clause restricting any trade being carried on on the premises. The plaintiff, by a memorandum of agreement not under seal, took the lower part of the premises for three years from the defendant, intending to carry on his business as a metal-worker, &c., there, and he had no knowledge of any superior lease being in existence. The Governors of the Foundling Hospital, however, obtained an injunction against the plaintiff preventing him carrying on his business on those premises, and he consequently brought an action against his landlord, the defendant relying on his agreement which, he said, implied a covenant for quiet enjoyment. In the absence, however, of fraud on the part of the defendant or of an express collateral agreement as to the unlimited user of the premises, the plaintiff was held not entitled to succeed, as the words of his contract were only "the landlord lets," and an unlimited covenant for quiet enjoyment as against all persons could not be implied in the absence of the word "demise." In these days, when law and equity are supposed to be administered in all Courts, hard cases such as the above come as a surprise, but "equity" has still some hard and fast limitations, and although hard cases cause lawyers generally to be the subject of popular animadversion, the employment of a lawyer at the right time would often obviate the hard cases.

THE circumstances in the case of *Wright v. Lefever* are in themselves so unusual that they are hardly likely often to be repeated, yet lessors of houses will do well to consider the law which is laid down in that case. The plaintiff, attracted by a notice "To be let" in front of an unfurnished house, obtained an order from agents to view it. He found it much out of repair, and considered the steps leading to the basement actually dangerous, and informed the house agents of this. He, however, retained the key, and some few days later again visited the premises with his wife, but as he was going up the steps to the front door they gave way with him, and he sustained per-

sonal injuries, for which a jury awarded him damages 36*l*. The plaintiff was held to be on the premises at the invitation of the owner, the invitation to view the house not being limited to the first visit, and that the owner ought to have known of the danger, whilst the plaintiff, using reasonable care, had no such knowledge. Although it is fair to assume that not many houses in such condition are put up by their owners to be let, or if they are, that intending tenants do not frequently visit them, it must be borne in mind the same principles would apply in the case of far less serious structural defects. Thus, a rounded stair, worn so as to be dangerous on a dark staircase to a basement, might render the owner of the house inviting persons to view it liable to damages far more serious, and intending lessors will do well to have their premises made reasonably safe before putting them on the market.

THE decision of the House of Lords as to the liabilities of tramway companies in respect of the roads in the case of *Dublin United Tramways Co. v. Fitzgerald* must be read by the lay reader with a little caution. The plaintiff sued the Tramway Company and recovered 1,000*l*. damages for injuries sustained by him in consequence of his rick cart being overturned on the tramway owing to its slippery condition. The jury found that the tramway was quite properly constructed, but was slippery and dangerous to traffic and should have been sanded. The liability imposed on the tramway company under their Acts of Parliament was to keep their rails and the road about and between them in good and safe repair to the satisfaction of the Road Authorities, and they had appealed to the Court of King's Bench and the Court of Appeal in Ireland to set aside the verdict on the ground that they had satisfied their obligations, and that the slippery condition of the road from want of sanding and scavenging was due to neglect of duty on the part of the Road Authorities. The House of Lords upheld the decision of the Courts below, and refused to set aside the verdict, but it does not follow from this decision that if any person is injured because a tram-line is a little slippery he can always recover damages, for it is important to observe that in this case the structure on which the rails rested was worn quite smooth, and thus the system was defective and dangerous to the public unless it was either sanded or the stones or substructure had been again roughed or chiselled out. The decision turns on this absolute defect in structure, and not on the question of mere scavenging or sanding.

SIR OLIVER LODGE gave a very interesting lecture on "Electrons" to the Institution of Electrical Engineers last week. The author of "Modern Views of Electricity" gave a masterly résumé of the evidence we have for the existence of material particles less than the hydrogen atom, which move with a velocity approaching that of light. The first important discoveries in this direction were made by Sir William Crookes, who was struck by the apparently material nature of the electric discharge through rarefied gases. He found that these discharges were not due to wave motion,

and so was forced to invent a "fourth state of matter." Some of his experiments with vacuum tubes were shown to the meeting, and the cathode rays were shown to behave in exactly the same way as an electric current. J. J. Thomson in 1897 read an epoch-making paper to the British Association, in which he suggested that these rays really consisted of flying atoms or corpuscles, and, by ingenious calculations, showed that they must be about a thousand times smaller than the hydrogen atom. He has since then verified his calculations by the results of further experiments, and the lecturer was exceedingly enthusiastic about their marvellous ingenuity. For example, Professor Thomson had to determine the number of mist nuclei formed in a glass receiver when cathode rays fell on it and the air pressure was slightly reduced. This apparently impossible problem he solved in a very simple manner by noting the rate at which the cloud inside the glass vessel settled, and making use of a theorem due to Sir George G. Stokes on the limiting velocity of the fall of rain drops. In the "electron" theory a current of electricity consists of a flow of electrons. The chemical atom is built up of them. The lecturer compared it to a miniature solar system without a sun, the electrons revolving in fixed orbits. There is plenty of space for the electrons to pass through these atoms without colliding with anything, and hence they have great penetrative power. Electricians have been in the habit of comparing the action of the self-inductance of an electric circuit to the action of inertia in a moving body; if the electron theory is true, self-inductance is simply the inertia of the moving corpuscles forming the current. Sir Oliver Lodge said that there is no inertia except electric inertia, and that the electron is probably the fundamental substance.

IN his second lecture upon "The Future of Coal Gas and Allied Illuminants," delivered before the Society of Arts on Monday last, Professor Lewes recommended the passage of 40 per cent. of water-gas through the retorts during the distillation of coal in large works, and the carbonisation of tar by a new process now being worked at Sligo for small works. In both cases the result would be to reduce the cost of producing gas without greatly reducing its value for industrial or domestic purposes. Referring to the use of Argand burners with low grade gas, Professor Lewes pointed out that the London Argand burner is not suitable for consuming low grade gas, and gave the results of a long series of experiments, which show that a much higher efficiency can be obtained by burning low grade gas in an Argand burner of the type used for testing gas at Wandsworth. He also observed that the City of London Gas Act, 1868, requires that the burner selected by the Gas Referees for gas testing shall be such "as shall be the most suitable for obtaining from the gas the greatest amount of light, and shall be practicable for use by the consumer," and expressed the opinion that the London Argand burner would have to be discarded when testing the low-grade gas now coming into use. That the burner selected for testing should be the most efficient the consumer can employ is, of course, only just; but now that non-luminous gas can be readily used for

Liabilities of House owners towards intending Lessees.

Electrons.

Burners for Low Grade Gas.

lighting purposes, and that so large a proportion of the total output of gas is used for heating purposes, we should like to see a rating-power standard introduced. The commercial value of gas both for heating and lighting purposes is now more largely dependent upon its calorific value than upon its illuminating power when burned in an Argand burner.

The New Danube Bridges.

BETWEEN Cernavoda and Fetești the river Danube consists of two channels—the Danube proper and the Borcea—and between these is an island, some 13 kilometres in width, which is submerged at high water. The construction of a new railway for military and commercial reasons has necessitated the building of a series of bridges and viaducts, commencing at the Cernavoda bank we have, first, the Charles I. bridge over the Danube, 1828 metres long, and a viaduct 91275 metres in length extending to the island. Next come 4,126 metres of embankment, 4552 metres of viaduct, 6,086 metres of embankment, and 400 metres of viaduct, leading up to the Borcea bridge of 420 metres, which is connected with the other side of the river by 150 metres of viaduct. The Charles I. bridge is carried on four stone piers, and consists of two main cantilevers, 240 metres in length, joined in the centre with a bowstring girder 90 metres long, and connected with each abutment by a similar girder. The height of the cantilever above the piers is 32 metres, the web is composed of inclined members, and the bridge is of the "through" type, in which the platform is carried on the lower chords of the girders. The width of the girders at the lower chords is 9 metres, and at the top chords over the piers 263 metres. An interesting architectural feature of the bridge is the massive portal, built of Italian granite, and flanked at each side by a colossal bronze figure representing a Roumanian soldier. The viaduct connecting this bridge with the island consists of fifteen lattice girders, each 60.85 metres in length, supported on stone piers; the adjoining embankment is of stone, and the viaduct to the embankment following includes a series of thirty-four girders, each 42.80 metres long, carried on masonry piers. The approach viaduct to the Borcea bridge consists of eight girders, each 50 metres in length. The Borcea bridge includes a cantilever extending across two piers so as to form a centre span of 140 metres; and two bowstring girders 90 metres long, one at each end, making, with the projecting arms of the cantilever, two end spans, each of 40 metres. [Between the Borcea bridge and the Fetești bank the viaduct consists of three girder spans of 50 metres each. The whole of this important engineering work was placed by the Roumanian Government in the hands of M. A. Saligny, as chief engineer, and its cost is stated to have been about 1,400,000l.

Bridewell Hospital Burial Ground and Dorset-street.

APPLICATION will be made to Parliament in the ensuing Session for leave to bring in a Bill in respect of the old burial ground in Dorset-street, in the parish of St. Bride, appertaining to the Bridewell Hospital, and now belonging to the Earl De La Warr, a descendant of John Sackville, third Duke of Dorset. The Bill provides for

the removal of the restrictions at present imposed by the Disused Burial Grounds Act of 1884, as amended by the Open Spaces Act of 1887, and for enabling the Earl De La Warr and the Home Secretary to utilise the land for building purposes. In that grave-yard was buried Robert Levett whom Dr. Johnson befriended. The hospital was established as a workhouse and a house of correction temp. Edward VI., who gave his father's palace near the well of St. Bride (in Bride-lane) to the Corporation of the City; the buildings in Bridge-street comprise the treasurer's residence, the court-room, and offices of the governors of Bridewell and Bethlehem Hospitals, and a few cells for the punishment of refractory apprentices. Dorset-street and Salisbury-square commemorate the town house of the Bishops of Salisbury, of whom Bishop Jewel exchanged it for some land in Wiltshire to the father of Thomas Sackville, Earl of Dorset, the poet, who lived there, as also, it is stated, did Sir Nicholas Bacon, Lord Keeper, before his removal to York House in the Strand. The Duke's, or Dorset-gardens, theatre in Dorset-street was built by Wren, with sculpture reputedly by Gibbons, for Betterton and Sir William Davenant's widow. The theatre, which had a handsome front towards the river, and stairs at the waterside, remained until about 1720; its site was ultimately taken for the City of London Gas Company's works, which were removed shortly after the building of the Victoria Embankment.

Society of Painters in Water-Colours.

THE winter exhibition of the Royal Society of Painters in Water-Colours is of rather unusual interest in respect of the work of some of the new or comparatively new members, and the variety of the methods and schools of water-colour art illustrated. We propose in our next issue to refer to it rather more fully than we can find space for under "Notes."

The Fine-Art Society.

At the Gallery of the Fine-Art Society in New Bond-street there is on view an interesting and varied collection of drawings, pastels, and a few water-colours, by Mr. Bernard Partridge. A large number of these are black-and-white line drawings made for *Punch*. They are, of course, excellent work of their kind, and we are glad to see the original drawings of so many good and *Punch* illustrations; but the artistic interest of the collection lies more in the pastels, many of which are admirable; we may mention especially "Primavera" (98), a quarter-length study of a girl with remarkably good modelling of the features. Mr. Partridge in several water-colour sketches treats architectural subjects well, and there is striking effect in a pastel of the "Church of the Salute by Moonlight" (94). In the outer room at the same gallery there is a collection of charcoal drawings by Mr. H. S. Hopwood, of the Royal Water-colour Society, which show great freedom and power in the treatment of charcoal. "Feeding Time" (12), an interior of a cow-house, is a very powerful study, which might have come from Millet. "An Auld Body" (17), a portrait of an old peasant, is another especially successful example. A good many slight and broadly handled landscape subjects are noteworthy for the manner in

which the impression of light and air is given in this somewhat rough material, as well as for the instinct in landscape composition which they display.

The Abbey, Bury St. Edmunds.

WE are glad to learn that something like a systematic research among the remains of the Abbey at Bury St. Edmunds has been undertaken, and excavations have been in progress for three or four weeks past. This great Abbey with its surroundings was of such historical and architectural importance that every effort ought to be made to learn all about it which the remains still extant can furnish. According to the *Norwich Gazette*, the excavations have brought to light a square chamber which might prove to be a sort of outer court to the Chapter House:—

"There are well-defined stone seats running round it; the walls are of plaster, and in places traces of red stencilling in geometrical designs are distinctly seen. From this court a doorway has been discovered leading to a long narrow apartment running eastward towards the river. The east end of this apartment is paved, but the use of the place is not known. South of that is another square chamber, roughly speaking, and a long south wall has been uncovered to the length of nearly 90 ft., which, it is conjectured, may be the north wall of the Chapter House, supposing the latter to run between the excavated portion and the Abbey church. . . . Within the past few days there has been discovered a wall forming a segment of a circle, having a well-defined stone bench running round the interior, and the bases of the columns still in their places. At the entrance to this apartment one or two of the glazed tiles are still *in situ*."

It is hoped also to discover the crypt in which it is suggested that the body of St. Edmund was buried by the monks when they had warning of the coming dissolution. Sir Ernest Clarke and Dr. Montagu James, of King's College, Cambridge, started the investigations and got together a committee to assist in carrying them on. We are informed, however, that the funds already subscribed towards the work will be soon exhausted, and that subscriptions are much needed towards continuing it. We hope they will be forthcoming, for the subject is of far more than local interest.

LETTER FROM PARIS.

THE question of reserving Sunday as a day of rest from work for all employees and workmen occupied in the building trades was again brought up at the Congress of Builders and Contractors just held at Paris, and it has been decided to open a congress to deal specially with this subject at the Bourse de Commerce on December 11. The discussion will comprise the means of extending and generalising the principle of Sunday rest in the building industries; the part which the various building corporations should take in the matter, and the obligations to be imposed; the influence which such a measure would have on the price of labour; and the reservation of Sunday to the employee and workman.

Parliament has adopted the law concerning the transfer of the grounds of the Champ de Mars to the City of Paris. A clause, proposed by M. Georges Berger, was added, stating that the Government will enter into an agreement with the Municipal Council to study a means of preserving the Galerie des Machines, and re-erecting it on a portion of the ground to be left vacant by the disappearance of the fortifications, probably between the Avenue de la Grande Armée and the Porte des Ternes.

A competition is opened for plans and designs for the reconstruction of the Hôtel de Ville of Troyes. The cost of the proposed new building is to be 60,000l. Premiums of 240l., 160l., and 60l. will be awarded.

The Touring Club of France has just published three pamphlets treating on the various

questions concerning the sanitary arrangements of hotels, the sanitary installation of bedrooms, toilet and bath rooms, water-closets, and kitchens. All these questions have been carefully studied by the members of the Technical Committee of the Touring Club.

The Vieux Paris Committee has passed a vote concerning the revision of the regulations of 1850, requiring the periodical cleaning and painting of house fronts at Paris. The Committee requires that a certain latitude should be allowed to owners of artistic house fronts, and that these should not be compelled to paint or silicate their façades, but be permitted to simply brush and wash them after obtaining the permission of the official architect of their quarter.

The Union Syndicale des Architectes is organising a new and rather original competition, to be called a "Concours des Idées." Instead of the competitors having to comply with a defined annual programme which up to the present has not produced much originality, it is decided that architects, engineers, artists, and others should submit drawings, descriptions, or even written lectures, putting forward in a clear form any original ideas they may have concerning decoration, architecture, art, construction, sanitation, &c. The idea of this competition emanates from M. de Baudot, the well-known architect, pupil of Viollet-le-Duc. M. de Baudot will open his annual course of lectures on the "Architecture of the Middle Ages and the Renaissance" at the Trocadéro Museum this month. He will more especially lecture on Italian and French Renaissance.

M. Albert Carré, the director of the theatre of the Opéra Comique, has submitted to the Municipality a new scheme for the formation of a popular theatre at Paris. He proposes to acquire and rearrange the circus building at Montmartre for this purpose, and requests the City of Paris to grant an annual subvention of 4,000l.

The Salon du Mobilier has now closed its doors, after a few months of considerable success. The Minister of Commerce, M. Trouillot, made the various awards, which were carried off chiefly by the best-known Parisian firms connected with furnishing and decoration.

The new building of the Académie de Médecine was inaugurated on November 25. This important and much-needed building is situated in the Rue Bonaparte, next to the front courtyard of the Ecole des Beaux-Arts. The architect is M. Rochet, official architect to the Assistance Publique.

The Château d'Eu, which was almost completely destroyed by fire a few weeks ago, and which contained so many valuable artistic works, most of which were fortunately rescued in time, was built on the position of a fortress raised in 870 by Charlemagne to resist the Norman invasion. The present château was built by the Duc Henri de Guise in 1578, and was inhabited in 1661 by Mlle. de Montpensier, who entrusted to Le Nôtre the designing of the existing park and gardens, and collected in the château the pictures which later on formed the nucleus of the Museum at Versailles created by Louis Philippe. The late Queen Victoria visited this château several times.

The members of the Académie are seriously protesting against the scheme of the prolongation of the Rue de Rennes, which they say will, unless carried out according to their desires, cause great prejudice to their official building, the Institut. They require the construction of the new portion destined for the public offices of the Institut before the commencement of any work of demolishing, and they ask that the plans of this portion be submitted to them at once, in order that they may be assured that the public services of the Institut shall suffer no detriment on account of the proposed work of prolongation. They also ask that the City should place at the disposal of the State a piece of ground of such dimensions and position to allow the new buildings to be of sufficient importance, and isolated from the public road or square in such a manner as to have the principal rooms situated on, and lighted by, a large courtyard similar to the present arrangement of the rest of the buildings of the Institut. An objection has been also put forward to the scheme of a new line of Metropolitan railway, which will pass directly beneath the foundations of the building, just under the large Salle des Séances.

The exhibition of the signboard competition

designs, has attracted a great many visitors to the Hôtel de Ville. They form a curious collection, interesting from its novelty, and, though rather weak from the artistic point of view, seem to give some promise for the future, in a class of decorative design which is not to be despised; for artistically designed signboards have always a commercial value. Two hundred and one competitors have responded to the invitation, and among them are two members of the Institut, M. Detaille and M. Gérôme. The former, who started the idea of the competition, has sent a pretty design, representing a cupid in the dress of a mouquetaire of the Louis XV. period. M. Gérôme has signed "Gérôme barbouillavit, a no domini 1902," on a study of a little dog in a frame surrounded by indications of optical work. These are really two pretty pictures, and among the rest of the exhibits there are a great many *genre* and still-life pictures which it would be difficult to take for signboards. Much more suitable is the wrought-iron sign by M. Bergeotte intended for Pinaud the perfumer, or the design by M. Tronchet, the architect, in the form of a basket with luminous letters, intended for the Paillard Restaurant. M. Wille's, the caricaturist, is, as usual, original in his designs, among which we find the well-known "Chat noir" of the cabaret at Montmartre. There is a good one by M. Abel Truchet, of sheet iron painted on both sides, on one side children holding luminous balloons, on the other side geese round a sauceron; another by MM. Pierre Rochet and Regius, showing an immense spit with birds and other game on it cut out in sheet iron and painted. We may mention also one by M. Schenck, a drysalter's sign, an imitation in wrought-iron of the vertebrae of a fish, with a copper head and two luminous eyes. There is also a collection of historic signs, among which is the celebrated "Gourmand" by Debucourt, and the one painted by Boilly in 1822 for a café in the Palais Royale; also paintings by Chardin, fruit pieces by Diaz, and a horse by Millet, the painter of the "Angelus."

The Parisian Press has been much occupied about the future condition of the western portion of Paris, between the Porte d'Auteuil and the Porte Maillot, after the removal of the fortifications. It was hoped that this alteration would improve the sanitary condition of Paris by throwing this portion of the city more open to the air and in more direct connexion with the Bois de Boulogne. Unfortunately the letting out of the cleared land for building seems to threaten the erection of a number of very high buildings which will entirely do away with the advantage expected from the removal of the fortifications; it is even supposed that the Ranelagh quarter, with its gardens and plantations, so much frequented on Sundays and holidays, will be encroached upon by the speculating builder. It is hoped that the Municipal Council, the "Vieux Paris" Committee, and the Conseil d'Hygiène, will join in endeavouring to prevent this practical loss of what was intended as a benefit to the city.

The Prefect of the Seine is to give his formal enactment shortly in regard to the viaduct at Passy. The work will be commenced immediately afterwards. The viaduct will be composed of a lower roadway ("premier pont"), with double tracks for vehicles and foot passengers, and a second roadway superposed on this, for the metropolitan railway. The entire height will be about 50 ft. above the water line. It is expected that it will be finished in two years. On the other hand it is almost decided that the Pont de l'Institut, about which there has been so much discussion, should be abandoned. There is talk of substituting for this an alteration of the Pont des Arts so as to fit it for wheeled traffic. The tunnel under the river for the metropolitan railway, which was to follow nearly the same course and to pass under the Institut building, is also to be modified, and is to pass under part of the Louvre Gardens and cross under the Seine near the Pont des Arts, reaching the left bank near the Rue Bonaparte, which is to be widened.

The Service des Beaux-Arts of the Hôtel de Ville is to submit to the City Council the programme for the first annual exhibition of photographs of Parisian sites suggested by the Vieux Paris Committee. The first exhibition will be held from October 15 to November 15 of next year, either at the Hôtel de Ville or at

the Petit Palais. It will have for its main object the illustration of the banks of the river the Marchés aux Fleurs, and the old houses of Paris. The photographs to which the judgment medals will be preserved in the Carnavalet Museum. For the further exhibitions, a fresh programme will be drawn up each year by the Vieux Paris Committee. This same Committee, in its latest report, has recommended that a collection of the ancient regulations and by-laws relating to the public streets should be printed. Such a collection, accompanied by plans, would supply a want, and would enable the Municipal Council to know exactly the charges and liabilities connected with certain streets, which are constantly violated now, to the great detriment of the buildings—especially the façades in the Place Vendôme, the Place Vosges, and the Place Royale, the architectural symmetry of which is being gradually destroyed.

It is announced that M. Bouchot, the Curator of the Musée des Elampes, has a scheme for an exhibition of Early French art which, according to his view, based on documents existing in the Museum, will go to show that the French "Primitifs," or early painters, were in advance of the German—Van Eyck for example. According to M. Bouchot, the two Schools of Avignon and Burgundy, in the thirteenth century, included painters who were really masters in art, and the school of Fontainebleau had been founded on the imitation of the Italian and Flemish schools. The proposed exhibition will at any rate be of great interest, and will include carvings in wood and ivory, as well as chased and engraved metal, all belonging to the period of Philip Augustus and Saint Louis.

M. Emile Breton, landscape painter, died at Courrières, at the age of seventy-two. He belonged to a family of artists; he was the brother of Jules Breton, who was his instructor in art, and uncle of Mme. Demont Breton. He made his first public appearance at the Salon of 1861, obtained a "third medal" at that of 1866, a "second" in 1867, and a "first" in 1868. He specially excelled in marine subjects, and also painted landscapes of great power of effect. His colour was heavy, but his pictures showed a broad and grand style which produced a great impression, though he never obtained the fame and popularity of his brother Jules Breton.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The third general meeting (business) of the Royal Institute of British Architects for the session 1902-1903 was held on Monday, when the following candidates for membership were elected:—

As Fellows, Messrs. W. Black, Cape Town; South Africa; W. J. Hardcastle, London; I. V. Hunt, London; L. Martin, London; J. Ransome, Consulting Architect to Government, Calcutta, India; S. B. Russell, London.

As Associates, Messrs. G. W. Allsop, Parknell, Auckland, New Zealand; C. Worby, Beaumont, London; J. H. Belfrage, London; R. Berrill, London; W. Bevan, London; H. C. Bishop, London; E. D. Brown, London; R. P. Chamberlain, Leicester; H. Chapman, London; A. R. Farrar, London; J. H. Elms, London; R. F. Farrar, London; J. H. Gibbons, Manchester; T. H. Gibbs, London; T. S. Groom, London; B. Greig, London; P. J. Groom, London; P. J. Haywood, London; W. H. Hobday, London; O. Holden, Kettering; H. S. Jardine, London; I. C. Kent, Boynton, Hailsham; R. G. Kirkby, Sunderland; H. L. Emilie, Merile de Colleville, Brighton; W. J. Nash, Bournemouth; C. F. Newcombe, Newcastle-upon-Tyne; P. C. Newman, London; W. C. Oman, Johannesburg, South Africa; E. C. Payne, London; W. S. Payne, London; R. McMinnies Roberts, London; A. K. Robertson, London; E. Simm, Osbaldestone, near Blackburn; S. Smith, Deal; J. Swarbrick, Manchester; C. F. Ward, London; L. F. Ward, Birmingham; C. W. F. Wheeler, London; T. W. Whipp, Scarborough; H. A. Wilson, Newcastle-upon-Tyne; R. G. Wilson, jun., Aberdeen; D. Woodfield, Newark-on-Trent; W. W. Wrigley, Wakefield.

Hon. Associate—Mr. G. M. Freeman K.C., J.P., Kensington, W.

The announcement of the results of the November examinations was made during the meeting. The Preliminary examination, quali-

for Probationership R.I.B.A., was held in London and the undermentioned provincial centres on November 4 and 5. Of the 163 candidates admitted, fifty-four were exempted from sitting and 109 were examined, with the following results:—

Centre.	Number Examined.	Passed.	Relegated.
London	61	39	22
Birmingham	13	10	3
Bristol	5	3	2
Leeds	10	7	3
Manchester	13	10	3
Newcastle	7	6	1
	109	75	34

The following passed candidates, with those exempted—129 altogether—have been registered as Probationers:—

Messrs. N. A. Allen, Stroud; A. Andrew, Kilmaronock, N.B.; T. S. Attie, Putney, S.W.; W. Baird, London; T. W. Barley, Monton Eccles; L. Barnish, Southport, Lancs.; H. D. Barry, Sevenoaks, Kent; A. Binning, Blackheath, S.E.; W. Blackshaw, jun., Stockport; Q. M. Blum, St. Anne's-on-the-Sea, Lancs.; K. W. Booth, Brockley, S.E.; A. E. L. Bower, Liverpool; F. A. Broad, Bournemouth; F. Brooksby, Salop; A. F. Bryan, Waterless, Lutterworth, Leicesters; A. Bulloch, Streatham Hill, S.W.; J. W. Cabre, Liverpool; A. F. Caine, Belsize Park, N.W.; D. W. Clark, Wickham; G. L. Clarke, Keighley; N. S. Clarke, Beverley; H. Collins, Scarborough; C. R. Corfield, Birmingham; R. H. Crumack, Hartlepool; C. W. Davis, Birmingham; S. M. Dempster, Bayswater; W. F. Dickinson; London; C. M. Drewitt, Southport, Lancs.; H. V. M. Emerson, Wimbledon, S.W.; H. C. Emery, Hornsey, N.; C. W. Fairweather, Newcastle-on-Tyne; S. G. Follett, Edinburgh; G. Foster, Ilford; H. H. Frasier, York; A. W. Fulton, Liverpool; E. H. Gandy, Wolverhampton; W. S. George, London; J. J. Goldie, London; J. Govan, Wishaw; J. H. Grant, Hyde, Cheshire; T. F. W. Grant, Felstead, Essex; E. H. Hacking, Manchester; C. L. Hampton, Wimbledon Common, S.W.; W. K. Hart, Wakefield; E. H. Harvey, Southsea; R. W. Hawkes, Stratford-on-Avon; W. F. Helm, Woolston, Hants; J. W. Hepburn, London; D. Hill, Catford, S.E.; O. H. W. Hilliers, Hesse; F. J. W. Hodson, Bournemouth; A. E. Holbrow, London; T. Holland, Clay Cross; E. H. Honeyburne, Southport; P. C. Hoy, Heaton Mersey, near Manchester; H. Hudson, Shipley; G. F. Iotham, Sandwich School; S. D. Jennings, Birmingham; C. Johnston, London; J. H. Jones, Swansea; R. T. W. Jordan, North Shields; G. A. Kay, Ramsey; J. Kellett, Ealing, W.; A. Kirby, Watford; J. Knight, Manchester; C. A. Lamb, Hammersmith; A. H. Lamont, Edinburgh; R. A. Lawton, Rochdale; A. J. L. Leman, Clapham, S.W.; F. G. Leonard, Chatham; J. N. Lewis, Waterloo, Liverpool; H. C. Lowick, Little Brington, Northamptonshire; H. H. McDonnell, Forest Gate, S.E.; H. S. MacLaren, Brighton; W. R. Mann, Leicester; H. Y. Margary, Upper Tooting, S.W.; C. B. Metcalfe, Bradford; W. Milburn, jun., Sunderland; D. Mine, Streatham Hill, S.W.; J. Mundell, West Hartlepool; C. H. Murray, Eastbourne, Sussex; A. H. Nathanielsz, Glasgow; H. B. Newbold, Notting Hill, W.; L. M. Newell, Ledham, near Chester; S. G. Newstead, London; L. S. Nicholls, Handsworth, near Birmingham; F. G. Oliver, Berwick-upon-Tweed; H. A. Palmer, Petersfield; T. C. Pomphrey, Wishaw, N.B.; S. Pool, Derby; N. O. Reiersen, London; W. H. E. Roberts, Wandsworth; A. K. Robertson, Edinburgh; E. M. Runtz, Lewes; R. A. R. Saunders, Exeter; J. W. Shaft, Petersfield; W. G. Shaw, Blackburn; C. R. Shield, London; L. A. D. Shiner, Grays, Essex; C. E. Sleight, Scarboro, Hants; F. R. Smith, Leeds; H. M. Spence, North Shields; H. Stephen, Leigh, Lancs.; B. M. Sullivan, Hastings; J. B. Surman, Birmingham; W. Sutcliffe, Todmorden; D. A. Swan, Edinburgh; W. C. Symes, London; H. A. Symington, Leicester; W. J. W. Todd, Edinburgh; J. W. Tomlinson, Coventry; W. H. C. Tryon, Epsom; G. C. Tyler, Send, Surrey; G. Unsworth, London; R. O. Warder, Erdington, West Birmingham; F. Waterman, Norwood, S.E.; L. T. Weaver, Clapton, N.E.; M. E. Webb, London; J. H. L. Wheatley, St. Leonard's-on-Sea; P. G. White, Bromley; Kent; J. H. Williams, Leeds, Yorks; W. S. Willis, Great Grimsby; H. J. Wilson, Peterborough; A. E. Wright, Kingston-on-Thames;

G. Young, Glasgow; R. C. Young, Bristol; B. C. Westwick, Mansfield; G. B. Wills, London.

The Intermediate Examination, qualifying for Studentship, was held in London and the undermentioned provincial centres on November 4, 5, 6, and 7. Ninety-eight probationers were examined, with the following results:—

Centre.	Number Examined.	Passed.	Relegated.
London	67	40	27
Bristol	5	3	2
Glasgow	6	5	1
Leeds	7	2	5
Manchester	13	4	9
	98	54	44

The successful candidates have been registered as Students. Their names, given in order of merit as placed by the Board of Examiners, are as follows:—

Messrs. S. Warwick, London; A. G. Parker, London; H. A. Willatt, Nottingham; G. Hanson, Bradford; J. D. Clarke, London; G. V. Myer, London; C. Forsyth, Glasgow; H. V. Shebbear, Surliton; W. D. Quicke, London; F. B. Foster, Leamington Spa; G. Dykes, Glasgow; A. Wagstaff, Glasgow, W.; C. J. Goodwin, Croydon, Surrey; H. E. Woodsend, Nottingham; C. E. Lovell, Gravesend; R. A. Lovett, Abergeenny; H. J. Richardson, St. Leonard's-on-Sea; D. B. Hulton, Glasgow; A. A. Johnson, Croydon; C. Paterson, Bowdon, Cheshire; G. F. E. Daniell, London; W. Haywood, Birmingham; T. T. Cumming, Reading; H. Langman, Southport; R. Donnelly, Holywood, co. Down; M. Skinner, Beckenham; P. M. Stratton, Salisbury; P. G. Crawley, Peterborough; H. S. Sawyer, Winchester; B. B. Hooper, Brixton, S.W.; I. T. Sifton, London; E. A. Agutter, London; G. N. Beaumont, Wakefield; A. F. S. Bryden, Glasgow; A. E. Bullock, Chiswick, W.; O. H. Cockrill, Great Yarmouth; I. Cooke, jun., Liscard, Cheshire; W. H. H. Cooke, Stroud; E. H. Edleston, Nantwich, Cheshire; H. L. Etherington-Smith, London; F. J. Humphry, Worthing; H. Hunnisett, Rye; P. W. Lovell, London; A. S. Miller, Reading; E. L. Monson, Newark; A. Potter, London; E. L. Pryor, Greenwich, S.E.; H. B. Smith, London; R. Slubb, Cheshire; J. R. Sykes, London; E. R. Taylor, London; B. W. Thomas, Southampton; R. F. Tucker, Upper Teddington, S.W.; H. M. Whiddington, London.

The Final and Special Examinations, qualifying for candidature as Associate, were held in London from November 14 to 21. Of the forty-nine candidates examined, twenty passed, and the remaining twenty-nine were relegated to their studies. The following are the names of the passed candidates:—

Messrs. R. Bennett, Buxton; W. E. Brooks, London; F. B. Chester, London; W. St. L. Crowley, Cardiff; W. Greenwood, Blackburn; J. H. Higson, Blackburn; J. Holt, Wilmslow, Cheshire; H. J. B. Hoskins, Birmingham; J. I. P. Jones, Cardiff; J. M. Lethbridge, Highgate, N.; T. F. MacLennan, Edinburgh; C. E. Monro, Bearsden, nr. Glasgow; G. S. Nicol, Birmingham; C. E. L. Parkinson, London; H. T. Rees, London; N. T. Salmon, Reading; S. Towse, Catford; W. H. Watkins, Bristol; H. White, Loughton, Essex; F. C. Wrigley, Chiswick, W.

The following shows the number of failures in each subject of the Final:—

I. Design	...	23
II. Mouldings and Ornament	...	23
III. Building Materials	...	14
IV. Principles of Hygiene	...	12
V. Specifications	...	8
VI. Construction, Foundations, &c.	...	13
VII. Construction, Iron and Steel, &c.	...	16

The Ashpitel Prize.—The Board of Examiners recommend that this prize be awarded to Mr. William Greenwood, of Blackburn, he being the candidate who has distinguished himself most highly in the Final examinations of the year.

Dilapidations.

Mr. S. Flint Clarkson, on behalf of the Practice Standing Committee, gave an outline of the contents of the volume on "Dilapidations," prepared by the Committee, and now in the Press. At the conclusion, the thanks of the Institute were accorded to the Practice Committee, and particularly to the Sub-Committee, Messrs. S. Flint Clarkson, C. H. Brodie,

and Sidney Perks for their labours in connexion with the production of the book.

The following is a *précis* of the contents of the forthcoming book on "Dilapidations," which has been drawn up by the Committee, to give an idea of the scope of their work:—

Chapter I.—Preface.—Committee appointed in 1842 by the Royal Institute of British Architects. Publication in 1844 of Committee's Report. Order of present publication. Best current practice. Revision from time to time desirable.

Chapter II.—Repairing and Surrendering Covenants.—Covenants in leases. Dilapidations. Typical forms of repairing and surrendering covenants. Royal Institute of British Architects Council on covenants in 1844. Mitigating effect of legal decisions. Proposed forms of repairing and surrendering covenants.

Chapter III.—Report on the Condition of the Premises.—Reports as schedules to leases. What report should state. Notes as to existing custom abroad with reference to records of the condition of the premises ("Etat des Lieux"), France, Belgium. "Procès Verbal de l'Etat des Lieux," Vienna, Cologne, Berlin, Canada.

Chapter IV.—Liability of Lessee under a Lease for Years.—Definition of dilapidations. Burden of repairs in tenant. Possible liabilities of lessee. Bricklayer, mason, tiler, slater, carpenter, joiner, ironmonger, smith, plumber, copper smith and zinc-worker, plasterer, paperhanger, painter, glazier; altered and missing parts of buildings; special covenants; practice in Scotland, Ireland, the colonies, &c.

Chapter V.—Yearly and Other Tenancies.—Liability of yearly tenant. Tenant for life.

Chapter VI.—Farm Buildings and Farms.—Special customs. Custom as to finding materials. Payment by outgoing tenant for dilapidations. Customs as to cultivation, &c.

Chapter VII.—Ecclesiastical Dilapidations.—Principle of law. *Wise v. Metcalfe*, Martin v. Roe. Liabilities of Rectors. Ecclesiastical Dilapidations Act, 1871. Official surveyors. Exemption for five years. Appeals. Other provisions.

Chapter VIII.—Structures Appurtenant to Premises.—Appurtenant structures. Fixtures. General rules. Three lists of fixtures. Remarks on Chapter IX. Mortgagor and mortgagee.

Chapter IX.—Fixtures (continued).—Schedules of appurtenant structures and fixtures. 1. List of fixtures held not removable. 2. List of trade fixtures held removable. 3. List of fixtures held removable (not being trade fixtures) if put up by lessee.

Chapter X.—Notice to Repair. Money Payments.—Form of Notice to Repair. Form of Notice upheld by Court of Appeal. Costs of Solicitor and Surveyor. Money payments.

Chapter XI.—Professional Charges.—Charges by percentage. By time. For expenses. Under Ecclesiastical Dilapidations Act, 1871.

BRITISH SCHOOL AT ROME.

A MEETING of the General Committee and the subscribers of the British School at Rome was held in the rooms of the Royal Asiatic Society, Albemarle-street, W., on Saturday last week, the President of Trinity College, Oxford (Professor H. F. Pelham), presiding.

The Chairman said that up to now the School had existed in a provisional sort of way, with a Provisional Committee, but the time had come, it was thought, to constitute themselves, and give themselves a regular government, and it was mainly to do so that the meeting was being held. There was one thing in the brief history of the School he would like to refer to—i.e., the regrettable loss of their Treasurer, Mr. Spring-Rice, to whom the School owed a deep debt of gratitude. Not only had the country lost a valuable public servant, who gave promise of being more valuable as time went on, but the School at Rome had lost one of its best friends. The first step necessary to give themselves a regular constitution was to move, as he did, that "all subscribers present who are not members of the General Committee be added to the General Committee."

Mr. W. Loring, hon. secretary, seconded, and the motion was agreed to.

Mr. Loring then read the Report of the School for session 1901-2, which stated that the School was formally opened by his Excellency Lord Currie, H.M. Ambassador to the Quirinal, on April 11, 1901. It had now terminated the first complete session of its existence as a working institution, and, on the whole, the results achieved were satisfactory. The School had obtained the official recognition of all the authorities and bodies with whom it is necessarily brought into contact. The Italian Ministry of Public Instruction extends to the students all the facilities which it is accustomed to grant to members of such institutions, and the official intro-

duction to the authorities of the Vatican Library has been effected through the offices of Cardinal Vaughan. With the other foreign schools in Rome the relations of the British School are of the most friendly nature. At the instance of the British Consul, Mr. Morgan, an informal conference was held at the Consulate in April last between representatives of the British School, of the Anglo-American Archaeological Society, and of the British Academy of Arts. No decision was arrived at, but it seemed possible that with the British Academy of Arts, at any rate, some definite plan of co-operation might be framed. With the Archaeological Society the School is on the most friendly terms, but the constitution and functions of the two institutions were so different that it seemed best for each to continue to work on its own lines. The rooms leased for the School in the Odescalchi Palace have proved to be well adapted for the purpose. A good deal, however, remains to be done in the way of providing fittings and furniture; hitherto only the barest necessities have been purchased. Of greater importance for the efficiency of the School was the augmentation of the library. The Committee had to acknowledge very gratefully the numerous gifts of books already received. Thanks, chiefly, to these benefactions, the library now contains upwards of a thousand volumes. But large and frequent additions must be made if the library is to be of material use to students; and for this purpose, among others, a substantial increase to the small income of the School is required. As might be expected in a new and imperfectly organised institution, situated in such a busy centre as Rome, the Director's work had been of a somewhat varied nature. In addition to the preparation of his paper on *S. Maria Antiqua*, and to the giving of advice and assistance to the students of the School and to other English scholars at work in Rome, considerable attention was devoted to those visitors who desired more information about recent discoveries than could be obtained from the ordinary sources. Much time was also occupied in the development and arrangement of the library of the School. The School opened with two students. One of these, Mr. Thomas Ashby, M.A., of Christ Church, Oxford, sometime Craven Fellow of the University, had continued to devote himself to the topographical researches in Rome and the Campagna; the other, Mr. Culbert Elakiston, B.A., also of Christ Church, and at present Craven Fellow, was occupied with the study of the architecture of the fourth century A.D. In addition to these two students, two others have been more recently admitted—Mr. Bernard Webb, who was sent out by the Institute of British Architects, and Mr. Peter S. McIntyre, who holds a studentship from the University of St. Andrews for palaeographical studies. The best evidence of the work accomplished by the School was supplied by the volume of "Papers of the British School at Rome," recently published, the first, it might be hoped, of a long series. Of the two monographs contained in the volume, that by the Director (Mr. Rushforth) on *Santa Maria Antiqua* was the only adequate account of the church as yet published, and was of great interest and importance. Mr. Ashby's paper was an excellent illustration of the work that was being done, and had yet to be done, in the Campagna Romana—work which required a trained eye and the most patient and constant personal examination of the ground. The Committee, in referring to the financial aspect of the affairs of the school, mention their sense of the severe loss which it has suffered by the death of Mr. Stephen Spring-Rice, C.B., Hon. Treasurer of the School. He brought to the work not only his great financial ability and experience, but a generous enthusiasm for the cause of learning; and during the few months for which he held office he was unsparing in his efforts for the good of the School. The audited accounts, which were issued with this Report, cover the period from October 1, 1901, to July 31, 1902, it being found in practice that the end of July was the most convenient date for closing the School accounts. The receipts in the subscription account amount to 478*l.*, and the expenditure was 536*l.*, showing a deficiency on this account of 58*l.*. The donations amount to 113*l.*. Of this sum, 58*l.* are taken for the deficiency on the income account, and 55*l.* were devoted to the purchase of special books for the library. If the accounts had been taken on October 1, the deficiency on the income account would have been increased by 60*l.*, and the total of the donations by 20*l.* A complete year would have shown a deficit on the combined accounts of 55*l.* It would be obvious that strenuous efforts were still needed to put the School on a firm financial footing. The comparatively favourable results of the ten months' working were largely due to the subscriptions of colleges and other public bodies, which are only promised for short terms of years, and death had already begun to make itself felt among the individual subscribers. Funds were urgently required to raise the stipend of the Director to a more adequate sum, and to form a satisfactory library. The Committee had drafted, and now submitted to the General Committee for confirmation, a scheme defining the objects of the School, the privileges of subscribers, the composition and powers of the Executive Committee, the position, duties, and privileges of the Director and students, and other similar points. These rules are modelled on those in force for the British School at Athens, with such modifications as the different circumstances of the two Schools appeared to require. The newly-constituted Committee will report annually to the subscribers, as in the analogous case of the British School at Athens, with which it was hoped that the Roman School might ultimately establish an even closer connexion than had yet been possible.

Mr. Mackail then moved, "That the Report of the Executive Council be adopted, and that the rules submitted by them be confirmed." In doing so he attributed the falling-off of financial support to the South African war. It seemed little short of a scandal that the amount of public support for a work of the kind should be less than 500*l.* It ought to be possible and easy to treble that amount. The deficiency of income affected the School seriously, the principal result being an inadequate staff at Rome. On such a sphere of operations two directors were really needed—one to preside over the department of ancient art and history, and the other over that of the Middle Ages.

Dr. C. Waldstein seconded, and emphasised the need of an adequate staff and adequate remuneration of the staff. He hoped and believed that the School would appeal to wider support, and be able to extend its sphere of usefulness. The continuity of history from ancient times and throughout the Middle Ages was better realised in Rome than on any other spot; and the Renaissance really centred in Rome. It was to be hoped that, as there was already a student sent by the Royal Institute of British Architects, the full co-operation of that society and also of the Royal Academy would be secured.

Mr. A. H. Smith, Acting Treasurer, having explained the balance-sheet and accounts, the motion was agreed to.

The following are some of the new rules of the school:—

- I. The school shall be, in the most comprehensive sense, a school of Roman and Italian studies. It shall promote the study of Roman, and of Greek and Greco-Roman, archaeology in all its departments, including palaeography. Every period of the language and literature, antiquities, art, and history of Rome and Italy shall be considered as coming within the province of the school.
- II. The school shall also be a centre at which information can be obtained and books consulted by British travellers pursuing serious objects in Italy.
- III. A library of archaeological and other suitable books, including maps, plans, and photographs, shall be formed and maintained in connexion with the school.
- XVII. The Director shall be appointed by the Committee, on terms which shall be agreed upon at the time. No Director shall be appointed in the first instance for a period of more than three years. In case of misconduct the Director may be removed from his office by the Committee by a majority of three-fourths of the members present at a meeting specially summoned for the purpose. Of such meeting at least a fortnight's notice shall be given.
- XVIII. It shall be the Duty of the Director—(1) To guide and assist the studies of students and associates of the school, affording them all the aid in his power; (2) To hold occasional public meetings, at which he and the students may read papers on some subject or subjects of study or research; (3) To act as editor of any scientific papers which may be published by the School.
- XXI. At the end of each season he shall report to the Committee—(i) on the studies pursued during the season by himself and by each student; (ii) on the state of the school premises and the repairs

needed for them; (iii) on the state of the library; and (iv) on any other matter affecting the interests of the school.

XXII. He shall act as librarian, and shall have power to make rules for the use of the library, such rules being subject to the approval of the Committee.

XXIII. The Committee may admit as students of the school:—(1) Holders of travelling fellowships, studentships, or scholarships, at any University of the British Empire. (2) Travelling students sent out by the Royal Academy, the Royal Institute of British Architects, and other similar bodies. (3) Other persons who shall satisfy the Committee that they are duly qualified to be admitted as students. No person shall be admitted as a student who does not intend to reside at least three months in Italy.

XXIV. Students of the School will be expected to pursue some definite course of study or research, and to submit to the director in each season a report upon their work for the information of the Committee.

XXV. Persons wishing to become students are required to apply to the Secretary. They will be regarded as students from the date of their admission by the Committee to October 15 next following; but any student admitted between June 1 and October 15 in any year shall continue to be regarded as a student until October 15 of the following year.

XXVI. The Committee may elect as associates of the school any persons actively engaged in study or research in Italy, and may also elect as honorary members such persons as they may from time to time think desirable.

XXVII. Students, associates, and honorary members shall have a right to use the library of the School, and to attend all lectures and public meetings held in connexion with the School, free of charge.

Mrs. Arthur Strong then moved and Mr. Smith seconded, "That the General Committee be dissolved."

This having been agreed to, Mr. D. G. Hogarth moved, "That the President of Trinity College, Oxford, be elected Chairman under Rule IX. (1); and that the following be elected Members of the Committee under Rule IX. (2):—Professors J. S. Reid, Dr. G. W. Frothero, Dr. C. Waldstein, Sir Rennell Rodd, Mr. A. B. Cook, Mr. F. Haverfield, Mr. W. Loring, Mr. G. A. Macmillan, Mr. A. H. Smith; that his Excellency Lord Currie, Dr. Thomas Hodgkin, and the Dean of Westminster be appointed Trustees under Rule XXVIII.; and that Mr. Edwin Waterhouse be appointed Auditor for the current financial year."

Mr. G. F. Hill seconded, and the motion was agreed to.

On the motion of Dr. Waldstein a vote of thanks was accorded to the chairman, and the meeting terminated.

ARCHITECTS AND GAS-STOVES.

A CORRESPONDENT has sent us a copy of a paper by Dr. W. H. Birchmore, "On the Use of Gas for Warming Enclosed Space," recently published in the *American Gas-Light Journal*, and is apparently fearful lest copies should be seen by some of our readers and have lamentable results. As Dr. Birchmore poses as a teacher of architects, and simultaneously advocates a system of using gas which is diametrically opposed to all hygienic methods, it may be of service to briefly refer to one or two of his most dangerous assertions.

"Let us begin a campaign of education, first among the architects of houses and the makers of gas-stoves," says Dr. Birchmore, and, totally ignoring the work of such men as Frederick Siemens and Thomas Fletcher, asserts that not one of the gas-stove manufacturers has taken the trouble to investigate the subject of heating by gas as a matter of science, or if he has made such investigation he has not used it for the benefit of the public.

All architects know that fatal accidents have occurred owing to the combustion of large volumes of gas in appliances not connected with a flue, and that immediately a gas flame comes in contact with a cold surface poisonous products of incomplete combustion escape from the flue, while a disagreeable odour is simultaneously generated. Yet Dr. Birchmore would have us believe that "there is really no more sense in protesting against a gas-stove without a flue, which shall carry combustion products to the chimney, than there would be in protesting against a Welsh burner without the same inconvenience."

Again, every schoolboy knows that the inhalation of heated air is prejudicial to health, and that the best method of heating is that which warms the walls and furniture and

leaves the air comparatively cool, *i.e.*, that warming should be effected by radiant heat and not by convected heat. But, according to Dr. Birchmore, "the heat of the flame should be made to come in contact with the largest possible surface, so that the hot gases may be cooled and the air circulated in the room heated correspondingly."

Referring to the heat lost by windows, Dr. Birchmore makes the discovery that this heat can be saved by the use of double sashes, "but these double-sashed windows can be gained only by the education of the people and the architects." The latter will no doubt be duly grateful for the Doctor's remark that "as the architects are more intelligent and less numerous than 'the people,' it would be as well to begin with them."

Dr. Birchmore assumes that if 100 cubic feet of air per hour per person are added to the contents of a room of 1,536 cubic feet capacity, that is a sufficient volume for respiration purposes. We do not know why a volume of fresh air so much below that required as a minimum supply by British authorities should have been selected as a basis for calculations, but as the paper contains very little useful information it is needless to give it further consideration.

CAMBERWELL SCHOOL OF ARTS AND CRAFTS.

THE management is to be congratulated on the exhibition of students' work of the Chamberwell School of Arts and Crafts in Peckham-road. Owing to want of accommodation, there are no classes for such important branches of the crafts as bricklaying, joinery, and plumbing, but the work in the higher arts and crafts shows sufficient merit to encourage the hope that these will be efficiently taught when the contemplated addition to the school has been made. In the stonecutting and cabinet-making sections there is evidence of conscientious work, but it is in decorative work that the exhibition is specially interesting. The preparatory studies and drawings from life are not altogether striking, especially the latter, which might with advantage be conducted with more consideration of scale. Although small studies may apparently fit students for illustrative work more quickly, it cannot give that finish and action to figure drawing which is attained by studies of a large size, and this is evident in much of the black-and-white work. The work of the Misses Ballard and Fulger, and the effective penwork of Mr. E. Pay, are amongst the best in this class.

The modelling class has turned out some admirable work, especially the head of Mr. E. Shen and the delicately modelled tiles by Miss A. E. Burt. In plaster-work care has been taken to keep the students on the lines of good design, and it is a joy to see the feeling of restraint manifested in all the work. The stone and wood carving are good, considering the period of studentship. In lettering Mr. Smith shows some examples, notably his "Riddles," which have all the feeling of the best class of work; and the other exhibits are many and creditable. In book-binding there is a decorative quality which is very charming.

The embroidery and art needlework section shows many interesting pieces. A hanging in dark blue ground, with gold and green embroidery surrounding heraldic panels in applied red morocco leather, by Miss B. Venables, and a fragment by Miss E. Burr, are full of the best feeling of colour and form.

The furniture design is fairly good and sound, as well as the one example of architectural drawing, while the few examples of conventionalised flowers are decoratively treated.

Altogether, the decorative feeling in the whole of the work shown is most pleasing.

MEMORIAL TO THE KING'S (LIVERPOOL REGIMENT).—The committee having charge of the arrangements for the memorial to the King's (Liverpool Regiment) have now, subject to a few minor alterations, finally decided upon a design which has been submitted by Mr. Goscombe John, A.R.A. The whole of the money required, 3,000*l.*, has been raised. The joint committee who have charge of the new St. John's Gardens, subject to their final approval of the design, have granted the central site in these gardens for this memorial.

THE ARCHITECTURAL ASSOCIATION : DISCUSSION SECTION.

THE third meeting of the present session was held at 56, Great Marlborough-street, W., on the 26th ult., when Mr. George P. Bankart, of the Bromsgrove Guild, read a paper on "Decorative Plaster Work." There was a large and representative gathering of members and visitors. Mr. Geo. H. Smith was in the chair.

Mr. Bankart dealt with the subject of "Decorative Plaster Work," treating the whole subject both from the architect's and craftsman's points of view. He thought it was a great pity that the present day plasterer was encouraged in his "ideal" of perfectly smooth, evenly floated, and skimmed surfaces. The old ceilings were not die level and polished; they were full of delightful, but very slight, undulations; the ribs and strapwork were not painfully exact as ours are. In these days plaster, like charity, covered a multitude of sins. The properties of stucco and plaster-work were well known to the ancients; but, whereas a full knowledge of the capabilities of stucco was arrived at very early, that of plaster did not reveal itself until comparatively modern times. Mr. Bankart gave a brief historical sketch of the methods, commencing with the Egyptians, who used stucco on their pyramids, to the Greeks and Romans. The latter, carrying off the Greek treasures, must have taken with them the art of the decorative stucco worker. With the decadence of the Romans the art passed into obscurity, to be revived again in the sixteenth century by the researches of Cardinal Giovanni de' Medici.

It was made use of by Raphael and his fellow workers in the Vatican and other notable buildings. It then passed to Mantua and other buildings. It was carried to France at the time of Francois premier, and thence to England in the reign of Henry VIII., and largely used in his Palace of None-such. About the year 1547 we have record of an English stuccoist named Chas. Williams, who had travelled in Italy, and probably was the first to work in England and at None-such. About this period came Longleat House, 1567, old Hardwick 1567-90, and present Hardwick 1590-7. Time went on, and a cheaper and commoner material known as pargeing came into use. It consisted of ordinary lime, hair, sand, and applied both externally and internally to the buildings, for examples, Wyvenhoe, Clare, &c. Then followed the wave of plaster work particularly our own. The workmen had their moulds, tools, and traditions, perhaps some rough drawing for guidance instead of a fussy and pretty sketch of what it would not and could not look like. We cannot, if we would, get away from the use of plaster as a material, so we should first demand of the plasterer the surface most natural to it. In the old work simplicity and "bigness" will be found to be the keynote of its success, and so it must be with the work of to-day. Mr. Bankart dwelt at length on the existing relationship between architect, client, and craftsman, and thought a good deal of disappointment to all three might be avoided by a little consultation and consideration of the matter before the "prime cost" amount was fixed. The author pleaded very ardently that architects should encourage good workmanship, and thereby raise the standard of craft-workers. In conclusion, Mr. Bankart impressed upon his hearers the necessity for the architect to educate his clients, and insist on his own views being carried out; otherwise it meant grind, grind, grind on every hand as a matter of principle.

At the close of the paper, Mr. Bankart put on the screen a most interesting and instructive collection of slides dealing with plaster work, commencing with remnants of ancient Roman remains, through the Stanze of Raphael at the Vatican to work in England, in both external and internal treatment, all illustrative of his paper, and which, with his explanatory comments, were most attentively followed.

The vote of thanks was proposed by Mr. R. H. Weymouth, and seconded by Mr. Guy Dawber, who said the work of Messrs. Bankart and Gilbert was personally known to him. He had listened with great pleasure to Mr. Bankart's truly interesting and instructive exposition of the value and beauty of good plaster decoration.

The discussion was carried on by Mr. W. Gilbert, of the Bromsgrove Guild (Special Visitor), who emphasised the necessity of co-operation between architect and craftsman, so

as to obtain work equal to that carried out by the old men.

Mr. E. Prieoleau Warren summed up the discussion, and wished to add his appreciation of having had the opportunity of listening to Mr. Bankart's paper. He called attention, in supplement to the author's remarks, to the vaulting in plaster to be seen in Northern Italy, which, looking up from the walls all round, seemed to support or lead up to a large shield or other enriched plaster work as the principal ornament of the apartment in its centre, and which was certainly very effective. With regard to "stamped" enrichments in ceiling work, he, in some repairs to an old house in the country, had been able to examine in detail the "stamped" ornament referred to by Mr. Bankart, and the methods of fixing. He noticed the great variety of light and shade obtained by their being fixed unevenly when pressed up by hand into the wet plaster. Referring to tradition amongst plasterers, he remarked that in building his own house in the country he noticed that the plasterers always covered the cement filleting to the roof with a "zig-zag and dot" ornament—evidently the remnant of local tradition still lingering on in an out-of-the-way country place, and which was evidently added as a matter of course in such a position.

The vote of thanks was carried with acclamation, and made to include the Special Visitor, and Mr. Osborne Smith for working the lantern. Mr. Bankart having replied, the meeting terminated.

The Chairman announced that Mr. J. S. Blunt would read a paper on "Crosses," on Wednesday, December 10, at Great Marlborough-street, and it was hoped that Mr. Swinfen-Harris would be able to attend as Special Visitor.

BUILDERS' BENEVOLENT INSTITUTION : ANNUAL DINNER.

THE fifty-fifth annual dinner of this Institution was held on Thursday evening last week at Carpenters' Hall, London Wall. The President, Mr. William Higgs, occupied the chair, being supported, amongst others, by Mr. B. J. Greenwood, President of the National Federation of Master Builders; Mr. W. F. King, President of the Institute of Builders; Mr. S. J. Lough, President, London Master Builders' Association; Mr. P. Preston, Senior Warden of the Carpenters' Company; and Messrs. H. H. Bartlett, J. T. Bolding, C. Busell, W. B. Brown, J. P. J. Carmichael, S. Collins, L.C.C., J. Howard Colls, J. S. Gibson, T. Gregory, B. J. Hellyer, J. Hill, A. Keen, E. W. Neighbour, J. Randall, A. Ritchie, C.C., J.P., Gilbert Seale, Osborne Smith, A. W. Spencer, T. Stirling, S. M. Young, and T. Costigan, Secretary.

The loyal toasts having been honoured, Mr. J. Howard Colls, treasurer of the Institution, proposed "The Imperial Forces," coupled with the name of Captain T. Stirling, who responded.

The Chairman then proposed the toast of the evening, "The Builders' Benevolent Institution." They were all, he said, so interested in this excellent Institution that it did not need oratorical power to induce them to give generously towards its support. The building trade is an exceptionally risky one. When they were successful in obtaining a contract they never knew whether it would prove profitable or not. His father used to say when they were sanguine over a job or otherwise, "Wait till the end," and it often happened that it was not till the squaring up of accounts that they knew whether they had lost or won. In such a risky trade it was not to be wondered at that many were unsuccessful, and it behoved those who had happened to some extent to be successful to help those who, on the other hand, had suffered misfortune. He sat with the secretary for a short time on an appointed day recently, when the recipients of the charity came to receive their pensions, and, as he interviewed them, he was deeply touched to see those who had once been successful men of business, and also widows of such, coming and taking their pensions and expressing their gratitude. One pensioner whom he recollected as being in a large way of business when he (the speaker) was a boy, had served on the committee of this Institution, and now was receiving, instead of dispensing, the gifts of the charity. Last year, under the able Presidency

of Mr. James Carmichael, high-water mark was reached by the Institution, but why should not the tide of charity rise higher and higher each year? London continues to grow; the building trade of the country continues to increase; the claims of this charity moved with the times; and, consequently, it required an increase of contributions to its funds. There was one point he would like to emphasise—the Institution never got into debt, and he always felt more inclined to contribute to a charity that pays its way than to one that had a debt. Since the foundation of the Institution 303 pensioners had benefited by the charity. Male pensioners receive at the present time 39l., and female (builders' widows), 27l. per annum respectively. There was an excellent committee composed of good business men, and the Institution could not be too thankful for the way in which Messrs. Stirling, Bolding, Bussell, and other members of the committee had worked for the charity, and also on the fact that a successor to Major Brutton, as secretary, had been found in the person of Mr. Costigan, who dispensed the pensions in a kind and genial way.

Mr. Costigan then read a long list of the names of the subscribers and donors this year. The President's list amounted to 917l., and included 103l. from the President; 50l. from the Institute of Builders; 26l. 5s. from the Associated Portland Cement Manufacturers, Ltd.; and 21l. each from the following:—Mr. W. Curling Anderson, Mr. Joseph Hill, Sir Westman D. Pearson, Bart & Son, and Spencer, Santo, & Co. The total amount announced was 1,140l.

The Chairman said he was pleased to be able to state that owing to their generosity that evening the Committee would now be in a position to place upon the funds of the Institution all the candidates who have made application for the December election. This would save them from the trouble and expense incurred in canvassing for votes.

Mr. H. H. Bartlett proposed "The Worshipful Company of Carpenters," and in doing so congratulated the Company upon the excellent scheme of lighting which had been introduced in that hall. The Carpenters' Company was well to the front, and had furthered building interests in many ways. They had provided good technical classes in the various branches of the trade, and had also done a good deal to promote health and strength by providing swimming-baths, &c. With the toast he coupled the name of Mr. P. Preston, senior warden.

Mr. Preston, in response, said it was always a pleasure to lend their hall to any trade or body of men connected with the industry which the Company represented. As to the lighting of the hall, the Master and Warden and Committee had lately carried out a scheme of lighting, redecoration, and warming in order to make the hall as perfect as they could, and with the aid of their architect and surveyor and Messrs. Waring, who did the work, he thought the scheme had been carried out in an admirable way. He was the secretary of a similar, although smaller, institution, and he knew what benefit was given by such societies. The expression of thanks which the recipients made from time to time for the help they received was very gratifying.

Mr. B. J. Greenwood, in proposing "The President," mentioned the fact that twenty-five years ago the President's father was the President of the Institution. He hoped that the generosity of the friends of the Institution would always be sufficient to do away with canvassing in connexion with those who apply for assistance, and that the help forthcoming would, as this year, always be equal to the need.

The President, in the course of his reply, said that next year Sir Westman D. Pearson, Bart., had promised to act as President of the Institution. Twenty-five years ago, as had been said his father was President, and they raised 600l. for the charity, and then, as now, all the candidates were elected, including one who had been a recipient ever since until this year, when he died.

Mr. W. F. King then proposed "The Architects and Surveyors." The architect was, first of all, an artist, who worked in three dimensions and designed buildings which should stand four-square, not only to the winds, but to the assaults of criticisms. Therefore an architect was also a man of construction and a man of business. In order to fit themselves as practical men of business and construction,

architects had formed a teaching body (the Architectural Association) to further the education and technical knowledge of the younger men. Builders prided themselves on being practical men, but what had they done to educate the men who were to follow them? Here was a lesson they could take from the architects. An architect was also an arbitrator between the client and the builder, and it was wonderful how the architect took up that high position—on the one hand seeing that the client's interests did not suffer, and on the other that the interests of the builder were not overlooked. This was not to be undertaken lightly, and the fact that it was done with such success was a credit to the majority of the members of the profession. But there was another gentleman who was a necessity nowadays in the erection of a building—i.e., the quantity surveyor, who was a man of hard and stern facts, who checked, on the one hand, the extra exuberance of the architect, and, on the other, the exuberant extras of the builder. With the toast he coupled the names of Mr. Arthur Keen and Mr. W. B. Brown.

Mr. Keen, in responding for the architects, said that differences did occur between architects and builders, but it was remarkable that they were not more numerous. Mutual confidence, in a remarkable degree, existed between them, and he had been often surprised to see with what confidence a builder would place himself, almost unreservedly, in the hands of the architect. He trusted that that confidence would never be misplaced.

Mr. Brown, having briefly responded for the surveyors,

Mr. J. Carmichael proposed "The Vice-Presidents, Committee, and Stewards," to which Mr. J. Lough responded. Mr. Lough, in the course of his remarks, said it must not be supposed that every one who applied to the charity received its benefits. Each case had to be inquired into by the Committee and approved before the candidate became eligible for election. Only when the applicant was a genuine builder, or his widow, really requiring assistance, was that applicant eligible.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir J. McDougall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Lambeth Borough Council 2,585l. for paving works; Battersea Borough Council 4,035l. for electric lighting and meters; Woolwich Borough Council, (sanction to loan) 53,000l. for erection of offices; Camberwell Guardians 310l. for erection of relief station; Kensington Guardians 1,200l. for works at workhouse; Chelsea Borough Council 5,000l. for purchase of land.

Improvements.—On the recommendation of the Improvements Committee, it was agreed to contribute 15,860l. towards the cost of widening West Hill, Wandsworth, between the police-station and Santos-road; 2,500l. towards the cost of widening Burntwood-lane, Wandsworth, to 54 ft.; 2,082l. towards the widening of Fulham-road between Britannia-road and Cedar-road; and 1,333l. towards the cost of widening Catherine-street south of Drury Lane Theatre.

Housing and the Works Department.—The Corporate Property, Charities, and Endowments Committee recommended that lots 2-6, Ben Jonson-road, be let to Mr. E. Jackson for a term of eighty years, at a ground-rent of 33l. per annum.

Mr. Piggott moved, and Mr. Jefferies seconded, that the land should be used for housing purposes.

The amendment, however, was defeated, and the recommendation agreed to.

The Housing of the Working Classes Committee recommended, and it was agreed, that the seal of the Council be affixed to the scheme for the erection by the Council of dwellings to accommodate 1,030 persons on sites in Preston's-road and Norfolk-street, Poplar, in fulfilment of the rehousing obligations of the School Board for London as to that number of persons of the working classes.

The Housing of the Working Classes Committee also reported as follows:—

"On July 30 and December 17, 1901, the Council voted sums of 15,000l. and 62,135l. for the construction of the foundations of blocks A to F and front-

ing Portpool-lane, and for the erection of the superstructure of blocks A to F, Reid's Brewery estate. We are now in a position to proceed with the erection of the blocks of dwellings on the estate, which front Clerkenwell-road and Leather-lane. For the sake of convenience and expedition these dwellings have been divided into four sections, and we submit working drawings and specification in respect of the first two sections, together with bills of quantities and the architect's estimate of 13,200l. in respect of the first and a portion of the second section. We propose that these bills of quantities shall form a schedule of prices which shall be applicable to the erection of the remaining portion of the second and the third and fourth sections. The estimate of the total cost of the four sections, including Architect's expenses and incidental charges, amounts to 51,890l. The dwellings provide an estate office and twenty-three shops fronting Clerkenwell-road, together with two tenements of one room, fifty-six tenements of two rooms, thirty-eight tenements of three rooms, and seventeen tenements of four rooms, affording accommodation for 592 persons. The average size of the rooms will be slightly in excess of the Council's minima of 144 square ft. for living rooms and 100 square ft. for bedrooms. Being of opinion that the work of building these dwellings should be carried out by the Council without the intervention of a contractor, we have referred the plans, specification, bills of quantities, and Architect's estimate of 13,200l. to the Works Committee, and they have now informed us that they are prepared to build the dwellings to which these documents refer at the amount of the estimate, and to build also the remaining dwellings on the Clerkenwell-road and Leather-lane frontages at the same schedule of prices, subject to the whole work being referred to them at once and to the several sections thereof being proceeded with in regular sequence at close intervals. These conditions accord with our intentions when referring the work to them for acceptance. . . ."

It appeared to the Committee in December last that the probable financial result of the estate as a whole would be an annual surplus of 144l.

Since that date we have been informed that the Architect's estimate of the cost of the dwellings on the whole estate approximates 135,877l. This is largely owing to the fact that the building operations now proceeding are proving very costly, chiefly by reason of the extraordinary nature of the foundations required and the difficulties consequently experienced in running the drainage, gas and water mains, &c. As this was a matter which, in our opinion, seriously affected the value of the estate for housing purposes, we communicated with the Improvements Committee on the question. In spite, however, of the disabilities referred to, the Improvements Committee have not seen their way to recommend any reduction in the housing value of the site. At the same time we were advised that, in consequence of the rise in rates in the borough of Holborn, and the increase in the income-tax, the net income from the dwellings on the whole estate would be reduced from 7,512l. to 7,447l. The effect of this was to turn the estimated annual surplus of 144l., in respect of the whole estate, into an estimated capital deficiency of about 1,800l.

Our Committee are of opinion that Reid's Brewery estate is earmarked for the erection of buildings to accommodate, amongst others, some of the persons to be displaced by the carrying into effect of the Holborn to Strand improvement. It is essential to the progress of the improvement that no delay should occur in the development of the estate, and, indeed, having regard to all the circumstances, it would be hardly possible to say that the difficulties in development which are due both to the nature of the particular site and to the incidence of local taxation can be overcome by any delay or reconsideration of the plans.

We therefore considered whether a saving sufficient to meet the deficiency could reasonably be expected on the Architect's estimate in respect of the works already in hand. We find that a saving of about 800l. will probably be effected on the estimate by the letting of the erection of the superstructure of blocks C, B, and A, since the accepted tender for block C was about 300l. less than the Architect's estimate. We also communicated with the Works Committee, who have constructed blocks D, E, and F, and the foundations for blocks A to F and fronting Portpool-lane, with a view to ascertaining whether they could advise us that any saving was likely to have been effected on the estimate for that work. The Works Committee have now informed us that they are of opinion that a sum of 2,600l. will be saved on that estimate, and we are therefore able to advise the Council that the erection of the dwellings on the Clerkenwell-road and Leather-lane frontages of the estate can be proceeded with in full compliance with the standing orders."

The Committee recommended accordingly.

Mr. Cousins said that blocks had already been put up on this site by contractors at 300l. under the Architect's estimate, whilst those put up by the Works Department on the same site had been taken at the Architect's estimate. The Council had put contractors and the Works Department side by side on this work

for comparison. He moved to refer the report back, in order to know what had been the cost of the structural work by the Department and what by the contractor.

Colonel Rolton seconded, but the amendment was lost, and the Committee's recommendation was agreed to.

Electric Light, Victoria Embankment and Westminster Bridge.—A supplemental estimate of 2,000l. for this work was agreed to.

Tramways.—On the recommendation of the Highways Committee, a scheme for the electrification of another section of South London tramways was agreed to, at a cost of 1,335,000l. The lines are mostly in the neighbourhood of the Elephant and Castle, Newington-causeway, and Southwark Bridge.

Model Lodging-house for Women.—The Public Health and the Housing Committees presented a Report recommending the construction of a model lodging-house for women in Webber-row, Southwark, to accommodate fifty-seven women. This is regarded as an experiment. It is to be on the cubicle system, with a common dining and sitting room. The Committees state that their inquiries show that the accommodation for women in lodging-houses was distinctly inferior to that provided for men, whilst the charges are higher. The recommendation was agreed to.

The following are particulars of the proposed building.—The entrance is at the north-eastern end of Webber-row, and gives access to the dining, reading, and sitting rooms on the left. The office commands the entrance, and is arranged close to the superintendent's quarters. The estate office is approached through the lodging-house office, and the public entrance is on the south-western side of the lodging-house. The dining-room is approached from the main corridor, and is lighted from one side and the roof. One large cooking range is provided. The lodgers' scullery is approached from the dining-room, and is also used as the lodgers' crockery store, and for washing the lodgers' crockery. A ship for the sale of cold viands is placed at the north-western side of the dining-room, and in close proximity to the latter and store. The reading-room is arranged so that it overlooks the garden in rear. The sitting-room also overlooks the garden, and has cross ventilation. The accommodation in the dining, reading, and sitting rooms, compared with the Mill-lane lodging-house, is as follows:—

	Areas in square feet.		
	Dining-room.	Reading-room.	Smoking-room.
Mill-lane lodging-house	6,067	3,057	2,031
Women's lodging-house	430	199	320
Square feet per lodger.			
	Dining-room.	Reading-room.	Smoking-room.
Mill-lane lodging-house	7.54	3.80	2.53
Women's lodging-house	7.54	3.33	5.61

The lockers, sixty in number, each 1 ft. 6 in. by 1 ft. 6 in. by 3 ft. 6 in. high, are in close proximity to the dining-room. The parcels-room is provided near the entrance. For water-closets, four lavatory basins, one feet-washing trough, two bath-rooms, changing-room, lodgers' washhouse and drying room are approached through a ventilated lobby from the main corridor. The superintendent's quarters comprise two sitting-rooms, two bedrooms, kitchen, bath, water-closet and coal store. The soiled linen shoot, clean linen room, hatter, and store are placed near the trades entrance. The dormitories are arranged on the three upper floors; one staircase leading to the dormitories is arranged at the south-western end of the lodging-house, and an additional iron emergency staircase, with exit from each dormitory floor on the flat over the dining-room, and thence by another flight to the ground level at the rear of buildings is provided, so that it will be practically impossible for both means of exit to be blocked in case of fire. Each cubicle is 4 ft. 10½ in. wide and 7 ft. long, internal dimensions, and is provided with a window, ample means of through ventilation being thus secured. The cubicle corridors are 3 ft. 6 in. wide. Two lavatory basins and a water-closet are provided on each of the cubicle floors. A garden is provided in the rear, and it is proposed to lay this out for the enjoyment of the lodgers. Aspect.—It will be observed that the building has been arranged so that each of the ventilated sitting-rooms will have the maximum amount of sunlight.

The Architect has also submitted drawings showing how the remainder of the site may be utilised for five-story block dwellings and shops.

The accommodation proposed to be provided is as follows:—101 two-room tenements, 203 rooms; 144 three-room tenements, 432 rooms (634 rooms), accommodating 1,265 persons. There will thus be

a total accommodation for 1,325 persons on the Webber-row area, as against 997 displaced by the whole scheme. Further accommodation will be provided on the remaining areas. In addition there would be ten shops and a store for administrative purposes in the rear. The Architect's preliminary estimate of the cost (5 per cent. above or below) of the women's lodging-house and the block dwellings and shops based on cubing (including Architect's and other incidental expenses) is as follows:—

Women's lodging-house (standard of finish same as that adopted at Mill-lane lodging-house)	£7,500
Block dwellings and shops (standard B)	58,276
Store in yard of block A	500
	66,276

To which must be added the estimated cost of furniture, viz. 450

66,726

The Valuer estimates the value of the land as follows:—

Site of dwellings	£10,500
Site of women's lodging-house	1,050
	12,450
Total	£79,176

The Housing Manager has prepared estimates of the receipts and outgoings of the proposed lodging-house and dwellings. The rent proposed to be charged for the lodging-house is 6s. per night for the single cubicles, and 9d. per night each for the three double cubicles, which will be suitable for a woman and her daughter, or two sisters or friends. The plans of the lodging-house make no provision for the washing to be done on the premises, and the most economical way will be for this to be done at the Parker-street house, where there is ample machinery for dealing with it, and the Housing Manager has therefore only estimated an expenditure equivalent to 8s. 4d. per week to cover the extra assistance that will be required.

Piccadilly Widening.—In answer to a question put by Mr. Wallace Bruce, Mr. Davies, the Chairman of the Improvements Committee said that Walsingham House and the Bath Hotel in Piccadilly were both coming down, and the street would be widened opposite those buildings.

Captain Swinton asked Mr. Pigott, chairman of the Parks Committee, whether the War Office was about to move the Duke of York's School in Chelsea out into the country. The site was 12 acres in extent, and Captain Swinton wanted to know whether 750,000l. had been offered for it as a building site, and what the Council could do to prevent this. Mr. Pigott was only able to confirm this statement partially, but he promised that his Committee would immediately communicate with the War Office on the matter, in order to see how the matter stood, and whether anything could be done to preserve the site as an open space.

Richmond Hill View.—The Parks Committee presented a Report which contained a statement about the trouble which had arisen between the Council and Sir John Whitaker Ellis, who had promised not to build on his land overlooked by Marble Hill. Now Sir John had offered some of this land for sale, and had declined to insert a clause in the conditions of sale forbidding the purchaser to build. The Committee reported that they had been advised that they could hold Sir John to his bargain. This they asked the Council to empower them to do. The Council unanimously instructed the Parks Committee to take all necessary steps to enforce the promise of Sir John Whitaker Ellis.

New Bills.—The Bills to be introduced in Parliament, suggested by the Parliamentary Committee, for the provision of steamboats on the Thames, and for the construction of tramways in various parts of London, were endorsed by the Council.

Theatre.—On the recommendation of the Theatres and Music Halls Committee the following proposals were agreed to:—

Arrangement of seating at the Carlton Theatre, Greenwich (Mr. A. Carlbom).

Fire-resisting curtain to proscenium opening at Haymarket Theatre, Haymarket (Mr. E. Wingfield-Bowles).

Arrangements for the Wild West show to be opened at Olympia, Hammersmith (Messrs. Barnum & Biley).

Arrangement of seating at the Prince of Wales's Road Baths, St. Pancras (Messrs. Aldwinckle & Son).

Arrangements as to lift at Wyndham's Theatre (Messrs. Waygood & Co.).

Bridges.—It was agreed to invite tenders for the reconstruction of Cat and Mutton Bridge, Shoreditch, and Bow Bridge; and also to contribute the sum of 1,000l. for rebuilding to

58 ft. instead of 50 ft. (as formerly proposed) the superstructure of the bridge carrying Old Kent-road over the Surrey Canal.

The Council adjourned soon after seven o'clock.

METROPOLITAN ASYLUMS BOARD.

THE fortnightly meeting of this Board was held on Saturday, Sir R. M. Hensley presiding.

The Board proceeded to the consideration of the following motion by Mr. Helby:—

"(i.) That the following resolution passed at the Board meeting of March 22, 1902, be, and is hereby, rescinded, viz. — That, after June 24, 1902, the Managers abstain from insuring their properties with the public fire insurance companies, with the exception of such special properties as they are required by any covenant or agreement with any other persons to insure, and of such other properties as they may from time to time, on the recommendation of the Finance Committee, determine to insure." (ii.) That the whole of the properties of the Managers be insured as heretofore [be forthwith insured against fire], and that inquiries be made with the view of obtaining, if possible, a reduction in the premiums charged."

Mr. Helby was given permission to substitute the words in brackets for the words in italics.

A letter was read from the Westminster Fire Office, in reply to the Managers' inquiry, offering to insure the whole of the Managers' property at the following premiums:—

	Amount.	Annual Premium.
1. Property as it stood at June 24 last	£2,688,387	£2,168 0 0
2. New property insured since June 24, being the insurances on the Orchard and Gore Farm Lower Hospitals ...	245,366	281 10 3
3. New property acquired since June 24 or in course of erection, estimated at	1,200,000	940 0 0 (approximately)
	£4,133,753	£3,389 10 3

The letter also contained the following paragraph:—"We intend above to be taken as a whole, being an offer to take 4,133,753l. (approximately) at an annual premium of 3.389l. 10s. 3d. (approximately). The usual agent's commission of 15 per cent. will be allowed to your agent as before." A communication was also read from the Fire Art and General Insurance Co., Ltd., offering to insure the whole of the Board's property, and quoting rates.

Sir E. Galsworthy, in supporting the rescinding, said the Board was now paying 1,658l. annually for the very moderate insurance of 570,000l. At the same time he mentioned that they were uninsured to the amount of 2,368,557l., to be increased within a few years to 3,568,557l.

In the course of discussion it was mentioned that the Managers' properties were of fireproof construction, that they were built of separate blocks about 200 or 300 yards apart, that fire drills had been instituted, and every precaution taken to guard against a serious conflagration. Eventually, Mr. Helby's motion to rescind the previous resolution was carried by 31 votes to 27. The Board also resolved to forthwith insure their properties against fire, and that it be referred to the Finance Committee to ascertain and report on the most favourable terms on which insurance could be effected. Mr. G. S. Elliott gave notice that at the next meeting he would move that the managers should abstain from insuring their properties with the public fire insurance companies with the exception of certain special properties.

The Works Committee reported the receipt of a number of tenders for the erection of a new home for female attendants at Darenth Asylum, and recommended the acceptance of that of Messrs. Walter Lawrence & Son, of Waltham Cross, in the sum of 6,854l. in accordance with the plans and specifications of Messrs. Newman & Newman, architects.

The recommendation was adopted. The following were the other tenders:—

J. & C. Bowyer, Upper Norwood, 6,888l.; Scott & Branton, Greenwich, 6,055l.; Robert L. Tonge, Watford, 7,008l.; J. & M. Patrick, Wandsworth, 7,115l.; Henry Wall & Co., Kentish Town, 7,121l.;

Cropley Bros., Ltd., Epsom, 7,740l.; James J. Wise, jun., Deal, 7,264l.; Samuel Page & Son, Croydon, 7,220l.; John Lonsdale, Swanley Junction, 7,444l.; W. Reason, 47, Rosebery-avenue, 7,517l.; Goddard & Sons, Farnham and Dorking, 7,600l.; Enness Bros., Erith, 7,918l.

Illustrations.

BOARD ROOM, ELECTRA HOUSE.

THIS room is for the use of the various Submarine Telegraph Companies housed in the extensive new premises at Finsbury-pavement, known as Electra House.

With slight modification the work has been carried out as indicated in the drawing. The wall panelling has been executed in Spanish mahogany by Messrs. Colls & Sons, and the arched ceiling is in fibrous plaster by Messrs. J. Garvie & Sons, of Aberdeen.

The panels have been arranged to take the various portraits of the former chairmen of the companies, and the furniture and fittings have all been specially designed to suit the room.

The models in the glass cases represent submarine cable ships used by the companies in laying and repairing the cables.

The architect is Mr. John Belcher, A.R.A.

ST. JOHN'S CHURCH, BYFLEET.

This church is about to be erected at Byfleet, near Weybridge. The walls will have flint facings with freestone dressings.

Messrs. Goddard & Son, of Farnham, are the builders, and the architect is Mr. W. D. Carue.

The drawing was exhibited in the last Royal Academy Exhibition.

BUNGALOW, WALMER.

THE main part of the walls of this house is proposed to be constructed of concrete, with an outer surface of white rough-cast, one gable having a parapet of red brick; the roof to be covered with green Westmoreland slates, with a lead ridge and down pipes and rain-water heads. All the wood and ironwork showing outside to be painted green, except the verandah, which is oak.

The walls round the verandah are covered with large green Dutch tiles. There are also movable glazed sashes to fill in the front in bad weather.

The central hall is the living-room, with dining-room entered through a domed octagon lobby; the kitchen, &c., at back, and servants' room over. The right wing contains rooms for the owner and family, and the left those for friends. The terrace and paths are laid in stone slabs, and the hedges made of Eucalyptus. The whole surrounded by a wall, and with cross walls in red brick and stone.

ALLAN F. VIGERS.

HOUSES, SCALBY PARK ESTATE, YORKSHIRE.

THE materials used for these houses are brick covered with cement rough cast, left white.

The roofs are covered with red Staffordshire tiles, and the exterior woodwork is painted green.

The work was carried out by Scarborough builders. The architects are Messrs. Hall, Cooper, & Davis, of London and Scarborough.

COTTAGES FOR THE SCARBOROUGH GAS CO.'S EMPLOYEES.

THE materials used are red bricks. The roofs are covered with tiles, and the woodwork is painted white.

Unfortunately, the white columns have been done away with.

The work was carried out by local builders, and the architects are Messrs. Hall, Cooper, & Davis, of London and Scarborough.

This drawing, as well as the last-mentioned one, was exhibited at the Royal Academy.

PULPIT, URNEY CHURCH, IRELAND.—A new pulpit erected in Urney Parish Church, as a memorial to the late Dean of Derry and Rector of Urney, was dedicated on the 23rd ult. The pulpit, which is of Gothic design, and made of carved oak, was constructed by Messrs. Harry Hems & Sons, Exeter, and was erected by Mr. James McCloy, of Sirabane.

COMPETITIONS.

WAR MEMORIAL, CLIFTON COLLEGE.—It is proposed to place in the quadrangle of the school a memorial to those old Cliftonians who fell in the recent South African war. Several architects have, in competition, submitted designs for the memorial; and Mr. R. Seldon Wornum, who was appointed assessor by the Committee, has now made his award as follows:—1st premium, to Messrs. Walter S. Paul & James, of Baldwin-street, Bristol; 2nd, to Mr. E. W. Marshall, of 139, Oxford-street, London; and 3rd, to Mr. Percy S. Worthington, of 46, Brown-street, Manchester.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of this Association was held in the rooms, 117, George-street, on the 26th ult., Mr. A. Hunter Crawford, the President, in the chair. After some formal business the President read a paper on "The Heating of Buildings by Steam Vapour." He discussed the warming more particularly of domestic buildings, pointing out the following disadvantages in the usual system adopted with the low-pressure hot-water system, which, while excellent in many ways, was unsightly: (1) the large size of pipes and radiators which it required, (2) its cost, and (3) its liability to be injured by frost. Attention was drawn to the method of heating commonly adopted in Germany. This was distinct in many of its important details from the low-pressure system largely used in America, and recently adopted somewhat freely in this country. The principal points in the former system were the working of the steam boiler at a pressure of only $\frac{1}{2}$ lb. per square inch, the complete automatic control of this pressure, the entire absence of air valves on the radiators, the use of only one valve for admission of steam to the radiators, and the fact that this valve could be opened to any extent desired, giving complete control of the amount of heat given off by the radiator. The attention of heating engineers was specially drawn to the system because of its extreme simplicity in working, its security from injury by frost, its easy control, and its suitability for placing in houses in a way so as not to be at all an eyesore.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—At a meeting of this Society, held at the Royal United Service Institution, Whitehall, on the 1st inst., Mr. Percy Griffith, President, in the chair, a paper was read on "The Depreciation of Plant and Works under Municipal and Company Management," by Mr. Charles H. W. Biggs. The author commenced by observing that the question of municipal and companies' accounts, and especially depreciation, had been largely debated of late. The designs of engineers, especially such as required the use of iron and steel, played a considerable part in the question of depreciation, in that the life of the structure in which those materials were used depended upon the life of that part of the material used according to the factor of safety adopted. He pointed out that there was a tendency among modern engineers to use too low a factor of safety, which meant a higher rate of depreciation than when a higher factor was adopted. The debt of the local authorities of this country, he said, was now about 300,000,000l., which, at $\frac{3}{4}$ per cent. per annum, meant about 10,500,000l. a year for interest. The whole of that capital was obtained upon the condition that a certain definite part must be repaid annually. That capital was expended upon two classes of work, non-productive and so-called productive, the latter producing a revenue, though not necessarily a profit or a loss. He observed that the most obvious charges upon an undertaking were:—(1) interest; (2) repayment of capital; (3) depreciation; (4) maintenance; and (5) working. Item 3 had been the most severely criticised of all the charges, and it was held by a very influential and numerous class that, in addition to maintenance and repayment, depreciation was absolutely necessary to place municipal undertakings upon a sound financial basis. He would assume the undertaking to be a tramway. If maintenance meant keeping the works efficient out of revenue, and depreciation as well as repayment was required, then

revenue must earn during the period over which repayment extended a threefold equivalent of capital. The author pointed out that depreciation as applied to municipal undertakings was not founded upon a logical principle. Repayments extended over an arbitrary period, decided by a government department, but usually the period was in his opinion too short, and the rates of repayment therefore too rapid. As at present carried out, it imposed far too heavy a tax upon the first users for the benefit of subsequent users.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Hampstead.—Retention and completion of a motor-car shed on the forecourt of No. 112, Finchley-road, Hampstead (Mr. J. D. Hunter for Mr. H. Harris).—Consent.

Hackney, North.—Buildings on a site on the north side of Manor-road, Stoke Newington, eastward of No. 4 (Messrs. Gordon & Gunton, for Mr. F. Matthews).—Consent.

Paddington, North.—Shop fronts at Nos. 484, 486, and 488, Harrow-road, Paddington (Mr. C. McGarrick for Messrs. McGarrick & Sons).—Consent.

Woolwich.—Two-story eel windows in front of the Royal Arsenal Co-operative Society's stores to be erected on the south side of Powis-street, Woolwich (Mr. F. Bethell for the Royal Arsenal Co-operative Society, Ltd.).—Consent.

Hampstead.—A wood and tile portico at the entrance to Dane-court, Hollycroft-avenue, Hampstead (Mr. W. J. King for Mr. H. B. Gower).—Consent.

Hampstead.—Retention of a wood and glass advertisement screen on part of the forecourt of No. 162, Finchley-road, Hampstead (Messrs. B. E. Anthony & Co., Ltd.).—Consent.

Wandsworth.—Seven houses on the east side of Abney-road, Epsilfield, Wandsworth (Mr. R. A. Hinds for Mr. G. Edwards).—Consent.

Hammersmith.—Two blocks of buildings, with projecting bay-windows and angle-turrets, on the west side of Ravenscourt Park, Hammersmith, next Hamlet Gardens (Mr. W. J. Hardcastle for Messrs. Hudson, Matthews, & Co.).—Consent.

Kensington, South.—An iron and glass hood over the entrance to No. 31, South-street, Thurloe-square, South Kensington (Mr. T. Lott for Mr. A. L. Pearce).—Consent.

Lewisham.—Two houses on the east side of Bromley-road, Catford, to the northward of the entrance to the Catford Cricket Club ground (Messrs. Kennard Bros. for Mr. F. H. Straw).—Consent.

Lewisham.—Retention of a greenhouse in the garden of No. 39, Micheldever-road, Lee, abutting upon Wantage-road (Messrs. W. J. Scudamore & Sons).—Consent.

Marylebone, East.—Projecting porches and balconies to blocks A and B, Clarence Gate Mansions, Gt. Marlborough-street, St. Marylebone (Messrs. Hudson & Hunt for the Clarence Gate Mansions Co.).—Consent.

Marylebone, East.—An iron and stone balcony at the first floor level of No. 13, Upper Wimpole-street, St. Marylebone (Messrs. Hoare & Wheeler for Mr. M. Tucker).—Consent.

St. George, Hanover-square.—An iron and glass hood over the entrance to No. 23, Hill-street, Berkeley-square, St. George, Hanover-square (Messrs. Maple & Co., Ltd., for Lady Gerrard).—Consent.

Westminster.—Wood and tile pents over the entrances to two dwellings on the north side of Dorset-street, Westminster (Messrs. Cluttons on behalf of the Ecclesiastical Commissioners).—Consent.

Clapham.—A one-story addition to the shop of No. 135, Lavender Hill, Battersea, to abut upon Suggen-road (Mr. J. W. Cobb for Mr. S. Daiber).—Refused.

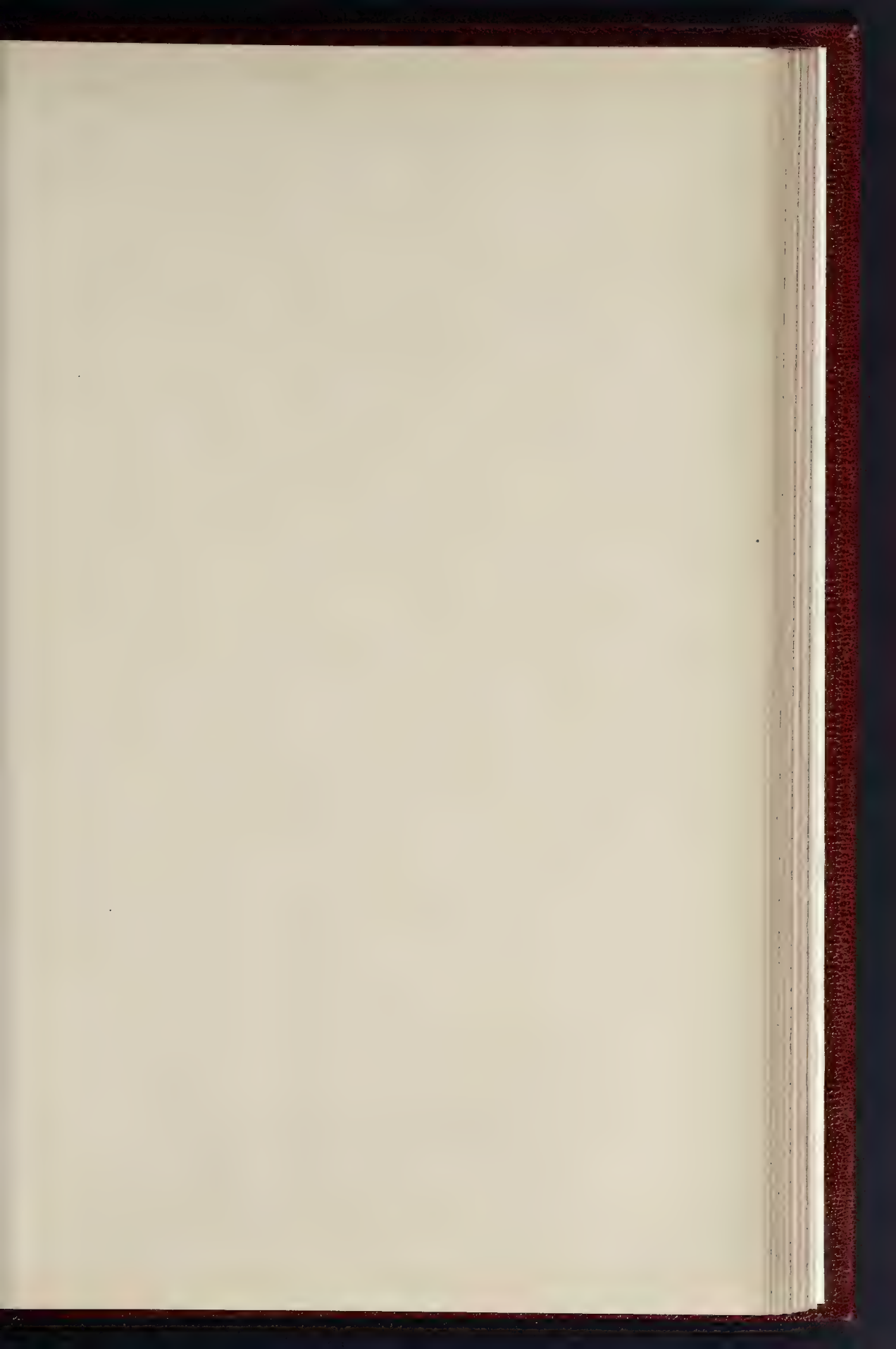
Dulwich.—A one-story coach-house at the flank of No. 203, Upland-road, East Dulwich, to abut upon Crebore-street (Mr. H. J. Collis for Mr. W. Ewer).—Refused.

Fulham.—A one-story shop on a site on the east side of North End-road, Fulham, adjoining Bank-parade (Messrs. Pattison & Co.).—Refused.

Hampstead.—A request of Mr. J. D. Hunter for the Express Dairy Co. for permission to retain a projecting wooden erection in front of No. 108, Heath-street, Hampstead. —Refused.

Marylebone, East.—A projecting iron sign in front of Nos. 102 and 104, Oxford-street, St. Marylebone (Mr. W. Graves for Messrs. Slater, Ltd.).—Refused.

Marylebone, West.—An iron balcony at the first floor level of No. 30, Bryanston-street, St. Marylebone (Mr. E. C. W. Evans for Major S. E. Lamb).—Refused.



THE BUILDING, DECEMBER 6, 1902

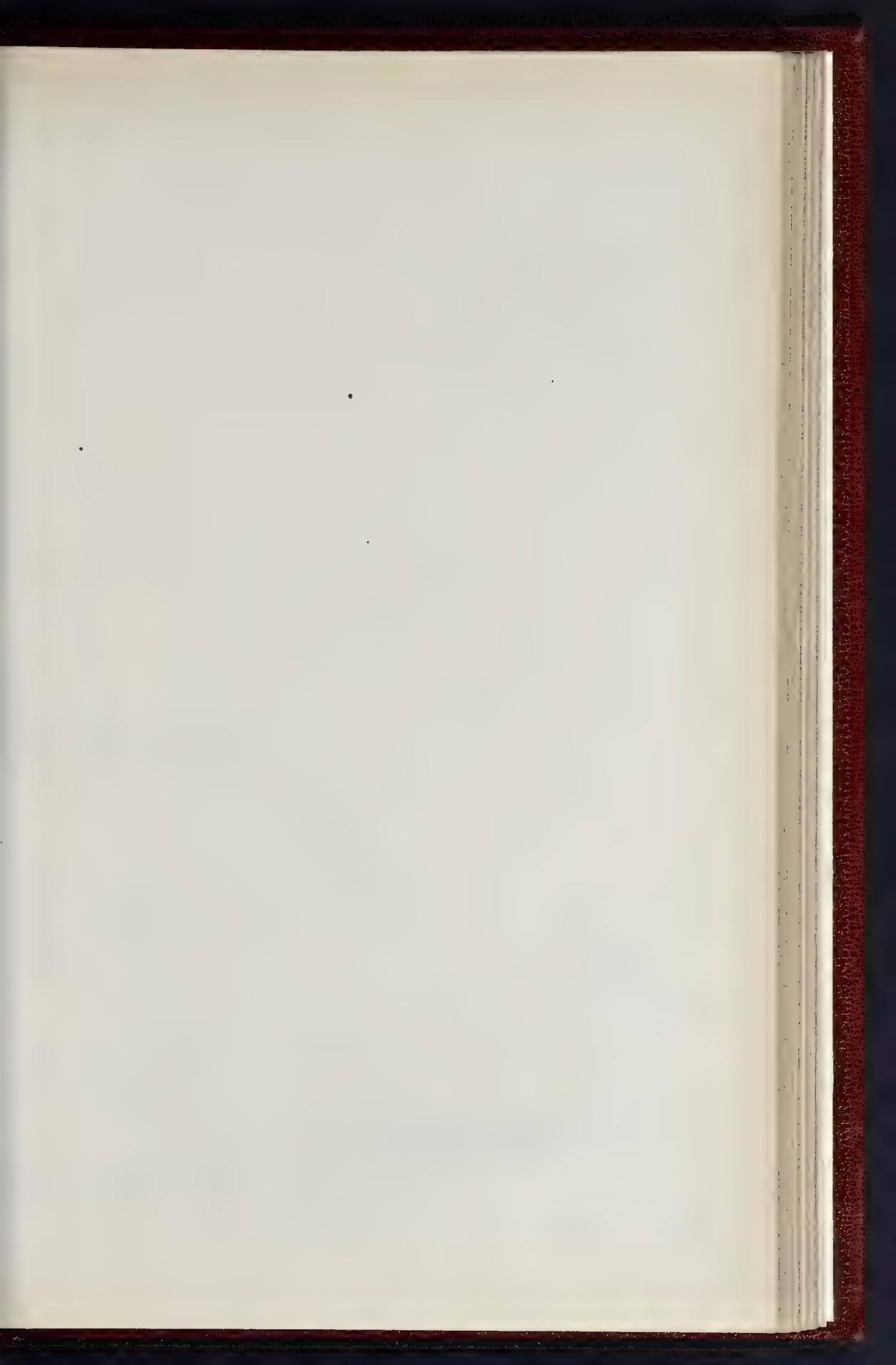




NO. PHOTO SPANISH A.C. - 4 5 EAST HARBOR STREET NEW YORK

ELECTRA HOUSE. INTERIOR OF BOARD ROOM. MR. JOHN BELCHER, A.R.A., ARCHITECT

W. T. Jones Del.



ST. JOHN'S CHURCH
BYFLEET &
W.D. CAROE Architect



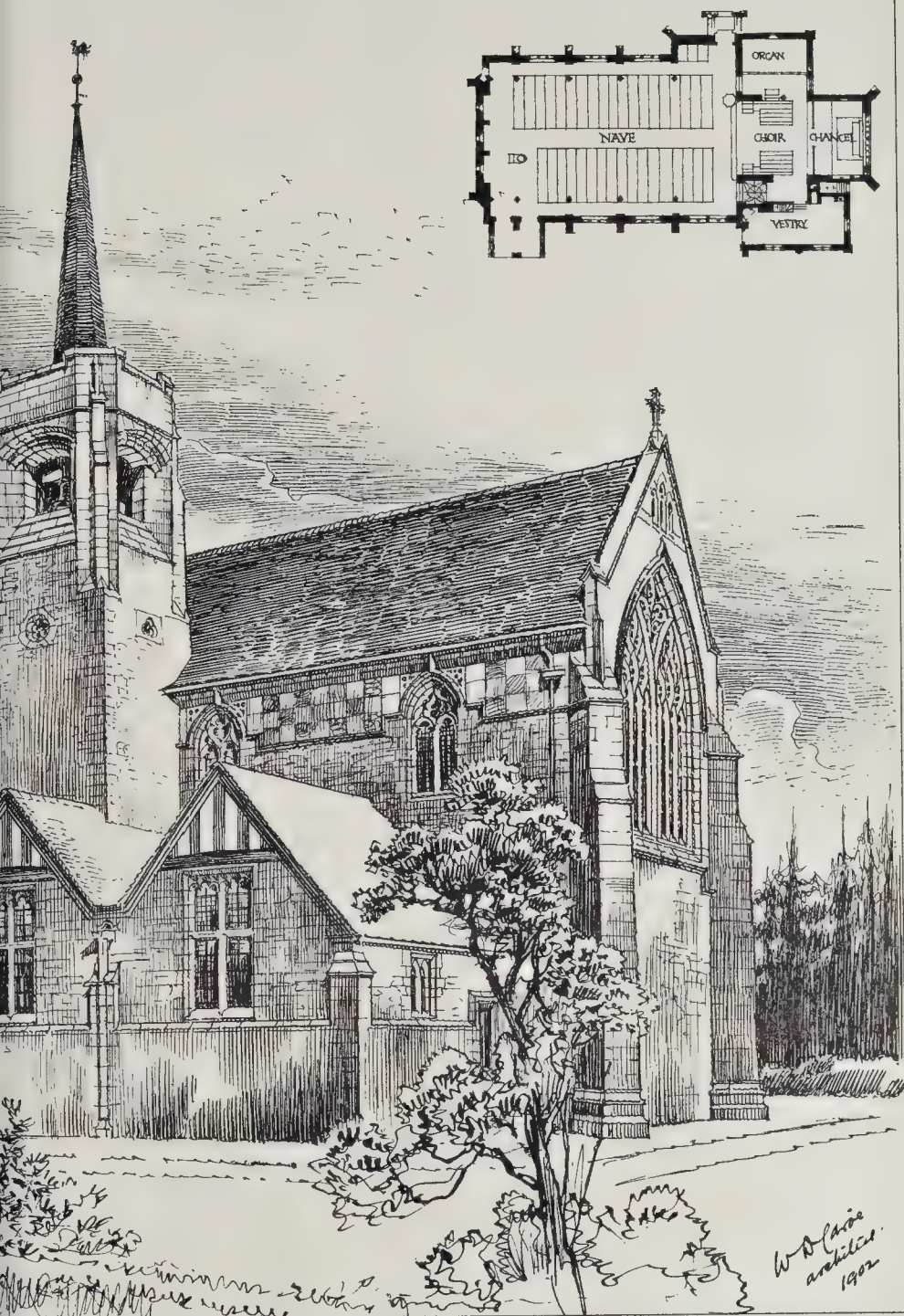
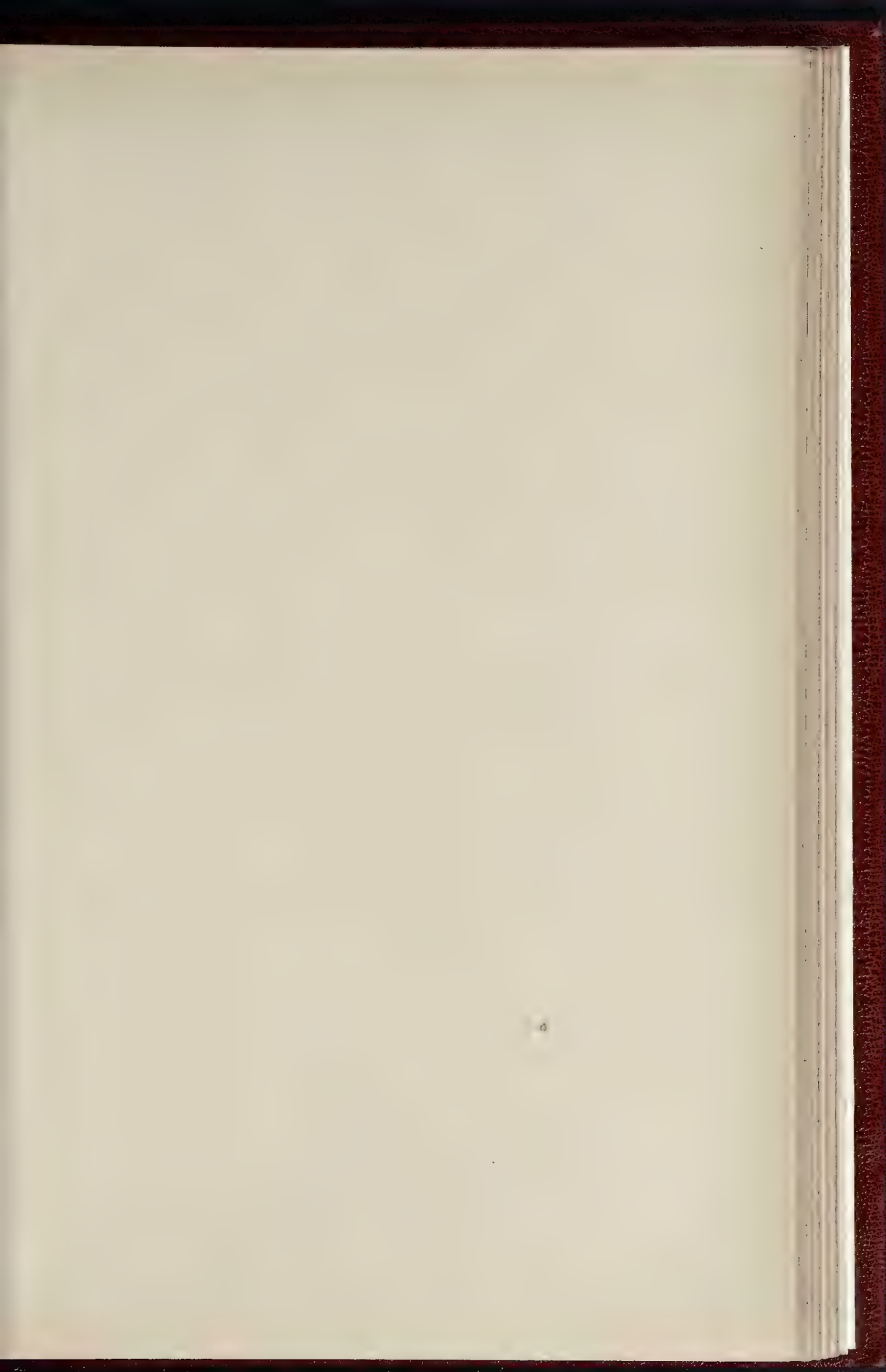


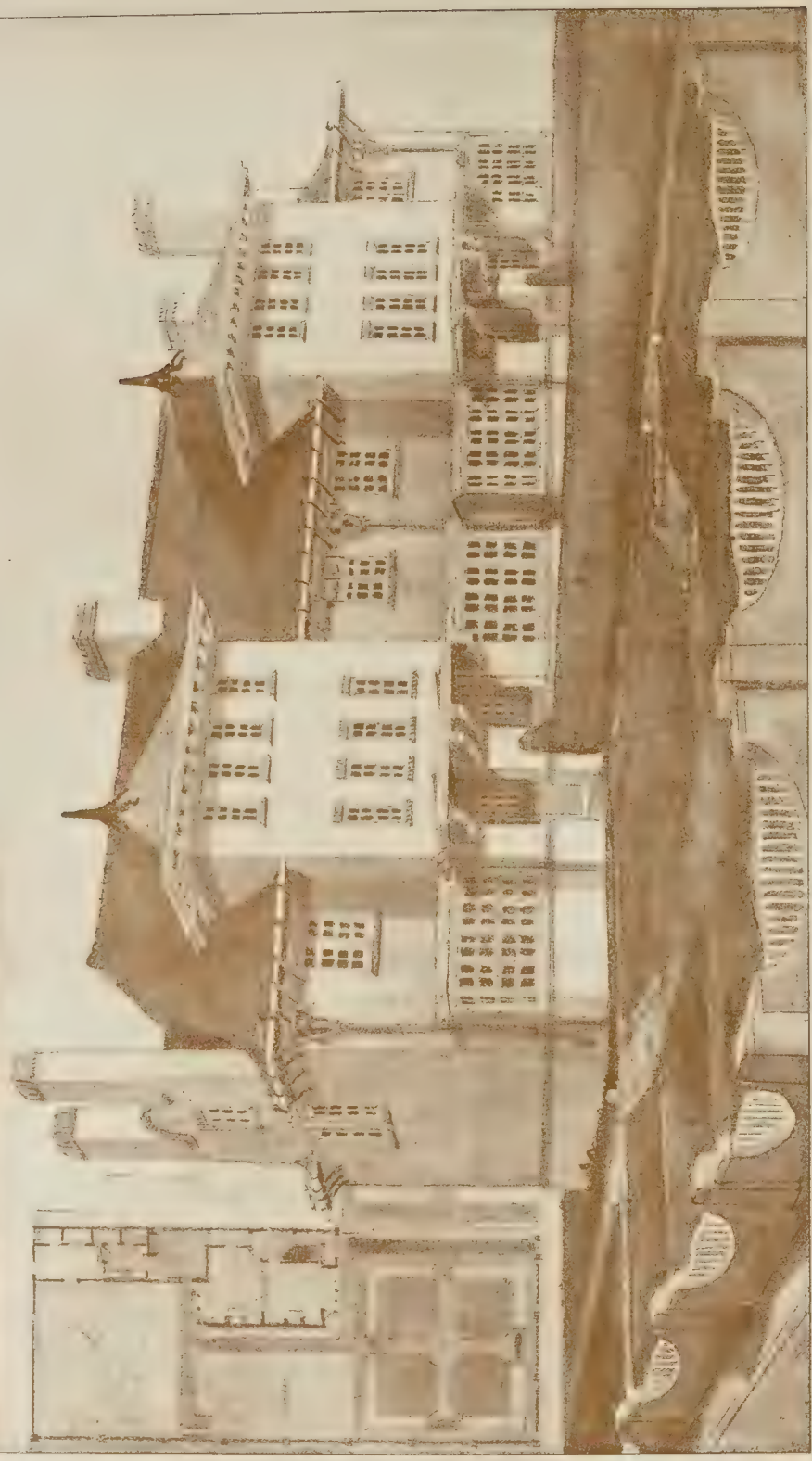
PHOTO LITHO SPRAGUE & CO. LITH. 4 & 5 EAST HARDING STREET, FETTER LANE E.C.

W. D. Davis
architect
1902



THE BUILDER, DECEMBER 6, 1902

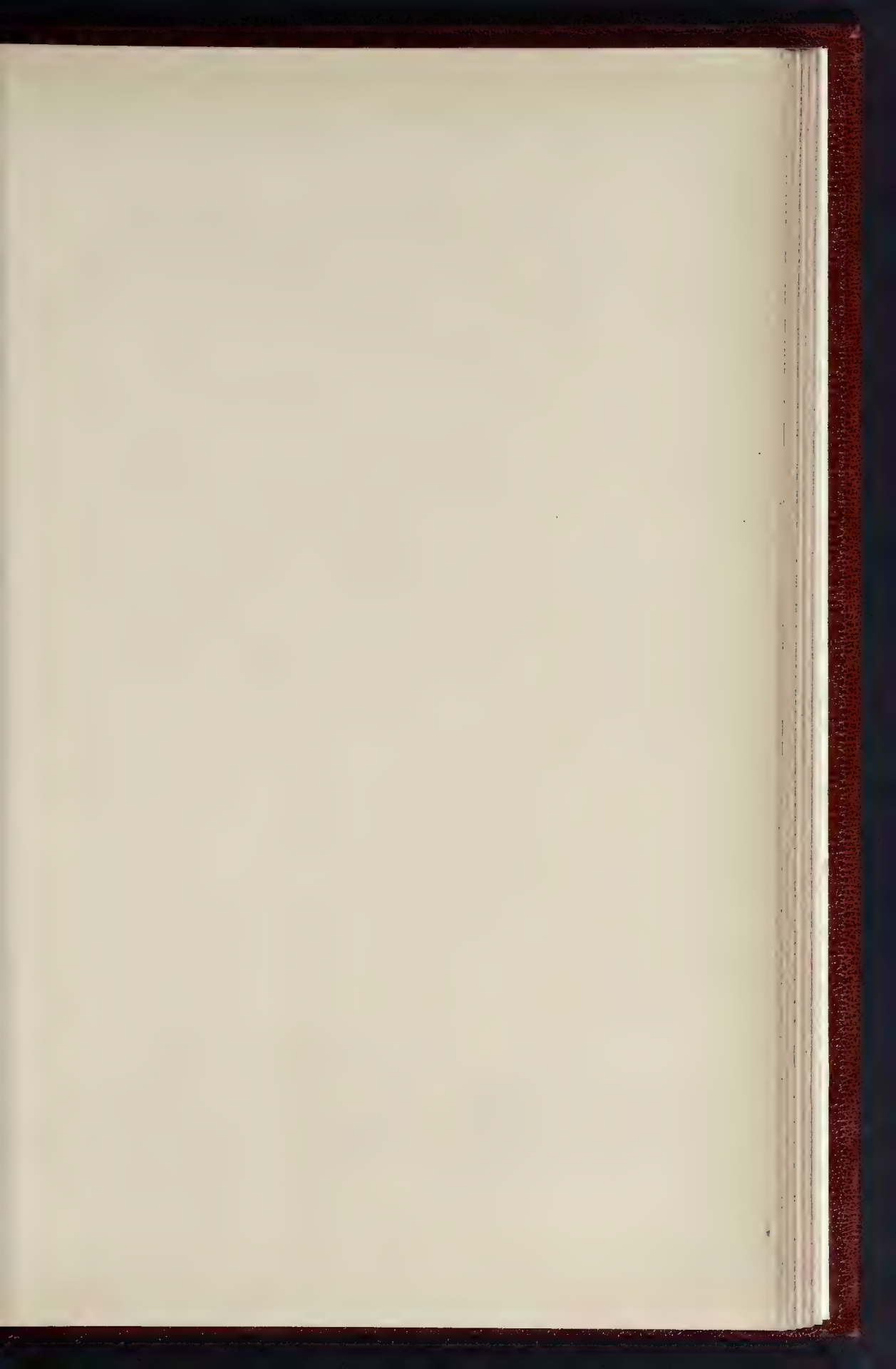
Four Houses on the Scalby, Park Estate, Toronto
K. J. E. Marsden Esq. J. P. Has Gable and Dams





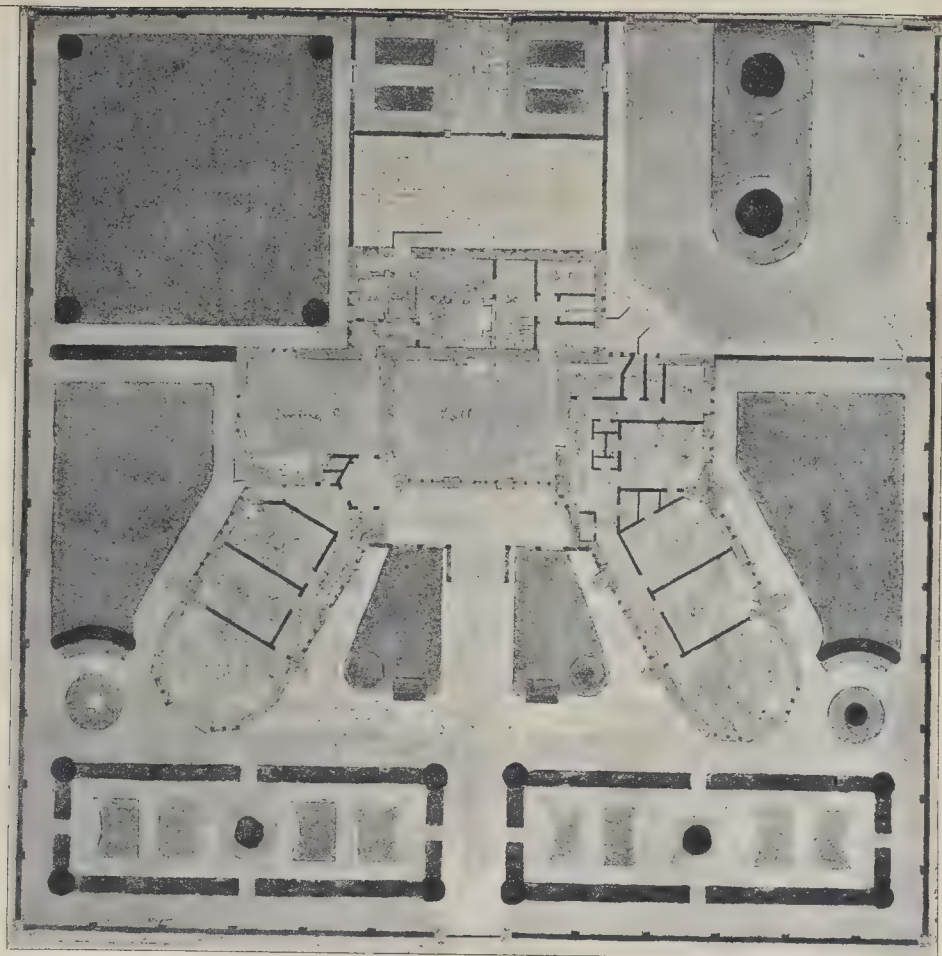
MR. J. H. STRENGTH & CO. 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406, 408, 410, 412, 414, 416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438, 440, 442, 444, 446, 448, 450, 452, 454, 456, 458, 460, 462, 464, 466, 468, 470, 472, 474, 476, 478, 480, 482, 484, 486, 488, 490, 492, 494, 496, 498, 500, 502, 504, 506, 508, 510, 512, 514, 516, 518, 520, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, 546, 548, 550, 552, 554, 556, 558, 560, 562, 564, 566, 568, 570, 572, 574, 576, 578, 580, 582, 584, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654, 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 686, 688, 690, 692, 694, 696, 698, 700, 702, 704, 706, 708, 710, 712, 714, 716, 718, 720, 722, 724, 726, 728, 730, 732, 734, 736, 738, 740, 742, 744, 746, 748, 750, 752, 754, 756, 758, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 780, 782, 784, 786, 788, 790, 792, 794, 796, 798, 800, 802, 804, 806, 808, 810, 812, 814, 816, 818, 820, 822, 824, 826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000.

HOUSES FOR THE GAS COMPANY, SCARBOROUGH MESSRS HALL, COOPER & DAVIS, ARCHITECTS





A BUNGALOW, PROPOSED TO BE BUILT



INK PHOTO SPRAGUE & CO. 174 & 5 EAST HARDING STREET FLYTER LANE E.C.

Width of Way.

Hackney, North.—A block of two-story flats, with projecting bay windows, on the south side of a paved footway leading from Church-path to Albion-road, Stoke Newington (Mr. A. P. Osmant).—Consent.

Westminster.—A building on the site of Nos. 7, 9, 11, and 13, Douglas-street, to abut upon Douglas-place (Messrs. Flood & King for Mr. F. Willmet).—Consent.

Chelsea.—A box-room in the garden at the rear of No. 8, Cadogan-place, Chelsea, to abut upon Cottage-place (Messrs. Squire & Potter for Mrs. Parr).—Refused.

Lambeth, North.—A warehouse on the north-east side of Juxon-street, Lambeth, to abut upon Sail-street (Messrs. E. Runtz & Co. for Mr. G. Edwards).—Refused.

Space at Rear.

Lewisham.—A modification of the provisions of Section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of No. 131, Farley-road, Lewisham, with an irregular open space at the rear (Mr. C. Farley).—Consent.

Holborn.—A modification of the provisions of Part V. of the Act with regard to the proposed erection of a building to be known as Nos. 83, 85, and 87, Southampton-row, Holborn (Mr. C. F. Doll for Mr. H. Walduck).—Refused.

Deviation from Certified Plans.

Whitechapel.—Deviations from the plans certified by the District Surveyor, under Section 43 of the Act, so far as relates to the proposed erection of a new building on the site of a building on the east side of Valence-street, Whitechapel, at the corner of Durward-street (Mr. T. G. Charlton for Mr. J. Warschawsky).—Consent.

Lines of Frontage, Width of Way, and Projections.

Chelsea.—A projecting doorway in front of the stables at the rear of No. 3, L-wndes-square, Chelsea, to abut upon William's-mews (Mr. B. D. Hedderwick).—Consent.

Kensington, South.—The retention of an iron and glass covered way to the entrance to No. 3, Doro-place, Victoria-road, Kensington (Messrs. E. Keeling, Teale, & Co., Limited, for Miss Lee).—Consent.

Chelsea.—That the application of Mr. H. T. A. Chidgey for an extension of the period within which the erection of an addition at the rear of No. 4, Chelsea Embankment, Chelsea, was required to be commenced, be granted.—Consent.

Formation of Streets.

Hammersmith.—A deviation from the plan sanctioned for the formation of a new street for foot traffic only to lead from Shepherd's Bush-green to Pennard-road, Shepherd's Bush, so far as relates to the position of the eastern end of such street next Pennard-road (Mr. F. Matcham).—Consent.

Lewisham.—That an order be issued to Messrs. Norfolk & Prior refusing to sanction the formation or laying out of new streets for carriage traffic, on the Mountfield Estate, George-lane, Catford (Mr. C. Story).—Agreed.

Means of Escape* at Top of High Buildings.

Battersea.—Means of escape in case of fire, proposed to be provided in pursuance of Section 63 of the Fire (Escapes) Bill, at the buildings known as Southampton Wharf, York-place, Battersea (Messrs. Gorton, Hill, & Co.).—Consent.

* * * The recommendations marked * are contrary to the views of the Local Authority.

BOOKS RECEIVED.

BOOK-KEEPING FOR BUILDERS: Specially adapted for Small Businesses. By Arthur E. Davis. (London. Published by the author. 1s.)

HOW TO ESTIMATE: Being an Analysis of Builders' Prices. By John T. Rea. (B. T. Batsford.)

ENGLISH INTERIOR WOODWORK of the Sixteenth, Seventeenth, and Eighteenth Centuries. By Henry Tanner, Jun., A.R.I.B.A. (B. T. Batsford. 30s.)

A DISCUSSION ON COMPOSITION: Especially as applied to Architecture. By John Vredenburg Van Pelt. (The Macmillan Co., New York.)

THE PRODUCTION AND USE OF ACETYLENE GAS. By W. Doman. (P. S. King & Son. 3s. 6d.)

THE BUILDERS' FOREMEN'S ASSOCIATION.—A small but successful meeting of this Association was held on Saturday, the 28th ult., at the Memorial Hall, when Mr. Ebenezer Howard, author of "Garden Cities of To-morrow," gave a lecture on the general scheme of garden cities and the work of the Garden City Association. This address was naturally of a particularly interesting nature to the members of the Builders' Foremen's Association, and it was very interesting to find that they received Mr. Howard's proposals well; in fact, at the conclusion of the meeting, the following resolution was unanimously adopted: "That the project of garden cities is practicable, and goes far towards solving the housing problem."

Correspondence.

BUILDING BY-LAWS IN RURAL DISTRICTS.

SIR,—Since the Dartford Rural Council prosecuted me for erecting a labourer's wooden bungalow in Eynsford Parish there have been two other prosecutions by Rural Councils on similar grounds. In Anglesey the Valley Rural Council prosecuted the Rev. W. E. Scott-Hall for erecting a wooden bungalow for his own occupation. The magistrates came to no decision, and the Rural Council intend to carry the case to the Divisional Court. The defence was that it was unreasonable, and therefore house to prohibit construction of wooden houses in the country, if properly isolated. By-laws of railway companies had been set aside when *ultra vires*, therefore building by-laws were not beyond impeachment. In the Siber case the Christchurch Rural Council prosecuted Mr. Arthur Hugh Clough for not depositing plans in the reconstruction of a mud and thatched cottage, and for putting walls of wood, contrary to the by-laws. The magistrates decided that the alterations did not come within the meaning of the Act, and that it was not necessary to submit plans to the Council. The case was dismissed. A separate summons against defendant for constructing walls of combustible material was withdrawn.

Thus the rebellion against the injustice of urban by-laws in rural parts is spreading.

In my case the Local Government Board in the person of their Inspector, Mr. J. S. Davey, C.B., have remonstrated with the Dartford Rural Council, and it is clear from the discussion at a Council meeting that Whitehall is wholly favourable to the application of their new code in country parts. Moreover, the Local Government Board are favourable to labourers' wooden detached bungalows, if isolated in large gardens, because every dwelling is then able to dispose of its own drainage.

In reply to a Councillor who considered that "garden ground was waste space" the Inspector said, "I do not consider garden ground waste space; the essentials of a building are that it shall be dry and have sufficient air-space. When they looked around in the country districts, they would see houses huddled together without sufficient air-space, no proper garden was given sufficient to allow the drainage of each house to be dealt with in its own land, and the consequence was that expensive sewerage schemes became necessary, and inflicted injustice on other parts of districts which did not require sewerage."

I am very much obliged to you, sir, for backing our case here; there is now every prospect of getting the new Rural Code applied in the whole of the agricultural parishes of the Union, and thus my offending bungalow will be legalised and the labourer housing question advanced.—Yours truly,

E. D. TILL.

CAST-IRON DRAINS

SIR,—In your recent articles on Drainage in the Students' Column it is stated, with respect to drains of ordinary gradient, that, while a few years ago stoneware drains were considered to be better than iron, the pendulum seems now to be swinging in the other direction.

Here in Manchester stoneware drains are, so far as I am aware, almost invariably employed, and iron drainpipes are not even specifically mentioned in the most recent by-laws; but I have been informed that in London the iron pipes are being used to a large extent.

The advantages claimed by your writer for iron pipes are their greater strength and fewer joints, increased velocity of flow, absolute imperviousness, true alignment, and the retention of these qualities for a long period of time; their disadvantages being increased cost, risk of corrosion, and the difficulty of connecting old to new drains where junction chambers are not provided.

As against the extra cost of iron, there is set the great saving in repairs and a slight saving in the amount of concrete required.

The general method of coating with Dr. Angus Smith's solution is said to be a fairly durable, although not a permanent, safeguard against corrosion.

The writer of the articles, while, apparently, leaning slightly in favour of iron pipes, does not seem by any means to hold a brief for them, and I shall be obliged if some other of your readers can give me their views, based on experience, as to whether the case in favour of iron pipes has yet been conclusively proved.

The great point of doubt in my mind is whether, in spite of the various advantages claimed for the iron, it is not sure, by the very nature of its surface, to become quickly and permanently fouled with a coating of matter subject to putrefaction, whereas glazed stoneware is to a great extent self-cleaning.

Surely the increasing tendency to substitute earthenware for metal in all portions of water-closet and other sanitary fittings is a strong argument against reverting to the use of a material so universally condemned.

INQUIRER.

SIR,—I notice in your issue of the 22nd ult., your critic, speaking from recollection, states that I have exaggerated the lowness of the proportions in my drawing which depicts the south "part" of Malmesbury Abbey. I presume he means the "south porch."

Anyway, I shall be glad if you will publish this letter in contradiction, for, as a matter of fact, I had the exact measurements from the foreman of the works, and I can vouch for the absolute accuracy of the drawing.

ALFRED FAHEY.

* * * "Part" was apparently a printer's error.—Ed.

INTERLOCKING RUBBER TILING.

SIR,—In his paper on "Sanatoria" read before the Architectural Association by Mr. Cecil C. Brewer, Mr. Brewer says, "with regard to the flooring for the corridors and patients' rooms:—"

"Noiseless floor coverings must be adopted—probably the Indian rubber floors now used in banks, &c., would be the best, if expense allowed."

In seconding the vote of thanks, Mr. Keith D. Young said (see page 499):—

"As to the Indian rubber floor referred to, he supposed Mr. Brewer meant the American Interlocking Rubber Tiles, which made a beautiful floor, but which cost almost as much per foot as terrazzo, for example, cost per yard. [Mr. Hall: More; it costs 21. per square foot.] He had obtained it for less than that, but in any case it was very expensive."

As this statement of the cost of the tiling is likely to deter many people from using it, we beg to explain that the tiling, so far from costing 21. per square foot, costs but 6s. 3d. per square foot. Those who are interested in Mr. Brewer's suggestion may see the tiling laid as a water-tight and germ-proof floor at the Middlesex Hospital, at the London and County Bank head office, Lombard-street, &c.—Yours faithfully,

ARTHUR L. GIBSON.
B. and S. Folding Gate Company

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

22.—TURPENTINE AND OTHER RESIN SOLVENTS.—VARNISHES.—STAINS.—GLUE.—SIZE.

TURPENTINE.—The term "turpentine" was formerly applied to sticky, resinous exudations from pines and other coniferous trees, but is now commonly applied to the volatile spirit obtained by distilling these semi-fluid turpentines with water or steam. The distillate separates into two portions, the lower layer being water and the upper layer turpentine spirit or "turps."

Rosin or colophony is the residue left in the still after the turpentine spirit has been distilled off. It melts at 90 to 100 deg. C., and has a specific gravity of from 1.045 to 1.100.

Rosin Oil.—Rosin is subjected to fractional distillation, like tar, and yields (1) rosin spirit, which is used as a substitute for turpentine spirit; (2) rosin oil, which is a yellow oil employed for lubricating purposes; (3) blue oil, also used as a lubricant and for making wagon-grease; (4) green oil, also used for making wagon-grease; and (5) yellow pitch, used as shoemakers' pitch.

The rosin oil is refined by washing it with hot water and caustic soda solution. Rosin oil is a non-drying oil, having a specific gravity of from 0.973 to 0.981.

Rosin spirit is a liquid somewhat resembling turpentine spirit, and is either colourless or has a pale yellow colour. Its specific gravity varies from 0.876 to 0.883, and it is, therefore, heavier than turpentine spirit. When exposed to the air it almost completely volatilises, but a small quantity of resinous residue is left.

Turpentine spirit or turps is a mixture of hydrocarbons, each of which is represented by the formula $C_{10}H_{16}$. These hydrocarbons are known as terpenes. Commercial turpentine spirit is a colourless liquid having a specific gravity of from 0.864 to 0.870. Recently distilled spirit evaporates quickly when exposed to the air and leaves little or no residue, but spirit of considerable age dries more slowly and leaves a small quantity of sticky residue. The flashing point of turps is from 36 deg. to 38 deg. C., and its boiling point about 160 deg. C.

Turpentine spirit is not miscible with water, but readily mixes with alcohol, ether, benzene, petroleum spirit, or carbon bisulphide. It is a solvent for most resins, fats, and oils. When exposed in bulk to the atmosphere, turpentine spirit slowly absorbs oxygen and becomes

viscid. It is frequently adulterated with petroleum spirit, rosin oil, rosin spirit, shale naphtha, or coal-tar naphtha.

Venice turpentine is a yellow transparent mass, having the consistency of thick honey. It is obtained from the common larch, which is largely grown in its turpentine in the Tyrol and in France. When it is free from water it is bright and clear, but when a little water is present the turpentine is cloudy. It does not become completely solid when exposed to the air at ordinary temperatures, and becomes perfectly fluid when slightly heated. It is often adulterated with cheaper turpentine.

Bordeaux turpentine is obtained from the maritime pine (*Pinus maritima*), which is largely grown in the south-west of France. This turpentine has a tendency to separate into two layers, one semi-fluid and the other an almost solid resin.

American turpentine is obtained from the loblolly pine (*Pinus taeda*) and the Georgia pine (*Pinus Australis*). It is yellowish white and is known in commerce as "gum thus."

Russian and Swedish turpentine are chiefly obtained from the Scotch pine (*Pinus sylvestris*).

Canada balsam is a turpentine obtained from the Canadian balsam pine (*Pinus balsamea*). It is a transparent, straw-coloured, viscid fluid which becomes solid on exposure to air.

Varnishes may be divided into two classes, viz., *Spirit varnishes* and *oil varnishes*. Spirit varnishes are made by dissolving resin, or some other solid of a like nature, in methylated spirit or other volatile solvent. Oil varnishes are made by dissolving resin in a fixed oil with the aid of heat, and then thinning the resultant liquid by mixing with it a volatile solvent, such as turps. The skin or coat produced by the drying of a film of spirit varnish is more brittle and less durable than that yielded by an oil varnish.

Varnish Resins, &c.—The following are some of the resins most extensively used for the manufacture of varnish:—Rosin, sandarach, copal, kauri, dammar, shellac, crude turpentine, mastic, and amber. Bitumen and coal-tar pitch are largely used for the production of black varnishes.

Varnish Spirits.—The spirits commonly used as solvents for resins are methylated spirit, turpentine spirit, benzol, petroleum spirit, and naphtha.

Varnish Oils.—Linseed oil with driers, or "boiled" oil, is nearly always used as the principal oil in oil varnishes. For the manufacture of oil varnish the resin is first melted, then hot linseed oil is added to the melted resin, and the mixture is well stirred. When the mixture is cool, turpentine spirit is added until the mixture is of the desired consistency.

Methylated Spirit.—The chemical composition of pure alcohol is represented by the formula C_2H_5OH . Alcohol is a product of the fermentation of grape sugar (glucose), and is commonly obtained by allowing barley or other cereal to ferment to convert the grain starch first into glucose and then into alcohol, and then distilling the fermented grain. Potatoes contain from 16 to 20 per cent. of starch, which, by boiling with dilute sulphuric acid, may be converted into glucose, and subsequently into alcohol by fermentation. Alcohol is largely obtained from potatoes in this manner. *Absolute alcohol* is pure alcohol free from water, and has a specific gravity of 0.794 at 15.5 deg. C. (60 deg. Fahr.). *Methylated spirit* contains, approximately, 90 per cent. of alcohol, mixed with 10 per cent. of wood spirit, and 0.12 per cent. of petroleum oil to render it undrinkable. It has a specific gravity of 0.821 at 15.5 deg. C. *Rectified spirit of wine* consists of 86 per cent. of alcohol with 14 per cent. of water, and has a specific gravity of 0.838, while *proof spirit* contains 49.2 per cent. of alcohol and 50.8 per cent. of water, and has a specific gravity of 0.920.

Methylated spirit is a solvent for most aniline colours, and for rosin, shellac, and many other resins, but does not dissolve the hard fossil resins known as animé, copal, and kauri to any considerable extent.

Petroleum spirit, benzoline, or benzine is one of the lightest commercial distillates obtained from petroleum. It consists of a mixture of hydrocarbons belonging to the paraffin and naphthene series. Petroleum spirit has usually a specific gravity of about 0.730, and boils at about 65 deg. C. It is not miscible with water or alcohol, but mixes freely with turps or benzol.

Benzol, or benzene, has a composition repre-

sented by the formula C_6H_6 , and should not be confounded with the mixture of hydrocarbons sold as benzoline or benzine, although the latter much resembles benzene in its behaviour as a solvent. Benzene is obtained from coal-tar, and is a good solvent for resins, oils, fats, pitch, indiarubber, or sulphur. It is not miscible with water, but mixes readily with alcohol, ether, or acetone. Its specific gravity is 0.809, and its boiling point 80.5 deg. C.

Coal-tar naphtha contains benzene and other hydrocarbons of the benzene series. It resembles benzene in its solvent properties, and is often used for varnish manufacture. Crude coal-tar naphtha has a dark brown colour, and contains ammonia and several complex bodies. It has a specific gravity of from 0.840 to 0.940, but the purified product is colourless and has a specific gravity of from 0.865 to 0.877. The purified naphtha is commonly called *solvent naphtha*, and is largely used as a solvent for india-rubber.

Shale naphtha is a mixture of volatile hydrocarbons obtained by the distillation of shale. It is not miscible with water or alcohol, but mixes readily with turpentine spirit, ether, or benzol. It has a specific gravity of about 0.750, and is a solvent for many oils and resins. It is largely used as a substitute for turpentine spirit.

The following are a few typical recipes for the manufacture of varnishes:—

Spirit Varnishes.

French Polish.	Shellac Varnish.
Shellac 2 lbs.	Shellac 1½ lbs.
Gum benzoin ... 4 ozs.	Methylated spirit 1 gal.
Methylated spirit 1 gal.	

Cheep Oak Varnish.

Rosin 3½ lbs.	
Turps 1 gal.	

Oil Varnishes.

Oak Varnish.	Amber Varnish.
Kauri gum ... 8 lbs.	Fused amber ... 6 lbs.
Linseed oil ... 3 gal.	Boiled linseed oil 2 gal.
Turps 3½ gal.	Turps 4 gal.

Black Varnish.

Bitumen 6 lbs.	
Linseed oil 2 gal.	
Turps 4 gal.	

Stains.

Stains are liquids holding certain colouring matters in solution or in suspension, and are prepared for application to deal or other wood of a light colour. The wood after treatment with stain is usually carefully sized with two coats of size, and then varnished. For work not exposed to strong sunlight or required to remain permanent in colour for more than one or two years many of the brilliant aniline colours may with advantage be used.

The following are a few of the materials commonly used for staining wood:—

Oak Stain.—Raw sienna.

Mahogany Stain.—Burnt sienna ground in vinegar; or a mixture of madder, logwood extract, and potassium carbonate.

Walnut Stain.—A mixture of Vandyke brown, potassium bichromate, and sodium carbonate.

Black Stain.—Logwood extract with yellow potassium chromate.

Blue Walnut Stain.—Burnt umber.

Glue consists essentially of a mixture of gelatine and chondrine. The latter substance is somewhat similar to gelatine in its composition and properties. Glue is prepared from hoofs, skins, bones, and other animal offal. Glue of the best quality merely swells when immersed for some time in cold water, and is not dissolved to any considerable extent, but it is readily soluble in hot water. The weakest commercial glues are almost completely soluble in cold water. If alum be added to a solution of glue the chondrine will be precipitated, but the gelatine will remain in solution. Gelatine is obtained from animal skin, tendons, and bones, while chondrine is obtained from cartilage.

Glue is obtained by steeping and boiling the animal refuse, the boiling being performed under pressure: the ossein or collagen is thereby converted into gelatine, and the cartilage or chondrine into chondrine. Gelatine has greater adhesive power than chondrine.

The proportion of water contained in glue should not be less than 12 per cent., nor more than 18 per cent., for the adhesive quality of the glue is diminished by over-drying, while an excess quantity of water encourages putrefaction, and acts as a makeweight. The ash left after ignition should not exceed 3 per cent. The glue should be almost neutral in its reaction; if strongly acid it is liable to inju-

riously affect the materials with which it is brought in contact, while if slightly alkaline owing to lime having been used to neutralise the sourness or acidity of the glue, it is apt to putrefy or decompose.

Size is glue of good quality which has been placed in contact with water and melted. The glue is placed in a pot and covered with water, then melted, and subsequently thinned by adding more water. Size is used in distemper to cause the whitening to adhere to the surface of the wall; also under the name of *clear size* as a coat to fill up the pores of wood or plaster surfaces, and render the surfaces more suitable for receiving varnish or paint.

Gold Size is of a totally different character from common size, but is applied to surfaces to render them suitable for receiving a coating of gold leaf. The following is one of the recipes for making gold size:—8 lbs. gum copal, 9½ gallons boiled linseed oil, and 24 gallons of turpentine spirit.

Liquid Glue.—A solution of glue which does not require heating before use, and which may be kept as a solution for an indefinite period, may be prepared by dissolving the glue in hot water and then adding a little nitric acid. A liquid glue may also be prepared by boiling the glue with strong vinegar instead of with water. When the glue solution becomes cold it does not solidify, but glue thus treated is a weaker cement than ordinary glue, and the presence of the acid prohibits its use for many purposes.

Elastic Glue is glue mixed with glycerine.

Marine glue does not contain any glue. It is prepared by dissolving india-rubber and shellac in naphtha or other suitable solvent, the proportions of the ingredients being such that the mixture will solidify when cold, but will melt when heated to about 120 deg. C.

Isinglass is a fish-glue obtained by drying the bladder or "sound" of certain fish. It is almost pure gelatine, and is one of the strongest glues.

Fish glue is sometimes obtained by treating fish refuse in a manner similar to that in which animal refuse is treated for the production of common glue. It has a fish-like odour and does not gelatinise, but can be used as size where its odour does not prohibit it.

23.—THE CHEMICAL EXAMINATION OF LIME, LIMESTONE, MORTAR, OR CEMENT.

IN the present and following chapters the methods commonly employed in a chemical laboratory for determining the commercial value of different building materials will be briefly described. In many cases several different methods by which the proportion of any given constituent of a mixture may be estimated are known, but in these columns only one method for the determination of each of the principal constituents will be mentioned. When a considerable number of samples of a similar character have to be examined, the analyses may, in many instances, be accomplished as accurately and with greater speed by substituting volumetric for gravimetric processes; but when only one or two samples have to be examined, the time required for the preparation of the standard solutions for volumetric analysis is often greater than that expended in effecting analysis by gravimetric methods. Those desiring to study volumetric processes should consult Sutton's "Volumetric Analysis."

Limes, limestones, mortars, and cements all require to be examined for the quantity of water, silica, oxide of iron, alumina, lime, magnesia, carbon dioxide, and sulphur present, and may all be subjected to the same chemical treatment. Sometimes the proportions of the alkalis (potash and soda) are also determined, but they are seldom present in greater quantity than 0.5 per cent., and are not, therefore, usually estimated.

Preparation of Sample.—The sample to be examined must be reduced to a fine powder as possible, and placed in a dry stoppered bottle to prevent it from absorbing carbon dioxide from the atmosphere, or from absorbing or losing water. The whole of the sample should be mixed as perfectly as possible.

Moisture.—The water not in a state of chemical combination is commonly termed moisture or hygroscopic water. The proportion of free water may be determined by placing 5 grammes of the sample upon a clock glass or in a platinum basin in an air-bath maintained at 100 deg. C. until the sample ceases to lose weight. This is not a strictly

accurate method of determining the moisture, because the lime, mortar or cement has a tendency to absorb carbon dioxide while drying, but it is sufficiently accurate for practical purposes.

Loss on Ignition (combined water).—Place two grammes in a platinum crucible or dish, and subject to bright red heat over blowpipe, or in muffle furnace, until the substance ceases to lose weight. From total loss in weight deduct moisture and CO_2 ; the remainder represents combined water and organic matter if any organic matter be present.

Silica and Silicates Insoluble in 10 per Cent. HCl.—Boil two grammes with excess of 10 per cent. HCl solution (i.e., concentrated HCl solution diluted with 90 per cent. water) and filter. Wash, ignite, and weigh insoluble residue, which consists of insoluble silica and silicates (sand and clay). To estimate the proportion of clay (if any) in the insoluble residue, the residue, after being weighed, may be fused with a mixture of sodium and potassium carbonates and subjected to the treatment to be described when discussing the analysis of clays.

Silica Soluble in 10 per Cent. HCl.—Evaporate filtrate obtained during removal of insoluble matter to complete dryness over water-bath and sand-bath. By this treatment all silica previously dissolved by the hydrochloric acid is rendered insoluble in that re-agent. Moisten the dry residue with HCl, add hot water, and boil. (N.B.—Distilled water must always be used for chemical analysis.) Collect insoluble residue, if any, on filter, wash free from chlorides, ignite, and weigh it as silica soluble in 10 per cent. HCl. Examine filtrate for iron oxide, alumina, lime, and magnesia.

Silica Soluble in 10 per Cent. Caustic Soda.—The following process, described by Mr. John Hughes in the *Builder* (June 18, 1892), may be employed. Treat two grammes with excess HCl, evaporate to dryness on water-bath, treat residue with dilute HCl, collect insoluble residue on filter, and then wash, ignite, and weigh it. After weighing, boil the insoluble siliceous matter with 100 c.c. of a 10 per cent. solution of pure caustic soda. Collect the insoluble matter on filter, wash it free from soda, and then ignite it. The difference in the weight of the siliceous matter before and after boiling with caustic soda represents the silica soluble in 10 per cent. caustic soda. As silicate of alumina (clay) is slowly soluble in boiling caustic soda solution, the filtrate obtained when removing the matter insoluble in soda should be examined for alumina. This may be done by adding a slight excess of HCl, and then a slight excess of ammonium hydrate. Alumina, if present, will appear as a white or almost colourless precipitate. The caustic soda used for this test should be quite free from alumina.

Iron Oxide and Alumina.—The filtrate obtained upon removal of the silica soluble in boiling 10 per cent. HCl should be treated with a slight excess of ammonium hydrate and boiled. The oxides of iron and aluminium will then be precipitated together, and may be collected upon a filter, washed, ignited, and weighed as a mixture of the two oxides.

To separate the iron oxide from the alumina the mixture, after weighing and grinding to fine powder, may be dissolved by boiling it with about 20 c.c. of concentrated HCl. In another beaker a strong solution of caustic potash (about 50 c.c.) is boiled. The solution of iron and aluminium should be added drop by drop to the caustic potash solution, when the iron will be precipitated as ferric hydrate, while the alumina will remain in solution. This process depends upon the fact that alumina is soluble in caustic potash, while iron oxide is insoluble in that reagent, and it is, of course, necessary that the quantity of caustic potash employed should be considerably greater than that required to neutralise the acid in which the mixed oxides are dissolved. The ferric hydrate is collected on a filter, washed free from caustic potash, ignited, and weighed as ferric oxide. Difference in weight between weight of mixed oxides and weight of ferric oxide alone represents the weight of alumina present in the 2 grammes of the sample taken for examination.

Lime.—The ammoniacal filtrate obtained during removal of mixed hydrates of iron and alumina should be treated with about 2 grammes of solid ammonium oxalate, boiled, and then allowed to stand for at least half-an-hour. The white precipitate of oxalate of lime may then

be collected on filter, washed, and heated to a bright red heat over blowpipe or in muffle furnace until it has all been converted into lime (CaO), and is therefore constant in weight. As the lime when cool has a great affinity for water, it should be placed in a desiccator while it is cooling, and should be weighed immediately it has cooled to atmospheric temperature.

Magnesia.—The filtrate obtained during removal of the lime should be treated with a few drops of H_2SO_4 , then evaporated to dryness and gently heated to expel the ammonium oxalate. The residue should be dissolved in about 50 c.c. of water, then treated with excess of ammonium hydrate, ammonium chloride, and sodium phosphate, and, after stirring, be allowed to stand for at least 12 hours. The precipitate is collected on filter, washed free from sodium phosphate, heated at a bright red heat until constant in weight, and then weighed as magnesium pyrophosphate ($\text{Mg}_2\text{P}_2\text{O}_7$). To find the MgO in the $\text{Mg}_2\text{P}_2\text{O}_7$ obtained, multiply by the factor 0.3604.

Alkalies.—The estimation of the alkalies is a tedious process, and is usually neglected, but may be effected in the following manner:—Treat 5 grammes of the sample with excess HCl, and take to dryness to render all silica insoluble. Moisten dry residue with HCl, and add sufficient hot water to dissolve all soluble matter. Filter, heat filtrate with excess of milk of lime to throw down iron, aluminium, magnesium, and phosphorus, and then remove precipitate by filtration. To filtrate, add ammonium hydrate, ammonium carbonate, and ammonium oxalate. Filter, evaporate to dryness, and then heat sufficiently to expel all ammoniacal salts. Treat residue with about 100 c.c. of water; filter if necessary; add slight excess HCl, and evaporate to dryness in platinum dish of known weight. Dry dish and contents at 100 deg. C. in air-bath. The weight of the residue represents the weight of the mixed chlorides of potassium and sodium. The potassium may be subsequently separated from the sodium by dissolving the residue in a little water, and adding a considerable excess of platinum tetrachloride solution. The potassium will be precipitated as a double chloride of potassium and platinum (K_2PtCl_6). The double chloride should be washed with alcohol until free from platinum tetrachloride, dried at 100 deg. C., and weighed. To find the quantity of K_2O in the weight of double chloride obtained, multiply by the factor 0.1927.

Sulphur.—Treat 5 grammes of the sample with excess HCl, and take to complete dryness to render all silica insoluble. Moisten residue with HCl; dilute with sufficient hot distilled water to dissolve all soluble matter, and then filter; boil filtrate, and add excess of barium chloride solution to precipitate the sulphur as barium sulphate. After boiling for a few minutes, allow precipitate to settle down; then filter, wash precipitate free from barium chloride, ignite, and weigh it. To find weight of S in the BaSO_4 obtained, multiply by the factor 0.1373; to find weight of SO_2 in the BaSO_4 , multiply by the factor 0.3434.

Carbon Dioxide.—The proportion of CO_2 present in a sample of lime, mortar, or cement

A small quantity of distilled water is placed in A. The cylinder B is filled with HCl, the cock D being kept closed. In C is placed a little concentrated sulphuric acid to absorb any water vapour which may be carried forward by the carbon dioxide as it escapes. The apparatus when thus charged is weighed. Some of the substance to be examined (from 1 to 3 grammes) is then introduced into A, and the apparatus is again weighed to ascertain the exact weight of the substance added, and also the total weight of the apparatus and its contents.

The cock D is now opened to allow a few drops of HCl to pass into A. When effervescence ceases a few more drops of acid are admitted, and so on, until the introduction of acid into A ceases to cause any further effervescence. The apparatus is then gently heated until the liquid in A is raised almost to boiling point, in order to expel the CO_2 held in the cold solution. When cool, a small rubber tube is attached to the eduction tube at top of cylinder C, and a current of air is slowly aspirated through the apparatus until all the gaseous CO_2 has been replaced by air. The apparatus is then again weighed. The loss in weight represents the weight of CO_2 in the quantity of the sample introduced into the apparatus.

Specific Gravity.—It is usual when examining a sample of Portland cement to ascertain its specific gravity, for cement which contains much free lime has a lower specific gravity than that of cement of good quality. The specific gravity of fresh cement should not be lower than 3.100. The determination of the specific gravity may be accomplished with the aid of Keates' specific gravity bottle (fig. 3).



Fig. 3.—Keates' Specific Gravity Bottle.

This bottle has two bulbs, the lower being larger than the upper bulb. The capacity of the upper bulb from the mark B to the mark A is equal to the volume of 1,000 grains of distilled water at 15.5 deg. C. The operation of determining the specific gravity of a sample of cement is performed as follows:—

Fill the bottom bulb with petroleum (or other suitable liquid which has no action upon the cement) at 15.5 deg. C. until it reaches the mark B, and weigh the bottle with its contents. Then drop the finely-powdered cement, little by little, into the bottle until the petroleum reaches the mark A. Now place the bottle and contents under a vacuum by means of an air-pump for a few minutes to remove minute air-bubbles carried by particles of cement into the petroleum, and, if necessary, add a little more cement to bring the petroleum exactly up to mark A. Finally, again, weigh bottle with contents at 15.5 deg. C.

The difference in weight in grains before and after the addition of the cement when divided by 1,000 represents the specific gravity of the cement.

The specific gravity of other finely divided substances may be determined in a similar manner, but the powder must in all cases be quite insoluble in the liquid in which it is immersed.

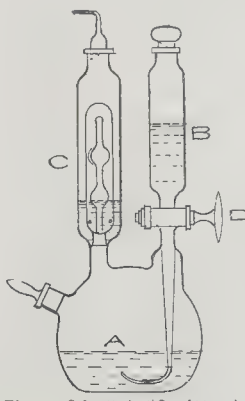


Fig. 2.—Schrotter's CO_2 Apparatus.

is most conveniently determined by means of Schrotter's carbon dioxide apparatus (fig. 2).

BOARD SCHOOL, MORECAMBE.—The new central Board Schools, Station-road, Morecambe, have just been opened. Mr. J. Edmondson was the con. tractor, Mr. Raynor the clerk of works, and Mr. J. B. Newton the architect of the building.

GENERAL BUILDING NEWS.

SEAMEN'S HOSPITAL, CARDIFF.—A new seamen's hospital is being erected at the Cardiff Docks by Messrs. William Thomas & Co., contractors, from the designs of the architect, Mr. E. W. M. Corbett.

A CHURCH ON THE COTTACIN SYSTEM.—St. Sidwells Church, Exeter, of which the foundation-stone has just been laid, is the first example in England of a complete building on the Cottacin system of steel-cored brick and steel-cored cement construction. The architects are Messrs. Commis & Coles, of Exeter. The system of construction has been passed by the Streets Committee on the report of Mr. Thomas Moulding, the City Surveyor, and approved by the City Council. The building, which will be an essentially fireproof one, has been completed as far as the caisson foundations of steel-cored brick, and the hollow walls of the same brick construction are now being built. The gallery, 14 ft. wide, which will go round six sides of the octagonal church, will be entirely constructed of steel-cored brick and steel-cored cement, and will be unsupported by any pillars or tie-rods. The octagonal domed roof will be constructed of an interior thickness of 3 in. steel-cored brick, and an exterior thickness of steel-cored cement, with air space between the two thicknesses. The octagonal lantern with roof and cupola above will be constructed on the same fireproof system, all timber being suppressed. The cost of the main construction will be 3,000*l.*, and the work is being done by the Cottacin Construction Co., with English materials and local labour, under the supervision of the engineer specialist.

CHURCH, WITTINGTON.—The new Roman Catholic Church of St. Cuthbert, Palatine-road, Wittington, of which the foundation-stone was laid by the Bishop of Salford about sixteen months ago, was opened on the 23rd ult. The new church, which is estimated to cost 15,000*l.*, has been designed by Messrs. W. Telford Gunson & Sons, of Manchester, and is in the Byzantine style. The length of the building is 100 ft., the width across the transepts 68 ft., with a height throughout of 60 ft. The church provides seating accommodation for 450 people.

CHURCH RESTORATION, MELTON, LINCOLNSHIRE.—Steps are being taken with a view to restore the spire of Melton parish church, which, it is stated, has been found to be in a dangerous condition. Mr. Bassett Smith has been appointed architect, and the work is to be put in hand at once.

MISSION CHAPEL, WILLESBOROUGH, KENT.—At Willesborough a permanent Baptist chapel has been erected. Messrs. Jeffery & Lacey are the architects, and Mr. W. Baker, builder. The building (capable of holding from 160 to 200) is executed in red brick, with slate roof, ventilated on Boyle's system.

CHURCH, HUCKNALL HUTHWATE, NOTTINGHAM.—The foundation-stone of the proposed parish church for Hucknall Huthwate was laid on the 22nd ult. A sum of 4,778*l.* is estimated to be required to complete the projected church in accordance with the plans of the architect, and towards this 2,578*l.* has been raised or promised. The material employed in the masonry is the Mansfield stone dressing. The architect is Mr. G. Ford Whitcombe, of London, and the building is being undertaken by Mr. A. B. Clarke, of Nottingham.

CHURCH, HUDDERSFIELD.—The corner stone has just been laid of the new St. Matthew's Church, Primrose Hill, Huddersfield. The new church, which is abutting on Orchard-street, will consist of a nave 60 ft. by 31 ft. 6 in., a chancel 20 ft. by 22 ft., with north and south transepts—the south transept being the organ chamber and the clergy vestry—and a sanctuary 14 ft. by 20 ft., the total length of the church being about 100 ft. In the basement will be the choir vestry and Church Council room, 16 ft. by 20 ft., and heating vault. The church will be built of coursed walling inside and out, covered with blue slates. There will be seating accommodation for 360, chairs being used. The following are the contractors:—Builder's mason work, Messrs. B. Graham & Sons, Huddersfield; joinery, Mr. Lewis Kettlewell, Lockwood; plumbing, Mr. Henry Graham; and slating, Messrs. Thomas Longbottom & Sons. The architect is Mr. J. William Cocking, Hull.

CHURCH, ABERDEEN.—A new church has just been erected by the trustees of the Burghhead Quoad Sacra Parish Church. The cost of the new church will be about 1,400*l.* The contractors who carried out the work are:—mason, Mr. Peter Macnean; Elgin; carpenter, Mr. Thomas McKenzie; Elgin; slater, Mr. Andrew Davidson; Elgin; plumber, Mr. James Ross; Elgin; plasterers, Messrs. J. and J. Munro; Elgin; painter, Mr. William Fordyce; Elgin. Mr. William Sandison, Burghhead, fitted up the iron railings and bell. Messrs. A. and W. Reid & Witter, Elgin, were the architects. The clerk of works was Mr. William Hay.

CHURCH HALL, GATESHEAD.—On Saturday last the foundation stone was laid of a new church hall in Beech-street, for the parish of St. James, Gateshead. The building consists of a large hall and class-rooms, capable of holding about 600 people, and will be built with deep-red bricks, with red-tiled roofs. The contractors are Messrs. John

Ross & Son, of Gateshead; and the architect of the building is Mr. J. H. Morton, of South Shields.

CHURCH, STOKES DAMERAL.—The Bishop of Exeter recently laid the foundation-stone of the new parish church of St. Andrew, Stoke Dameral, the mother parish of Devonport. The church is being erected from the designs of Mr. W. D. Carr, architect to the Ecclesiastical Commissioners. A minimum of 1,300 seats is provided for in the completed scheme, but funds at present only permit a small portion to be erected.

RE-ERECTION OF LADY CHAPEL, HEXHAM ABBEY.—It is stated that the contract for the re-erection of the lady chapel, a portion of Hexham Abbey, which was demolished in the year 1850, has been placed with Messrs. Thompson, of Peterborough. The cost of the work is estimated at 10,000*l.* Mr. Temple Moore is the architect for the work.

BOARD SCHOOLS, CLUTTON, SOMERSETSHIRE.—On the 22nd ult. the foundation stone was laid of the new Board Schools at Clutton. The new buildings are being erected adjoining the Congregational Church, and a teachers' residence will be built on the opposite side of the road, and directly facing the school block. The plans provide accommodation for 350 children. The mixed department is provided with two cloak-rooms, one for boys and girls, the walls of which will be lined internally to a height of 4 ft. from the floor with selected white glazed bricks, and fitted with Adams & Co.'s school lavatory basins. The external doors of the cloakrooms have been arranged to open outwards. The main schoolroom for the mixed department measures 45 ft. by 22 ft., and will accommodate two classes each of forty children. The classroom for this division open immediately from this room, and measure respectively 27 ft. by 18 ft. 6 in. and 27 ft. by 20 ft. In the centre of the building will be placed the boardroom, facing the main road. A small store opens from this room for the lodgment of safe, documents, &c. The boardroom can be used as a retiring-room for the teaching staff. The infants' department consists of a schoolroom, 45 ft. by 22 ft., and a classroom, 27 ft. by 18 ft. 6 in., fitted with a gallery, and designed for the special accommodation of children of tender years. The cloakroom is similar in every respect to that for boys. The walls of all teaching rooms, also the walls of the main corridor and of the boardroom, will be lined to a height of 4 ft. from the floor with a dado of varnished Carolina pine matchboarding. A free treatment of Gothic has been adopted for the elevations, the external walls being faced and built with pennant stone from Temple Cloud Quarries, and lined on the inside with selected stock bricks, the dressings being of moulded Bath stone. The pavings of the passages and cloakrooms will be laid in pennant stone, while all teaching-rooms will be laid with selected pitch pine blocks. The roofs will be covered with red Glastonbury flat tiles. The total cost of the scheme, inclusive of land purchase, heating apparatus, and other expenses, will be about 4,000*l.* Mr. William F. Bird, C.E., of Midsomer Norton, is the architect, the contractor being Mr. J. Flower, of West Hartree; and the School Board have appointed as clerk of works Mr. D. Bees, of Bristol.

WORKHOUSE BUILDINGS, ECCLESALL.—At a recent meeting of the Ecclesiastical Board of Guardians it was announced that fourteen tenders had been received for the erection of an infirm block on the present workhouse grounds. The Building Committee recommended the acceptance of the tender of Messrs. Martin & Hughes, Sheffield, for 7,032*l.*; Stoke stone to be used, and the work to be completed in fourteen months. Messrs. Lancashire & Sons are the architects.

NEW WING, RETFORD HOSPITAL.—A new south wing has just been completed at Retford Hospital. The wing has been constructed as a memorial to the late Miss Gylby. The work has been carried out under the direction of the architect, Mr. W. Southall.

RIFLE DRILL HALL, BRISTOL.—It is proposed to build a new frontage to the Rifle Drill Hall, Queen's-road, Bristol. The architects are Messrs. Cyril & Charles Thompson.

COURTHOUSE, WILMSLOW.—On the 27th ult. a new courthouse and police buildings for the districts of Wilmslow and Alderley Edge were opened at Wilmslow. The buildings have been erected at a cost of 6,000*l.* by Messrs. Meadows, of Stockport, from the plans of Mr. H. Beswick, the County Architect.

SHIPPING OFFICES, LIVERPOOL.—The new offices for Messrs. Elder, Dempster, & Co. are to be erected in Water-street, Liverpool, from the designs of Messrs. Briggs & Wolstenholme, F. B. Hobbs, and Arnold Thornely. The building occupies a rectangular piece of land at the corner of Water-street and Tower-gardens, having two frontages to Water-street and Old Churchyard. The principal entrance is in the centre of the Water-street front, and there is an additional entrance from Old Churchyard. The building covers an area of about 1,750 square yards.

COUNCIL OFFICES, CLUTTON.—The new offices of the Urban District Council in South-street, Clutton, are shortly to be opened. Constructed of red brick, with Bath stone dressings, the offices have a frontage of about 170 ft. The main entrance opens into a hall, with a committee-room on the left, and beyond is

an office for the Surveyor. An oak staircase leads to the upper floor, where the Council Chamber (30 ft. by 20 ft.) is the chief apartment. Adjoining the Council Chamber is a small ante-room, and away on the left of the staircase is a lavatory and quarters for the caretaker. Under the latter, on the ground floor, is the fire brigade station, with doors opening on to South-street. The work has been carried out in accordance with the designs of Mr. P. Watson, architect, Adelphi, London, by Messrs. Tompsett & Co., of Farnham. The contract price was 4,500*l.*

SANITARY AND ENGINEERING NEWS.

DEEP-WATER DOCK, CARDIFF.—The new deep-water dock at Cardiff is now in the final stage of its completion. The new dock covers an area of 503 acres (exclusive of the dry docks). Its total length is 2,550 ft., and its width varies from 80 ft. to 1,000 ft., while its depth below coping is 52 ft. The entrance lock is 800 ft. in length between the gates, and 90 ft. in width at the gates. The total depth of water over the sill will be 34 ft. at high water neap tide, and 43 ft. 6 in. at high water springs. At the south west extremity of the dock two graving basins are in course of construction. One of these is 800 ft. long and 85 ft. wide, and the other 800 ft. long and 75 ft. wide. At the north end the new dock is connected with the Roath Dock by a communication passage 600 ft. in length, with a minimum width of 90 ft. The south side has been set apart for a number of special cranes to be erected by the Cardiff Railway Company, the managing director of the Cardiff Railway Company. This dock has been built to the order of the Cardiff Railway Company, and under the immediate direction of Sir W. T. Lewis. The estimated cost of the undertaking (including machinery and other appliances) is 1,500,000*l.* The contract has been given to the firm of Messrs. C. L. Hunter, formerly the chief engineer to the Cardiff Railway Company.

DRAINAGE WORK, ABERDEEN.—The Town Council of Aberdeen are carrying out main drainage works, which are nearly complete. The drainage of the whole of the city is to be carried underneath the bed of the river Dee on its way to the sea. Hitherto the sewage has been discharged into the harbour, but under the new scheme, which is to cost 170,000*l.*, it will be thrown into the ocean near Girdleness, a little to the south of Aberdeen. The sewage will be conveyed underneath the bed of the river by an inverted siphon, operated by gravitation; but the carrying out of the work has been complicated by the proposals of the Harbour Commissioners to convert the river bed above the site of this siphon into a dock. At present the Commissioners are engaged putting down sections of quay wall on each side of the river, through which the siphon will be carried, this forming one of the main divisions of the scheme of engineering. The siphon tunnel, which is of cast iron, built in sections, will be constructed in the same way as the most recent of the London underground railways viz., by means of a shield and compressed air. The top of the tunnel will be situated at a depth of 41 ft. below high water mark, to enable the river to be dredged for the passage of shipping. The Burgh Surveyor's department, under Mr. Dyack, C.E., has charge of the laying of the siphon, and the operations to be undertaken by the Harbour Commissioners in connexion with this scheme are being executed under the superintendence of Mr. R. Gordon Nicol, C.E., their engineer.—*Scotsman.*

STAINED GLASS AND DECORATION.

A NEW SIDEBOARD.—Messrs. A. J. Arrowsmith & Co. have recently finished a fine sideboard of considerable size, from the designs of Mr. G. H. Fellows Prynne, and are now exhibiting it at their New Bond-street gallery. It is executed in Austrian oak, handsomely carved and fumed finished with a dull polish. Besides many pieces of furniture of their own design, Messrs. Arrowsmith have in their showroom chairs recently made from designs by Mr. Belcher and Mr. Hare for furnishing municipal buildings. Some of the panelling from the British Pavilion at the Exposition Universelle, from Mr. Lutyens' designs, is also on view.

WINDOW, SEATON DELAVAL CHURCH.—In the ancient Norman church which adjoins Seaton Delaval Hall a memorial window has just been placed. In order to commemorate the 800th anniversary of the foundation of the church, the panelling of the window, the work of which has been carried out by Messrs. Wailes & Strang, of Newcastle.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Messrs. Chas. Bell, Withers, and Meredith, architects, have removed their offices from 3, Salters Hall-court, to 50, Cannon-street, E.C.

PROPOSED RIVER EMBANKMENT AT SHADWELL.—The Billingsgate and Leadenhall Markets Committee of the Corporation have presented a report to them on a suggestion by the London County Council to take joint action for the formation of a

river embankment at Shadwell immediately adjoining the fish market, to provide, so far as the Council are concerned, a shaft for the purposes of the Rotherhithe and Ratcliffe Tunnel, and to enable the Corporation to have the embankment extended along the length of the river front of the market. The committee have unanimously arrived at the opinion that it is most desirable for the future development of the market and property to join in the scheme. The City Surveyor estimates that, if the work were undertaken by the Council, the proportion of cost to be borne by the Corporation would be 15,000*l.* Under present conditions, a large and recurring expenditure would be necessary to remove the great accumulation of mud on the river front of the market. The formation of an embankment would dispense to a large extent with the necessity for any such work being undertaken, and the additional space and increased facilities would, in the Committee's opinion, increase the value of the property sufficiently to justify the expenditure. Negotiations are involved with adjoining owners, but the Committee suggest that they should join with the County Council in making an application to the Thames Conservancy Board, and arrange with the Council to meet the cost up to 15,000*l.*

SCARBOROUGH MASTER BUILDERS' ASSOCIATION.—The annual meeting of this Association was held at the Albemarle Hotel recently. Mr. A. W. Sinclair, President of the Association, presided. The annual report and balance-sheet were read, and Mr. Sinclair was heartily thanked for his services during the past year, also for the diligent manner in which he had served the interests of the Association upon the Executive of the Yorkshire Federation of Building Trade Employers, having attended meetings in London, Manchester, Leeds, Dewsbury, York, Bridlington, and Invergate. Mr. Sinclair was re-elected President for the ensuing year, and Mr. T. B. Jowsey was re-elected Vice-President. The Hon. Secretary (Mr. R. H. Carr) had, previous to the meeting, placed his resignation in the hands of the President, but at the meeting was urged not to relinquish the post. Eventually Mr. Carr, who has held the office for six years, was again re-elected. Messrs. W. Malton and W. Tindall were elected auditors.

THE POST-OFFICE AND NEW SITES.—In the course of next Session a Bill will be introduced for enabling the Postmaster-General to acquire for the postal services sites in Stanley-street, Paddington, in Borough High-street and Great Dover-street, Southwark, in Upper Ground-street, Christ Church, Southwark, and in the parish of St. Werburgh, Bristol. The site in Upper Ground-street is now occupied by the Old Barge House wharves, and will be taken with a view to the erection of a station for generating electricity.

PUBLIC IMPROVEMENTS, COLCHESTER.—At Colchester Town Hall recently, Mr. W. A. Ducat held an inquiry into the application of the Town Council for sanction to borrow 2,273*l.* for purposes of street improvement; 100*l.* for the construction of a footbridge over the Colne near Middle Mill; and 11,033*l.* for defraying the balance of the cost of the Town Hall.

ROMNEY REMAINS, DORSET.—Some remains of a Roman residence have lately been unearthed in the village of Fiftehead Neville, in Dorset, where there is a brook crossed by an ancient footbridge in stone, believed to be of Roman work. Close to the bridge are being brought to view, under the directions of Mr. W. R. Ditchey, of Sherborne, remains of a Roman residence, with almost certainly many more adjoining. A mosaic pavement, probably of the chief room, has just been uncovered, and adjoining it have been found a bath, the square red Roman tiles in perfect preservation, numerous walls bounding other rooms, flues, bricks, nails, bits of pottery, and so on. The remains of the walls and the floors were only 18 in. from the surface of the ground.

MANCHESTER ROYAL INFIRMARY.—A special meeting of the new Board of Management of the Manchester Royal Infirmary was held on the 1st inst., under the presidency of Mr. John Thomson. The Board sat in private. At the previous meeting it was suggested by the Chairman that it would be necessary to obtain a distinct offer from the Owens College Council with regard to the site in Stanley-grove, and that any conditions which might accompany the offer could then be fully considered with the plans before the Board. At the meeting held on Monday two committees were appointed. One committee is to report upon the legal position of the Trustees with regard to the Piccadilly site before entering upon negotiations for the sale of it. The other Committee is to inquire and report (1) whether the Stanley-grove site is the best available, and (2) if so, report fully regarding that site and the portions of the estate allotted to the southern Hospital and the Cancer Pavilion, and also upon the property adjoining. The Chairman read a letter from the Principal of the Owens College formally offering the Stanley-grove site for a new infirmary. The total area of the property at Stanley-grove is 12 a. 2 r. 27 p. The Cancer Hospital occupies 7,573 yards, and the Southern Hospital occupies a covenant to build within a few years on land which extends over 12,176 yards.

NO. 17, FLEET-STREET.—In the early part of 1901 the London County Council purchased the freehold of the interesting and ancient building, No. 17, Fleet-

street, with a view of preserving the historical portions from destruction. The demolition of the entire building had been decided upon, and the London County Council deserve every credit for their action in thus rescuing and retaining such exquisite examples of old London as the beautiful ceiling of the Council Chamber and the original front of the house, which has for many years been hiding behind a mask. The premises have for nearly a century been used as a hairdressing establishment. During the last fifteen months the business has been carried on in the old Council Chamber of the Duchy of Cornwall in days of James I. The County Council will shortly proceed with the front part of the building, and will take down the historic ceiling and panelling in the Council Chamber and remove them to South Kensington, and they will be restored by Sir Purdon Clarke, principal of the Art Department. When finished they will be returned to Fleet-street, and will be replaced in their original positions in the Council Chamber. The front of the house, which now overhangs the pavement, has been found to be a false one masking the original. This front will be rebuilding and removing, and the original, consisting of carved oak pilasters and other attractions, will be restored. The shop front will be set back about 5 ft., and the upper part thrown out on cantilevers to overhang the pavement.

THE HOUSING QUESTION.—The Report from the Joint Select Committee of the House of Lords and the House of Commons on the housing of the working classes, together with the proceedings of the Committee and minutes of evidence, were published on the 1st inst. as a Parliamentary Paper. The Committee submit two model clauses and three corresponding standing orders, which they recommend in place of the present model clauses and orders now in force dealing with London and all places outside London. They suggest that the model clauses be embodied in a public general Act of Parliament. They have come to the conclusion that in London it is desirable that every case in which houses of the labouring class are proposed to be taken should be noticed by the central authority, while outside London it is sufficient that the attention of the central authority should be called to cases in which thirty persons belonging to the labouring class are displaced in one Borough, Urban District, or Rural Parish, as the case may be. In settling schemes for providing new houses in place of those demolished they think it advisable that the Central Authority should exercise a full discretion. They recommend that the new houses to be provided be suitable for persons of the labouring class, and not too ambitious in character and design. They attach much importance to these conditions. It will be observed that the area within which the new houses may be provided under a scheme is left wholly to the discretion of the central authority. They recommend that in London the central authority be empowered to fix all rents for the new houses. On this point they are not agreed, the decision being arrived at on a division by six votes to three. So far as they can judge, the recommendations for places outside London are, with the necessary alterations, suitable for Ireland and Scotland.

SALE OF ARCHITECTURAL BOOKS.—Messrs. Sotheby, Wilkinson, & Hodge held this week a three days' sale of books and manuscripts, comprising the library of the late Mr. H. G. Hussey and other property. The following were amongst the works disposed of, and the prices obtained:—"The Monumental Effigies of Great Britain," by C. A. Stothard, 142 fine plates, 1817, 2*l.* 10*s.*; "In Materia d'Architettura et Perspectiva," by M. Bassi, Brescia, 1572, 5*s.*; "An Analysis of Gothic Architecture," by R. & J. A. Brandon, 1840, 1*l.* 10*s.*; "Ecclesiastical Edifices of the Olden Time," two vols., by J. Coney, 1842, 1*l.* 14*s.*; "Specimens of Architectural Remains in the Various Counties of England, two vols., by Colman & Rickman, 1838, 2*l.* 10*s.*; "Specimens of Ornamental Art," by L. Gruener, eighty coloured and other plates, 2*l.* 17*s.* 6*d.*; "Fifteenth Century Italian Ornament," by S. Vacher, 1860, 1*l.* 1*s.*; "Polychromatic Decoration," by W. & G. Andeley, 1882, 8*s.*; "History of Architecture in all Countries, with the Modern Styles," by James Ferguson, 3 vols., 1865, 19*s.*; "Dictionnaire Raisonné de l'Architecture Française," by E. E. Viollet-le-Duc, 1868, 7*l.* 15*s.*; "Specimens of Gothic Architecture and Ancient Buildings in England," 120 plates, by John Carter, 1839, 4*s.*; "Survey of the Cathedrals of England and Wales," by Willis Brown, original edition, numerous fine plates, 3 vols., 1742, 1*l.* 3*s.*; "Architectural Antiquities of Great Britain," by John Britton, 5 vols., 1835, 2*l.* 3*s.*; "Examples of Ancient Domestic Architecture," 170 designs, by E. T. Dolman, 2 vols., 1838, 1*l.* 3*s.*; "Floriated Ornament," 1849, "Chancel Screens and Rood Lofts," 1851, "Iron and Brass Pointed Work," 1856, "Pointed or Christian Architecture," 1841, and "Apology for the Revival of Christian Architecture in England," 1843, all by A. W. Pugin, together 5 vols., 12*s.*; "Etched Ornaments from Architectural Structures made in France, Belgium, and Germany," by Charles Wild, 34 fine plates, 2 vols., published by the author, 1833-36, 2*s.*; "Essay on British Gothic Architecture," by James Malton, 1798, and "Collection of Objects of Art of Mr. Edward Joseph,"

1800, 2*s.*; "Ecclesiastical Ornament, a Collection of Drawings, Tracings, Ornamental Alphabets, &c., of Ecclesiastical Architecture and Decoration," is a practical architect's scrap-book, about 200 designs, 5*s.*; "The Elements of Architecture," by Henry Wotton, first edition 1624, 4*s.*; "The Arts connected with Architecture, thirteenth to fifteenth century," by J. B. Waring, 1858, 10*s.*; "Architectural, Sculptural, and Picturesque Studies in Burgos and Neighbourhood," by J. B. Waring, forty-three fine lithographs, 1852, 12*s.*; "Plans, Elevations, Sections, and Views of the Church at Batalha," by James Murphy, 1836, 2*s.*; "Examples of Carved Oak Woodwork in Houses and Furniture of Sixteenth and Seventeenth Centuries," by W. B. Sanders, twenty-five photo-lithographs, 1885, 1*l.* 8*s.*; "Architectural Antiquities of Normandy," by J. Sell Cotman, 100 fine etchings, 1822, 17*s.*; "Engravings of Ancient Cathedrals, Hôtels de Ville, &c., of France, Holland, Germany, and Italy," by John Coney, 1842, 9*s.*; "Specimens of Medieval Architecture in France and Italy," by W. Eden Nesfield, 100 fine plates, 1862, 2*s.*; "Etchings (288), comprising the Architectural Antiquities of Norfolk, York, Cambridge, Suffolk, Lincoln, Essex, and North Wales, and Labor Studiorum," by J. Sell Cotman, 1838, 1*l.* 12*s.*; "Remarks, with illustrations, on the Domestic Architecture of France," by H. Clutton, 1853, 6*s.*; "Architectural Sketches from the Continent," by R. Norman Shaw, 100 fine plates, 1858, 10*s.*; "The Priory of St. Mary Overie, Southwark," by Fr. T. Dolman, 44 fine plates, 1881, 5*s.*; "Architectural Beauties of Continental Europe," by John Coney, 1831, 8*s.*; "Christ Church Cathedral, Dublin: an Account of its Restoration by George E. Street, with historical sketch by E. Seymour," 1842, 10*s.*; "Moyen Age Monumental and Architectural," 336 fine lithographic plates of Architecture, by Fr. T. Dolman, at Paris (no date), 8*s.*; "Scottish Woodwork of the Sixteenth and Seventeenth Centuries," by J. W. Small, 100 plates (only 250 copies printed), 1878, 1*l.* 1*s.*

THE PRINCESS'S THEATRE, OXFORD-STREET.—The closing of the Princess's Theatre is due to the circumstance that the proprietor does not see his way to carry out the structural alterations which the London County Council require. The present theatre was erected on a site covering nearly 21,500 ft. superficial, after designs by the late C. J. Philp and under his superintendence, and was reopened on November 6, 1880. It has entrances in Oxford, Galle, and Winsley-streets, with a separate approach to the scene-dock, carpenter's shop, and painting-room; the stage, including the wings, measures 77 ft. in depth by 42 ft. in depth; the auditorium is 60 ft. deep by about 65 ft. wide; and there is seating-room for an audience of 2,150. A large apartment with a balcony above the chief entrance formed what was then, we believe, an unwanted feature in the plan of a London playhouse. At a projected sale by auction on February 16, 1897, when the property was withdrawn after a bid of 20,000*l.*, Messrs. Debenham announced that the property was held under a lease from the Duke of Portland's trustees at a ground rent of 1,000*l.* per annum; it now belongs, we believe, to the Lord Howard de Walden estate in Marylebone parish. The first theatre was built there on the site of the Queen's Bazaar, which having been burned in 1839 was rebuilt for exhibition purposes. The house was then remodelled as a theatre by Nelson, and decorated by Cranford Hamlet, a wealthy silvermith of Cranborne-street, Leicester-square, for opera in English, and the opera novelty of promenade concerts; on the opening night, October 6, 1840, the play-bills stated that Queen Victoria had given permission before her accession that the theatre should be called by the name it still bears. The Princess's is distinguished for the performances of Macready, and some fifty years ago was leased by Charles Kean, who there gave his memorable revivals of Shakespeare's historical plays.

CAPITAL AND LABOUR.

LIVERPOOL PLUMBERS' DISPUTE.—Mr. Bertram B. Moss, secretary of the Liverpool Master Builders' Association, has sent out the following letter:—"Sir,—I have pleasure in informing you that the Liverpool branch of the United Operative Plumbers' Society of Great Britain and Ireland have written me to-day stating that they are prepared to allow their men (including Messrs. W. Tomkinson & Sons) to return to work on Monday morning next, December 1, and that the dispute as to the interpretation of certain rules shall be discussed in accordance with the rules."

LEGAL.

PURCHASE OF COTTAGES AT LUTON TO EXTINGUISH ANCIENT LIGHTS.

In the Court of Appeal, composed of Lords Justices Vaughan Williams, Stirling, and Cross, Hardy on the 27th ult. judgment was delivered in the case of J. W. Green, Ltd., v. Hill.

This was an appeal by the plaintiffs, a firm of brewers, from an order of Mr. Justice Buckley in the Chancery Division, on February 16 last year, refusing a decree of specific performance of an

alleged agreement by the defendant to purchase certain cottage property at Luton. The action was brought to enforce specific performance of an agreement, dated April 6, 1901, for the purchase of certain cottages in Bond-street, Luton. The defence was that the defendant never agreed to purchase the property, and that the document, executed by him, was so executed without his knowing of what it contained, and in the belief that it was merely an authority for him to secure a purchaser of the property on behalf of the plaintiffs. The document was admittedly on the face of it a Contract to purchase. The property in question consisted of four or five cottages, which had on the ground floor small windows which overlooked a public-house belonging to the plaintiffs, called the Cross Keys, and the evidence was that the plaintiffs were desirous of purchasing in order to extinguish any claim for ancient lights. There was another prospective purchaser, a Mr. Hucksley, who desired to purchase in order to retain a right of way. The property was put up for auction in May, 1901, and Mr. Sidney Green, a member of the plaintiff company, asked the defendant to attend and buy for them. Hill did buy for them for a sum of 2,050l. and the purchase was completed and a conveyance executed in June, 1901. According to the plaintiffs' version, after this Hill told Mr. Green that if he desired to sell, he (Hill) could not get a better price than 2,050l. As the plaintiffs only wanted the property in order to block the ancient lights, Mr. John Green agreed to sell it without the right to ancient lights and an agreement was executed, by which Hill agreed to purchase from the plaintiffs for 2,100l., the purchaser to make no claim to ancient lights in respect of windows on the ground floor. Hill's story was that it had been arranged that he should merely sell on behalf of the plaintiffs, but that he did not see the document, it being folded up, and that he signed it without knowing its contents. Hucksley was not keen on buying, and the plaintiffs brought this action to enforce specific performance of Hill's agreement to purchase. Mr. Justice Buckley found that Hill had signed the agreement without knowing what he was signing, and dismissed the action.

Lord Justice Vaughan Williams, in delivering the judgment of the Court, said that he and his learned brothers regretted that they must differ from the conclusion of fact at which the learned judge had arrived. Even when an appeal turned upon a question of fact the Court of Appeal had to bear in mind that its duty was to re-hear the case and not to shrink from over-ruling the learned judge. This Court was sensible of the great advantage the learned judge had had in seeing and hearing the witnesses, but there were circumstances quite apart from manner and demeanour which showed that the statements on which the learned judge had based his judgment were not credible. The action was brought for specific performance of a certain agreement signed by the defendant for the purchase by him from the plaintiffs of certain property in Bond-street, Luton. The defendant did not deny that he signed the agreement, but he said that he signed it without reading it. That meant that J. W. Green had been guilty of fraud, and this Court could find no evidence upon which they ought to allow the finding of fraud against J. W. Green to stand. The result was that the judgment of Mr. Justice Buckley must be reversed, and judgment entered for the plaintiffs for specific performance of the agreement with costs.

The appeal was accordingly allowed.

APPEAL BY A MANUFACTURER OF ARCHITECTS' SPECIALITIES

The hearing of the case of Jones v. Lavington concluded before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Romer and Mathew, on the 27th ult., on an application for the plaintiff for judgment or a new trial of an action tried before Mr. Justice Grantham and a special jury in the King's Bench Division.

This was an action brought by the plaintiff to recover from the defendant damages for an alleged breach of covenant or, in the alternative, for an alleged breach of warranty, and for fraudulent misrepresentation on the letting of premises in Guildford-street, W.C.

The facts were, shortly, as follows:—The defendant, by an agreement dated July 19, 1900, agreed to let to the plaintiff the lower part of a house in Guildford-street for three years at an annual rent of 5s. The house in question was held by the defendant under a lease from the Governors of the Foundling Hospital, the defendant in that lease, as lessee, covenanting not to use the premises for the purpose of any trade or business, there being the usual provision for re-entry by the lessors in the event of any breach of the covenant. The plaintiff's case was that before entering into the agreement of July 19, 1900, he informed the defendant that he required the premises in question for the purpose of residing therein, and to carry on the trade or business of a manufacturer of architects' specialties, ornamental brass founder and metal-work, and that defendant represented that he had the right to let the premises for this purpose. The plaintiff, having no knowledge of the covenant the defendant had entered into with the governors, and relying on

the defendant's warranty and representation, entered into possession of the premises, and in December last the governors commenced an action against the plaintiff and the defendant for an injunction to restrain the plaintiff from carrying on his business on the premises, and Mr. Justice Phillimore granted an injunction, as prayed, restraining the plaintiff from so carrying on his business as from December 24, 1901. The plaintiff's case was that the defendant was liable to him by reason of his representation and warranty for the loss he had incurred. At the trial in the Court below the jury awarded the plaintiff 150l. damages, but specifically found, in answer to a question left to them by the judge at the instance of counsel for the defendant, that there had been no fraud on the part of the defendant. In these circumstances Mr. Justice Grantham entered judgment for the defendant. Hence the present appeal of the plaintiff on the ground that he was entitled to judgment as the agreement of July 19, 1900, carried with it an implied covenant for quiet enjoyment which entitled him to recover from the defendant in the circumstances of the case.

At the conclusion of the argument on behalf of the appellant, their Lordships held that in the agreement of July 19, 1900, an unlimited contract for quiet enjoyment could not be implied, and as the jury had negatived the allegation of fraud the plaintiff's action failed.

The appeal was accordingly dismissed. Mr. Wutt, K.C., and Mr. E. J. Drake appeared for the appellant, and Mr. T. F. Lloyd for the respondent.

ACTION FOR ALLEGED BREACH OF A RESTRICTIVE COVENANT.

Mr. Justice Farwell, in the Chancery Division on the 1st inst., concluded the hearing of the case of Earl de la Warr v. Wills, an action by the plaintiff, the tenant for life of a settled estate at Dextill-on-Sea, for an injunction to prevent the defendant committing the breach of a restrictive covenant.

The facts were shortly these:—The defendant, a doctor, occupied and used No. 20, Marine Mansions (which formed part of plaintiff's settled estate), as a private hospital for the open-air treatment of consumption. The defendant held the premises under a lease for seven years from the plaintiff at an annual rent of 125l. In the lease, the defendant entered into a covenant that he would not during the term permit to be done on the premises any waste or damage or anything which would be or become a nuisance or annoyance to the plaintiff, his heirs, or assigns, or the occupiers of the adjoining premises, and would not carry on on the said premises any trade or business, or use the same otherwise than as a private dwelling-house, lodging, or boarding-house, or professional residence or private hospital for the treatment of chest complaints. From March 24, 1900 (the date of the lease), the defendant used the house as a private hospital for consumptive patients, and the plaintiff's case was that the defendant had used the premises in such a way as to constitute a nuisance to the plaintiff and his tenants, and so as to constitute a breach of the above-mentioned covenant. The evidence for the plaintiff was to the effect that defendant's patients were continually sitting and lying on the balconies of the house, that beds were placed on the balconies, that the patients used the balconies by day as their sitting-rooms, and sometimes by night for their sleeping places. The defence was a denial of any nuisance or the breach of the covenant.

His Lordship, after hearing the evidence and the arguments of counsel, held that it had not been made out that the hospital was used in such a way as to be a nuisance. It had not, his Lordship said, been proved to his satisfaction that any reasonable person had been annoyed, though, of course, timid visitors might fear the idea of a hospital next door to them. He thought the evidence was conclusive that the hospital was conducted in the best possible way. The action must be dismissed, with costs. Mr. Butler, K.C., M.P., and Mr. J. T. Prior, appeared for the plaintiff; and Mr. W. H. Upjohn, K.C., and Mr. Christopher James for the defendant.

OWNER'S LIABILITY FOR DANGEROUS STEPS.

The case of Wright v. Lefever came before the Court of Appeal composed of the Master of the Rolls and Lords Justices Romer and Mathew, last week, on the application of the defendant for judgment or a new trial of the action tried before Mr. Justice Walton and a common jury in the King's Bench Division.

The facts were as follows:—The plaintiff, in going by the defendant's house, saw that it was to be let, and wishing to rent a house, applied about the same at the office of Messrs. Bliss & Sons, the defendant's agents. He obtained through Messrs. Bliss & Sons the key of the house, and went and inspected it. On the same day the plaintiff complained to the agents that the house was badly out of repair, and that the steps were dangerous. Plaintiff did not, however, return the key, but kept it in his possession. Two or three days afterwards, the defendant, accompanied by a builder, went over the house to see what repairs were necessary. The

following day the plaintiff, accompanied by his wife, went to see the house again, and while going up the steps to the front door, the steps gave way and the plaintiff was badly injured. The plaintiff then commenced the present action against the defendant to recover damages for personal injuries, and his case was that as he was on the premises by the defendant's invitation, the defendant was liable for the injury he sustained by reason of the premises being in a dangerous condition. The jury, in answer to specific questions left to them by the learned judge found that the plaintiff when the accident happened was going up the steps for the purpose of going over the house; that he was doing so at Messrs. Bliss's request; that the steps were in a dangerous condition; that the danger was not known to the plaintiff before the accident; that he could not by reasonable care have ascertained the danger; that the danger was not known to the defendant or his agents; but that if reasonable care had been taken in the management of the house the defendant would have known. They assessed the damages at 36l., and the learned judge entered judgment for the plaintiff accordingly. Hence the present appeal of the defendant, on whose behalf it was contended that when the plaintiff went to the house the second time he went at his own risk and was in the position of a mere licensee, and that, therefore, the defendant was only liable for that which constituted a trap. The danger was not known to the defendant or his agents, and therefore the former was not liable.

In the result, their Lordships, without calling upon to justify the findings of the jury, directed the judgment to stand, and dismissed the appeal with costs.

Mr. Montague Lush, K.C., and Mr. H. C. Davenport appeared for the appellant, and Mr. Kemp, K.C., and Mr. Herbert for the respondent.

CAMDEN TOWN ANCIENT LIGHT CASE.

The case of Segalini v. Day, Toms third party, came before Mr. Justice Bigham in the King's Bench Division on the 1st inst., an action by the plaintiff, a restaurant keeper, of 53, Park-street, Camden Town, to recover damages from the defendants, the occupiers of adjoining premises, and the plaintiff's builder, for the diminution of light to the plaintiff's kitchen and restaurant and yard, for interference with the carrying on of his business, and for loss of profit.

Mr. Macmorran, K.C., and Mr. Abinger were counsel for the plaintiff; Mr. Dickens, K.C., and Mr. Smith for the defendant Day, and Mr. Colam for the defendant Toms.

Plaintiff was called, and stated that he held the premises for the remainder of a lease. He had a restaurant on the ground floor with a kitchen behind it, the windows of which faced a yard from which it received its light. The defendant Day had adjoining premises. About October last the defendant Day desired to rebuild certain of his walls adjoining plaintiff's restaurant, and plaintiff was approached and offered roof if he would consent to the proposed building, but he declined the offer. Eventually party-wall notices were served, and defendant commenced to build without submitting any plans.

Mr. Dickens said the wall in question was condemned, and they pulled it down and commenced to rebuild the restaurant, and plaintiff was aggrieved of the building that they had the wall. His case was that they sent the plans of their building to the plaintiff's surveyor before they commenced to build. But in their building contract they were indemnified by the builder, who was now the third party in the action.

Plaintiff, continuing his evidence, said he could not say the height of the yard wall prior to its demolition, but it was considerably higher now. The result was that owing to the new wall he had been obliged to keep the gas on all day in the kitchen, the light to which had been very much diminished. During the pulling-down operations he suffered considerable annoyance from the dust and dirt arising therefrom, both in the kitchen and restaurant. The front wall of the building had been advanced, and the light to the restaurant had suffered. In consequence of the building operations his takings had fallen off some 10l. per week. He had also lost his first-floor lodger, who had paid him 11. a week.

Cross-examined by Mr. Dickens: He was certain that the light to his kitchen had been considerably diminished.

Mr. Dickens: Having regard to all the conditions, we say that we have not appreciably diminished the plaintiff's light, but if we have, we have not done so to a greater extent than 5s. a year.

His Lordship: I am strongly of opinion that this wall must diminish, in fact, had materially diminished the light to the kitchen, and so it becomes a question of compensation. Now what is reasonable compensation? How much have you paid in?

Mr. Dickens: 35l. for the diminution of light, which is seven years' purchase. That is the only question I have to deal with.

Cross-examined by Mr. Colam: The dust and dirt from the demolition of the building was detrimental to his trade. It spoilt his meats, soups, &c., and many of his customers never returned to him in consequence. He opened his business at

7.30 a.m., and his customers began to arrive at 9 a.m. The book produced revealed his takings.

Re-examined: The pulling-down operations lasted about fourteen days, and during the whole of this period he suffered from the dust and dirt.

Mr. Choate, an architect and surveyor of Denmark Hill, practising in London since 1881, said in August plaintiff handed him the party-wall notices. His Lordship: There are only two questions to put to the witness. Did you see the kitchen before and after the building operations? And what has been the result?

The witness said he was in the kitchen before the defendant's wall was pulled down, and after, and in his opinion plaintiff had lost about half his light to the kitchen in consequence of the erection of the new building. A wall of plaintiff's building had cracked, and it would cost about 10s. to put it right. The dust and dirt from the pulling down operations would materially interfere with the business of the plaintiff.

Mr. Pollard, an architect and surveyor of thirty-two years' standing, gave corroborative evidence. At the conclusion of this witness's evidence his Lordship said this was a case that ought to be settled and the unfortunate plaintiff got out of this lawsuit. Would counsel now leave the case in his hands?

Mr. Macmorran, Mr. Dickens, and Mr. Colam asked leave to give judgment for plaintiff for 35s. and no costs, remarking that the plaintiff ought never to have been allowed to get into a lawsuit of this kind. He did not mean to blame Mr. Dickens's client.

Mr. Colam: We have a mass of evidence here that we did all we could in the matter.

His Lordship: You assent to the judgment? Mr. Colam: Yes.

His Lordship then gave judgment for plaintiff for 35s. and no costs, and said there would be no injunction.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

15,476.—APPLIANCES FOR INCANDESCENT GAS-BURNERS: *H. Stollenhoff*.—The object of the invention is to increase the supply of air to the mixing-tube and to effect a more complete mixing of the air and gas: a contracted neck joins that tube to an enlargement which is open at its base. Arms or bristles carry the gas from the gas nozzle, and discs made of gauze are interposed between the neck and the gauze burner-head, the chimney holder or gallery slides upon the burner.

15,530.—AUTOMATIC WORKING OF ELECTRICAL SWITCHES: *P. Thémé*.—In this invention, which relates more especially to regulators and accumulators, it is proposed that the motion of the switch shall be completed when it is started independently from the starting-device. In one form, for cutting in or out accumulator cells, the core is actuated to make contact with a contact if the solenoid, which is joined to the circuit that is to be regulated, varies from the normal, thereupon a current flows through one of two electro-magnets, one of the armatures is attracted, and the switch of the motor that works the accumulator switch is operated, the motor turns a disc having two contact-rings, whereof one is fitted with an insulating piece, contacts are mounted upon a bar which is connected to the armatures and are severally connected to one of the mains and to the magnets. By this means the motor being suitably braked, a shut circuit will be kept up through one of the magnets in the course of an entire revolution.

15,556.—DOOR-CLOSING APPARATUS: *E. Verity*.—A crank, the piston-rod of an oscillating cylinder, and a spiral spring combine to turn a spindle, to which the door is joined. With the closing of the door the piston on the rod, on which two are fitted two non-return valves, impels the liquid through a port and so past the regulating valve to the cylinder again. The screwing up or down of the regulating valve controls the rate at which the door will close.

15,567.—PIPE JOINTS FOR CLOSET-BASINS, &c.: *J. West*.—A flanged rubber collar is fitted on the flushing pipe at its junction with the horn. A cone, made of thin copper, with one of its edges cut into strips, bound with a wire, makes the joint secure. In a variant form flanged collars, drawn to one another with bolts, are used for compressing the packing, or set-screws may secure a rigid cone similar to that already mentioned.

15,575.—DOWEL PINS FOR PAVING AND SIMILAR BLOCKS: *H. Cooley*.—The pins, having double points, are intended for use in laying wooden pavements and flooring blocks. They are fashioned with radial arms from the centre, which are bent and sharpened in opposed directions so as to enter the blocks.

15,584.—SELF-CLOSING VALVE: *S. Frank*.—On the upper portion of the spindle of a plug-cock is put a coil spring of which the ends are joined to the casing and the spindle respectively. The plug can be locked by means of a slide, upon the casing, having a finger-piece to be inserted into slots cut in the lower end of the plug.

15,590.—COUPLINGS FOR PIPES AND TUBES: *W. R. Carpenter*.—For joining two metallic pipes is devised an elastic tube which is fastened with spring-clips of metal on to their flanges. The clips

have their ends bent as hooks which can be fastened or unfastened by gripping the exterior projections of the clips.

15,621.—A WATERPROOFING COMPOSITION FOR USE IN BUILDINGS: *J. Thame*.—The composition is intended for floor-coverings, wall-decorations, and similar surfaces. It consists of an admixture of the gum of the plant *Dyera Costulata*, or *Costula*—the Fontenay, or Jelutong, of commerce—with some fibrous binding material, a filling material such as wood-meal, and zinc oxide or barytes for hardening purposes. The compound should be rolled when hot, and can be suitably dyed when it has become cold. It may be used with a backing of paper, linen, or other cloth.

15,639.—PROCESS OF MOULDING BRICKS: *J. Hawboldt and J. Shenon*.—At the mouth of the pug-mill is a die-plate having openings through which the material is pressed into moulds in a sliding plate which is reciprocated at intervals, the boards that receive the ejected bricks lie on tables from which chains carrying counter-weights pass around pulleys, and as the bricks are ejected the boards are forced against stops. The machine may be adapted for the delivery of bricks from only one side.

15,641.—FLUSHING APPARATUS: *D. Laurie*.—On the lower end of a sliding-rod connected to the pull-chain is attached a gravity catch, the front end of a pivoted bar that is kept up with a spring supports the seat, the rear end of the bar will rise above and engage with the catch, when the seat is pressed down, but when the seat has been freed the spring as it acts upon the rod and catch pulls the chain, and so effects a flush, a cross-bar stops the pivoted bar, and the catch is liberated at the same time. Otherwise, a cord from the tail of the catch to the ball float lever will serve to trip the catch.

15,660.—AN APPLIANCE FOR THE CONSTRUCTION OF ARCHES: *A. Dix*.—Adjustable bearing plates, which are slotted and have curved extensions that will enter the joints of the masonry, are screwed to the centre in such a manner that they may have a bearing away from the edges of the bricks. The depth of the centre can be increased for an arch springing from a level higher than that of the plates, which can be adjusted by means of projections from their sides.

15,666.—IMPROVEMENTS IN TRAVELLING CRANES: *T. D. Hollick*.—Each of the two drum shafts carries another drum, and on both of them is wound a rope with a balance-weight hung in its light. When the weight is fixed, the shaft of an auxiliary drum is freed, the load can be traversed horizontally, and it can be lifted or lowered when the shaft is fixed and the weight is freed. Around the auxiliary drum is wound a rope, which passes over a pulley, and is fastened to a carriage running upon rails on the beam. The weight can be fixed either with a brake drum on which are wound in opposed directions two ropes joined to the top and bottom of the weight, or with transverse locking-bolts. For pushing out or pulling in the beam upon its rollers the carriage is affixed to it, and the traversing gear is then worked.

15,680.—ELECTRICAL LIGHTING APPARATUS: *J. R. Quinn*.—A switching device for incandescent lamps with two or more filaments is arranged in the holder for connecting one filament or more to the circuit, and varying the light by simply turning the lamp. A rib which enters a groove in a spring tube secures the rotatable cap, the tube having a bayonet-joint and the contacts on the cap engaging with the contact-slugs. A snap-action for the switch may be effected with stepped or inclined contact-plates upon the cap.

15,690.—BORING, DRILLING, AND SHAPING MACHINES: *Angular Hole Drilling and Manufacturing Co. and G. F. Black*.—By way of an improvement of the machines specified in No. 19,023 of 1891 for boring and drilling taper angular holes and shaping taper surfaces the inventors mount the coned roller, that will engage with the templet upon the headstock, upon a screw to be turned at a uniform rate of speed from a vertical shaft in order that when the headstock is fed downwards a taper surface or hole may be made. The speed of the shaft as relative to the amount of tool-feed regulates the amount of taper imparted to the work, and friction discs which drive the vertical shaft from a shaft at the side will effect a variation of the rate of speed. One disc is mounted upon a bush feathered upon the shaft and carried in a bracket which is fitted with a vertical adjustment. The radially-adjustable sets of blocks that constitute the templet can be adjusted separately in grooves of a ring so as to either change the shape of the polygon or afford compensation for wear. In one variant form the adjusting screw engages with the block by means of its pair of collars. In another form a spring and a locking-screw maintain contact between those two parts.

15,714.—A BURGLARY ALARM: *D. Vial*.—The inventor causes the pendulum which is connected to the contact-plate to pass a washer above a large hole in the second contact-plate, when the pendulum stops it automatically leaves the washer out of contact with itself so that the pendulum needs no delicate adjustment for keeping the circuit broken under normal conditions; the invention applies to the alarms specified in No. 1,704 of 1900, wherein the motion of the pendulum which the shaking of a window or door will cause to vibrate completes the alarm-circuit.

15,810.—BRACKETS FOR SHELVES: *A. E. Beer*.—A slotted bracket having two lugs is secured in position with a bolt inserted through the slot and one of the holes in the standard, a flange engages with the lug, and so supports the bracket when it is turned upwards; the bracket can be set to slide in a pivoted socket instead of being itself slotted and pivoted.

15,820.—A WATERPROOFING COMPOSITION FOR WOODWORK, &c.: *F. M. Wharlow*.—The composition consists of solutions of a resin, oleate, palmitate, stearate, or some such organic salt of copper, lead, zinc, manganese, calcium, chromium, &c., it may be used for either impregnating or coating purposes; and, when dry—as, for instance, a dry resinate of copper—will serve as a basis for enamels and paints.

15,845.—MEANS OF WORKING ELECTRICAL SCREW FANS: *E. W. Brown*.—Screw fans affixed near ceilings can be driven without raising dust or creating draughts by fitting on the fan, which has a small diameter, a bell-shaped air-deflector in which is fixed an alternating-current motor. Arms which act as guards for the fan-blades carry the deflector. The field magnets of the motor are secured to a bracket upon the motor; the bracket is provided with a footstep-bearing for the shaft of the fan and the armature.

15,853.—AN IMPROVED AUGER: *G. Hallenscheid*.—The screw is made by twisting a flat bar and the sharpened end forms the cutting edge. The edges of the upper screw run out into the cutter and the bottom screw. The diameter of the bored hole is about twice that of the upper screw.

15,856.—MANUFACTURE OF GLUE: *L. L. Kelsey*.—The glue is laid on to travelling carriages of net through the ends of jacketed tubes; two endless chains move the carriages backwards and forwards through the drying-chamber until, having reached to their lowest position, they are tilted by a lever for discharge and so again to the position for charge. They are lowered and take a reversed motion by means of tripping-appliances, a refrigerator and a ventilation-fan are also supplied.

15,862.—AN APPLIANCE FOR WINDOWS AND DOORS: *H. Millar*.—For turning doors open upon their hinges and for lifting doors or casement windows clear from a raised sill. As applied to a window a lever, having its fulcrum in a bracket fastened on to the frame, lifts the window as well as a vertical bar on to which the window is hinged, a catch that lies on the edge of the bracket holds up the lifted window, and a pull upon a chain will liberate the catch.

MEETINGS.

FRIDAY, DECEMBER 5.

Architectural Association.—Mr. J. S. Gibson on "Architectural Practice: Real and Ideal," 7.30 p.m.
Birmingham Architectural Association.—Miss E. Charles on "Furniture."
Association of Managers of Sewage Disposal Works.—Annual general meeting and dinner, Holborn Restaurant, 6.30 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. A. Reynolds on "The Erection of Steel Bridges," Sheffield Extension of the London and North-Western Railway, 8 p.m.

Institution of Junior Engineers (Westminster Palace Hotel).—Mr. W. J. Tennant, Past Chairman, on "The Flanometer," explained simply, without mathematics, 8 p.m.

Glasgow Architectural Association.—Anniversary dance.

SATURDAY, DECEMBER 6.

British Association of Waterworks Engineers. (Seventh Winter Meeting, at the Geological Society's Rooms, Burlington House, W.)—(1) Ballois will be taken for the Council and Officers for 1903; and for new Members, and Associates; (2) Mr. W. H. Humphreys on "The Coating of Cast-iron Water Pipes"; (3) Mr. T. Molyneux on "Softening Plant at Wilmshurst, Stockport Corporation Waterworks"; (4) Mr. John Shaw on "The Detection and Prevention of Underground Pollution," 10.30 a.m.

The Craft School (Globe-road, Bethnal Green, E.).—Mr. F. W. Troup on "Roof and Ornamental Leadwork," Lantern Illustrations, 8.30 p.m.
British Institute of Certified Carpenters.—Annual general meeting, 6 p.m.

MONDAY, DECEMBER 8.

Surveyors' Institution.—Mr. James W. Tyler on "Estate Duty Valuations and Agricultural Property," 4 p.m. (held for the convenience of country members in the afternoon instead of in the evening).

Society of Arts (Cantor Lectures).—Professor Vivian B. Lewes on "The Future of Coal Gas and Allied Illuminants," 11.15 p.m.
Lyceum Institution.—Sir Wyke Baylis, K.B., on "The Hoguey in the Studio; an Address to Lovers of Art on Vexed Questions of the Day," 5 p.m.

TUESDAY, DECEMBER 9.

Institution of Civil Engineers.—Paper to be further discussed, "High speed Electrical Generating Plant," Mr. H. Minshall, 8 p.m.

WEDNESDAY, DECEMBER 10.

Architectural Association Discussion Section.—Mr. J. S. Blunt on "Crosses, Pagan and Christian," 7.30 p.m.
Institution of Junior Engineers.—Visit to Messrs. Elliott Brothers' Mathematical, Electrical, and Optical Instrument Works, Conington-road, Lewisham, 3 p.m.
Institute of Sanitary Engineers, Ltd..—Half-yearly General Meeting, 5 p.m.; 2nd Annual dinner, Holborn Restaurant, 6.30 p.m.

The Sanitary Institute.—Discussion on "Drain Testing." The discussion will be opened by Dr. Louis C. Parkes, to be followed by Mr. J. Osborne Smith,

PRICES CURRENT (Continued).

BRICKS, &c.

£ s. d.

GLAZED BRICKS.			
Best White and Ivory Glazed			
Stretchers	13 0 0	per 1,000	alongside in river.
Headers	12 0 0	per 1,000	do.
Quoins, Bullnose, and Flats	17 0 0	per 1,000	do.
Double Stretchers	10 0 0	per 1,000	do.
Double Headers	10 0 0	per 1,000	do.
One Side and two Ends	19 0 0	per 1,000	do.
Two Sides and one End	20 0 0	per 1,000	do.
Spalls, Chamfered, Squints	20 0 0	per 1,000	do.
Best Dipped Salt Glazed Stretchers and Headers	12 0 0	per 1,000	do.
Quoins, Bullnose, and Flats	14 0 0	per 1,000	do.
Double Stretchers	13 0 0	per 1,000	do.
Double Headers	14 0 0	per 1,000	do.
One Side and two Ends	15 0 0	per 1,000	do.
Two Sides and one End	16 0 0	per 1,000	do.
Spalls, Chamfered, Squints	14 0 0	per 1,000	do.
Seconds	12 0 0	per 1,000	do.
White and Dipped Salt Glazed	10 0 0	per 1,000	less than best.
Thames Ballast	7 0 0	per yard, delivered.	
Best Portland Cement	31 0 0	per ton, delivered.	
Best Ground Blue Lias Lime	22 0 0	per ton, delivered.	

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime..... ros. 6d. per yard, delivered.

Stourbridge Fire-clay in sacks, 27s. 0d. per ton at rly. dep.

STONE.

s. d.

Ancastr in blocks	11 12	per ft. cube, deld. rly. depot
Farleigh Down Bath	1 8	per ft. cube, deld. rly. depot
Beer in blocks	2 6	per ft. cube, deld. rly. depot
Grinshill	1 10	per ft. cube, deld. rly. depot
Thames Portland in blocks	2 8	per ft. cube, deld. rly. depot
Darley Dale in blocks	2 4	per ft. cube, deld. rly. depot
Red Corshill	2 5	per ft. cube, deld. rly. depot
Cloaburn Red Freestone	3 0	per ft. cube, deld. rly. depot
Red Mansfield	2 4	per ft. cube, deld. rly. depot
YORK STONE.—Robin Hood Quality.		
Scrapped random blocks	2 10	per ft. cube, deld. rly. depot
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per foot super.
6 in. Rubbed two sides ditto, ditto	2 6	per foot super.
3 in. Sawn two sides slabs (random sizes)	0 11 1/2	per ft. cube
2 in. to 2 1/2 in. Sawn one side slabs (random sizes)	0 7 1/2	per ft. cube
2 1/2 in. to 2 in. ditto, ditto	0 6	per ft. cube
Best Hard York	3 0	per ft. cube
6 in. sawn two sides landings to sizes (under 40 ft. sup.)	2 8	per ft. super.
6 in. Rubbed two sides ditto, ditto	2 11	per ft. super.
3 in. sawn two sides slabs (random sizes)	1 2	per ft. cube
2 in. self-faced random flags	0 5	per ft. cube
Hopton Wood (Hard Bed) in blocks	2 3	per ft. cube
6 in. sawn both sides landings	2 7	per ft. super.
3 in. do.	2 2 1/2	per ft. super.

SLATES.

£ s. d.

20 x 12 best blue Bangor	13 2	per 1,000 of 2800 sq. ft. dep.
20 x 12 " "	13 17 6	per 1,000 of 2800 sq. ft. dep.
20 x 12 best seconds	12 15 0	per 1,000 of 2800 sq. ft. dep.
20 x 12 " "	13 10 0	per 1,000 of 2800 sq. ft. dep.
20 x 12 best	11 7 0	per 1,000 of 2800 sq. ft. dep.
20 x 10 best blue Portman	12 5 0	per 1,000 of 2800 sq. ft. dep.
16 x 8 best blue Portmadoc	6 0 0	per 1,000 of 2800 sq. ft. dep.
20 x 10 best Eureka	15 0 0	per 1,000 of 2800 sq. ft. dep.
20 x 12 " "	16 10 0	per 1,000 of 2800 sq. ft. dep.
16 x 8 " "	11 10 0	per 1,000 of 2800 sq. ft. dep.
16 x 8 " "	8 7 6	per 1,000 of 2800 sq. ft. dep.
20 x 10 permanent green	10 10 0	per 1,000 of 2800 sq. ft. dep.
16 x 10 " "	9 0 0	per 1,000 of 2800 sq. ft. dep.
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TILES.

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Best plain red roofing tiles	42 0	per 1,000, at ly. depot.
Hip and valley tiles	56 6	per 1,000, at ly. depot.
Do. Ornamental tiles	52 6	per 1,000, at ly. depot.
Hip and valley tiles	4 0	per doz.
Best Rushton Red, brown or brindled Do. (Edwards)	57 6	per 1,000, at ly. depot.
Do. ornamental Do.	60 0	per 1,000, at ly. depot.
Hip tiles	4 0	per doz.
Valley tiles	3 8	per doz.
Best Red or Mottled Staffordshire Do. (Peakes)	51 0	per 1,000, at ly. depot.
Do. Ornamental Do.	54 6	per 1,000, at ly. depot.
Hip tiles	4 1	per doz.
Valley tiles	3 8	per doz.
Best "Rosemary" brand plain tiles	48 0	per 1,000, at ly. depot.
Do. Ornamental Do.	50 0	per 1,000, at ly. depot.
Hip tiles	4 0	per doz.
Valley tiles	3 8	per doz.

PRICES CURRENT (Continued).

WOOD.

BUILDING WOOD.—YELLOW.

Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.			
At per standard.	£ s. d.	£ s. d.	
Deals: best 3 in. by 9 in. and 4 in. by 7 in. and 8 in.	14 10 0	15 10 0	
Battens: best 2 1/2 in. by 7 in. and 3 in. by 7 in. and 8 in.	11 10 0	12 10 0	
Battens: best 2 1/2 in. by 6 in. and 3 in. by 6 in.	10 0 0	11 0 0	
Deals: seconds	7 10 0	8 10 0	
Battens: seconds	9 0 0	10 0 0	
2 in. by 4 in. and 2 1/2 in. by 5 in.	8 10 0	9 10 0	
Foreign Sawm Boards—1 in. and 1 1/2 in. by 7 in.	0 10 0	more than battens.	
2 in.	1 0 0	do.	
Fir timber: Best middling Damag or Menel (average specification)	4 30 0	5 0 0	
Second	4 5 0	4 10 0	
Small timber (8 in. to 10 in.)	3 12 6	3 15 0	
Small timber (6 in. to 8 in.)	3 0 0	3 10 0	
Swedish Baltic	3 15 0	3 0 0	
Pitch-pine timber (30 ft. average)	3 5 0	3 15 0	

JOINERS' WOOD.

At per standard.

White Sea: First yellow deals, 2 in. by 11 in.	23 0 0	24 0 0
3 in. by 9 in.	21 0 0	22 10 0
Battens, 2 1/2 in. and 3 in. by 7 in.	17 0 0	18 10 0
Second yellow deals, 3 in. by 11 in.	16 10 0	17 0 0
Battens, 2 1/2 in. by 9 in.	13 10 0	14 0 0
Battens, 2 1/2 in. and 3 in. by 7 in.	13 10 0	14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	15 10 0	16 10 0
Battens, 2 1/2 in. and 3 in. by 7 in.	11 10 0	12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0	22 10 0
Do. 3 in. by 9 in.	18 0 0	19 10 0
Battens	23 10 0	25 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0	17 0 0
Do. 3 in. by 9 in.	14 10 0	15 0 0
Battens	11 10 0	12 10 0
Third yellow deals, 3 in. by 11 in.	13 10 0	14 0 0
Do. 3 in. by 9 in.	10 0 0	11 0 0
Battens	10 0 0	11 0 0
White Sea and Petersburg:—First white deals, 3 in. by 11 in.	14 10 0	15 10 0
Do. 3 in. by 9 in.	12 10 0	13 0 0
Battens	11 0 0	12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	14 10 0
Do. 3 in. by 9 in.	10 10 0	11 0 0
Battens	9 10 0	10 0 0
Pitch-pine: deals	16 0 0	17 0 0
Under a: thick extra	0 10 0	1 0 0
Yellow Pine—First, regular sizes	33 0 0	upwards.
Oddments	24 10 0	25 10 0
Seconds, regular sizes	20 0 0	21 0 0
Yellow Pine Oddments	20 0 0	21 0 0
Kauri Pine—Flanks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs—Large, per ft. cube	0 2 6	0 3 6
Small	0 2 3	0 3 6
Waincoat Oak Logs, per ft. cube	0 5 0	0 5 0
Dry Waincoat Oak, per ft. sup.	0 7 0	0 8 0
3 in. do.	0 0 6 1/2	0 0 7 1/2
Honduras, Tabasco, per ft. sup.	0 0 0	0 0 1 1/2
as inch	0 0 0	0 0 1 1/2
Selected, Figury, per ft. sup.	0 1 6	0 2 0
Dry Mahogany—per ft. cube	0 10 0	0 11 0
Dry Walnut, American, per ft. sup.	0 10 0	0 11 0
Teak, per foot	16 10 0	17 0 0
American White Wood—Per ft. cube	0 4 0	0 5 0
Prepared Flooring—Per square	0 13 6	0 17 6
1 in. by 7 in. yellow, planed and shot	0 14 0	0 15 0
1 in. by 7 in. yellow, planed and matched	0 14 0	0 15 0
1 in. by 7 in. yellow, planed and shot	0 16 0	0 17 0
1 in. by 7 in. white, planed and shot	0 11 6	0 13 6
1 in. by 7 in. white, planed and matched	0 12 0	0 14 0
1 1/2 in. by 7 in. white, planed and matched	0 14 6	0 16 6
1 in. by 7 in. yellow matched and beaded or V-jointed boards	0 11 0	0 13 6
1 in. by 7 in. do. do.	0 14 0	0 15 0
1 in. by 7 in. white do. do.	0 10 0	0 11 0
1 in. by 7 in. do. do.	0 11 6	0 13 6
6 in. at 6d. to 9d. per square less than 7 in.		

JOISTS, GIRDERS, &c.

In London, or delivered Railway Vans, per ton.

Rolled Steel Joists, ordinary sections			
Compound Girders	£ s. d.	£ s. d.	
Angles, Tees and Channels, ordinary sections	7 17 6	8 17 6	
Flat Plates	8 3 0	8 15 0	
Cast Iron Columns and Castings, including ordinary patterns	7 2 0	8 5 0	

METALS.

Per ton, in London.

Iron—			
Common Bars	£ s. d.	£ s. d.	
Staffordshire Crown Bars, do. merchant quality	7 15 0	8 5 0	
Staffordshire "Marked Bars"	8 5 0	8 15 0	
Mild Steel Bars	10 10 0	11 0 0	
Hoop Iron, basis price	9 5 0	9 10 0	
" galvanised	16 0 0	17 0 0	

(* And upwards, according to size and gauge.)

PRICES CURRENT (Continued).

METALS.

Per ton, in London

Sheet Iron, Black—			
Ordinary sizes to 20 g.	£ s. d.	£ s. d.	
" " 10 to 24 g.	31 0 0	32 0 0	
" " 25 g.	32 10 0	33 0 0	
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes 6 ft. by 2 ft. to 3 ft. to 30 g.	19 25 0	20 0 0	
" " 22 g. and 24 g.	13 5 0	14 0 0	
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 30 g.	16 0 0	17 0 0	
" " 22 g. and 24 g.	16 10 0	17 0 0	
Galvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 25 0	13 0 0	
" " 22 g. and 24 g.	13 5 0	14 0 0	
" " 26 g.	14 5 0	15 0 0	
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 30 g.	12 0 0	13 0 0	
" " and thicker	12 0 0	13 0 0	
" " 22 g. and 24 g.	13 0 0	14 0 0	
" " 26 g.	14 5 0	15 0 0	
Cut nails, 3 in. to 6 in.	9 5 0	9 25 0	
(Under 3 in. usual trade extra.)			

LEAD, &c.

Per ton in London

LEAD—Sheet, English, lbs. 8 up.			
Pipe in coils	£ s. d.	£ s. d.	
Sold Pipe	13 7 6	14 0 0	
Comp. Pipe	16 7 6	17 0 0	
Zinc—Sheet	26 2 6	26 5 0	
Vieille Montagne	25 0 0	25 5 0	
Silesian	24 10 0	25 0 0	
Copper—			
Strong Sheet	per lb.	0 13 1/2	
Thin	0 13 1/2	0 13 1/2	
Copper nails	0 13 1/2	0 13 1/2	
Brass—			
Strong Sheet	per lb.	0 9 1/2	
Thin	0 10 1/2	0 10 1/2	
Tin—English Ingots	per lb.	0 13 1/2	
Solder—Plumbers	per lb.	0 13 1/2	
Tinmen's	per lb.	0 13 1/2	
Blowpipe	per lb.	0 9 1/2	

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds			
per ft. delivered.	£ s. d.	£ s. d.	
fourths	14 10	15 0	
21 oz. thirds	14 10	15 0	
fourths	14 10	15 0	
26 oz. thirds	14 10	15 0	
fourths	14 10	15 0	
30 oz. thirds	14 10	15 0	
fourths	14 10	15 0	
Fluted sheet, 15 oz.	14 10	15 0	
Churches	14 10	15 0	
Hartley's Bold Plate	14 10	15 0	
1 1/2 in. 15 oz.	14 10	15 0	
1 1/2 in. 15 oz.	14 10	15 0	
1 1/2 in. 15 oz.	14 10	15 0	

OILS, &c.

£ s. d.

Raw Linseed Oil in pipes or barrels			
per gallon	£ s. d.	£ s. d.	
" " in drums	8 3 0	8 3 0	
" " in pipes or barrels	8 3 0	8 3 0	
" " in drums	2 7 0	2 7 0	
Turpentine, in barrels	0 3 3	0 3 3	
" in drums	0 3 3	0 3 3	
Genome Ground English White Lead	per ton	21 0 0	
Red Lead, Dry	20 0 0	20 0 0	
Best Linseed Oil Putty	per cwt.	0 3 0	
Stockholm Tar	per barrel	1 12 0	

VARNISHES, &c.

Per gallon.

Fine Pale Oak Varnish			
£ s. d.	£ s. d.	£ s. d.	
Fine Copal Oak	8 0 0	8 0 0	
Superfine Pale Elastic Oak	12 6 0	12 6 0	
Fine Extra Hard Church Oak	10 10 0	10 10 0	
Superfine Hard-drying Oak, for Seats of Churches	0 24 0	0 24 0	
Fine Elastic Carriage	0 12 6	0 12 6	
Superfine Pale Elastic Carriage	0 16 0	0 16 0	
Fine Pale Maple	0 16 0	0 16 0	
Finest Pale Durable Copal	0 18 0	0 18 0	
Extra Pale French Oil	3 10 0	3 10 0	
Eggshell Flatting Varnish	0 18 0	0 18 0	
White Copal Enamel	3 4 0	3 4 0	
Extra Pale Paper	0 12 0	0 12 0	
Best Japan Gold Size	0 10 6	0 10 6	
Best Black Japan	0 16 0	0 16 0	
Oak and Mahogany Stain	0 9 0	0 9 0	
Brunswick Black	0 8 6	0 8 6	
Berlin Black	0 16 0	0 16 0	
Knocking	0 10 0	0 10 0	
French and Brush Polish	0 10 0	0 10 0	

TO CORRESPONDENTS.

J. F. W. & G. N. W. H. & Son—S. S. (Assents should have been stated.)

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return requested communications. Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses. Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE P

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITION.

Nature of Work.	By whom Advertised.	Premiums	Designs to be delivered
Designs for University Buildings, Cape of Good Hope	Agnt.-Gen. for Cape of Good Hope	400l., 200l., 100l.	Jan. 31

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	To whom to be delivered
Sewer	Blackpool Corporation	J. S. Brodie, Civil Engineer, Town Hall, Blackpool	Dec. 6
Church, Skelmersdale, near Ormskirk		Wright & Son, Surveyors, Lancaster	Dec. 9
Church, Skelmersdale, near Ormskirk, Lancs		Antin & Faley, Architects, Castle Park, Lancaster	do.
Chimney shaft at Waterworks		J. W. Webster, Engineer, Council Offices, High-street, Cowes	do.
Alterations, &c., 8, Prince-street, Bridlington		J. Earnshaw, Architect, Wellington-road, Bridlington Quay	do.
Home, Gorleston		W. Lake, Architect, Great Yarmouth	do.
House and Shop, Kettlewell, near Skipton		H. Harley, Architect, Skipton	do.
Grange Road Metal		Borough Surveyor, Charter House, Kingston	Dec. 12
Paving Works at Workhouse, Crumpton		A. J. Murgatroyd, Architect, 23, Street-street, Manchester	do.
Extension of Sanatorium, West Lane		F. Baker, Civil Engineer, Municipal Buildings, Manchester	do.
Road Works, Park Grove		J. B. Taylor, Civil Engineer, Manor House, Artalee	do.
Street Works, Cradock		R. H. Maynes, Engineer, Town Hall, Newport	do.
Additions, &c., to Blackhall Mill Inn, Elcheater		G. T. Wilson, Architect, 21, Durham-road, Blackhill	do.
Stone Wall, Great Harwood		C. Harland, Surveyor, 3, James-street, Accrington	do.
Business Premises		Drugg & Manchester, Architects, Marlborough, Crowe	do.
Sewerage Works, Skerries		W. Kernaghan, Civil Engineer, 11, Rutland-square, Dublin	do.
Enclosure, Cemetery, Greenbank		T. H. Yabouso, Civil Engineer, 64, Queen-square, Bristol	do.
Sewerage Works, Whitbram Road, &c.		Widdington (Lancs) U.D.C.	do.
* Making-up Horrocks and Tanworth streets, &c.		Borough Surveyor, Town Hall, Fulham, S.W.	do.
Two Villas, New Hey-road, Lindley		J. Kirk & Sons, Architects, Muddersall, Lincs.	Dec. 11
Additions to Infirmary, Cardiff		E. Seward, Architect, Queen's Chambers, Cardiff	do.
Three Houses, Wyke		Fairbank & Wall, Architects, Craven-bank Chambers, Bradford	do.
House, Killybeg		W. H. B. Marten, Architect, Bradford	do.
Hospital, Fulwood, near Preston		Seward & Rawcliffe, 110A, Fishergate, Preston	do.
Sewerage Works, Amber-street		W. Green, Surveyor, Castle-street, Castleford	do.
Road Works, Salford-junction, &c.		J. Arkhison, Civil Engineer, St. Petergate, Stockport	do.
Paving Works, Park Lane-street, Newham		R. Grieves, Surveyor, Waterloo, Blyth	do.
Grange Road Metal		A. Fidler, Engineer, Guildhall, Northampton	do.
Well sinking, Crondall, Hants		R. Nunn, Engineer, 11, Victoria-street, Westminster	Dec. 12
Police station, Magdalen-road		A. E. Collier, Civil Engineer, Guildhall, Norwich	do.
Parish Church, St. John's, Accrington		Hy. Ross, 15, Cannon-street, Accrington	Dec. 13
Dispensary, Gargrave		P. J. Kigallien, Architect, Abbeyville, Sligo	do.
Baths & Hall, Morley-street		City Architect, Chapel-lane, Bratton	do.
Road Stone		County Surveyor, Monk Bar, Newcastle-on-Tyne	do.
Additions to Gasworks		H. Stummonds, Gasworks, Elton, Bury	do.
* Painting, Cleaning and Drainage Works, Wandsworth		Office of the Board, Embankment, E.C.	do.
Bandstand, North Lodge Park, Dartington		W. O. Weller, Borough Surveyor, Town Hall, Dartington	Dec. 14
Block of shops, Commercial-street, Halifax		G. Ball, Civil Engineer, Town Hall, Exmouth	do.
Additions to Electric Light Works		W. T. Douglas, Engineer, 15, Victoria-street, S.W.	do.
Seven Croynes, South Beach		J. Gammon, Borough Engineer, Town Hall, Dudley	do.
Additions to Technical School, Stafford-street		J. C. Mould, Civil Engineer, Town Hall, Lancaster	Dec. 16
Cast Iron Pipes		P. Phillips, Architect, 1, Strand, London	do.
Roadmaking, Denton-road		City Architect, District Council Offices, Bromley, Kent	do.
School		Engineer to the Council, 712, High-road, Tottenham, N.	do.
* Laundry Buildings for Corporation-road School		M. R. Beaumont, Maldon, Essex	Dec. 17
4, 10, 11, Norwegian Granite Kerb, &c.		Lincoln & Barker, Westgate Chambers, Nottingham	do.
* Making-up Hasbary, &c., Bonds		Wilcox & Kaines, Engineers, Temple-row, Birmingham	do.
* Ward block, Administrative Block, &c.		T. S. Pictou, Borough Surveyor, Town Hall, Exeter	Dec. 18
Sewerage Works, Finton, near Ayrton		Borough Engineer, Town Hall, Exeter	do.
Drainage Works		E. Munro & Son, Architects, Grosvenor House, Acton Vale, W.	do.
Road Works, Mather-road, &c.		J. H. Crowther, Great Post, near Birkenhead	Dec. 31
* Making-up Denbigh-road, Huddersfield, &c.		W. Bayley, Glover's Tower Hill, Dorking	do.
* Erection of Boys' school, South Ayrton		A. Cress, Architect, Guildhall, York	do.
Sewerage Works		W. Jacques, 2, Fen-cour, Feuchurch-street, E.C.	Jan. 7
* Erection of Lunatic Asylum		J. Hugh Goodman, Town Hall Chambers, Reading	do.
* Nottingham Road S. Road		C. M. Shiner, 6, 7, & 8, Crutched Friars, E.C.	Jan. 7
* Isolator Hospital		G. Moxham, Architect, 35, Castle-street, Swansea	Nov. 24
* Carnegie Free Library at Grays, &c.		A. D. Kaye, Architect, 15, Aldi-street, Leeds	do.
Village, Vetrade-le		Mr. Wat, 17, Sheraton-terrace, Consett	do.
Six House, Sharncliffe-lane, Leeds		E. H. Parkinson, Architect, Old Bank Chambers, Bradford	do.
House, &c., Medomsley-road, Consett, Durham		R. Rose, Architect, 15, Cannon-street, Accrington	do.
Alterations to Cambridge House, Bradford		Potts, Sons & Hemmings, Architects, Bolton	do.
Parish House, Kingston		J. Davies & Son, Architects, Cowell House, Llanelli	do.
Reservoir, Great Lever, Bolton		do.	do.
Four Houses, Llangenhoch, Wales		do.	do.
Additions to Twynhyd, Llanelli		do.	do.
Rail, Rhondda, Rhondda Valley		do.	do.
House, Tylwyd cross, Hants, Wales		do.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be delivered
Work of Works	Ilford School Board	2l. 3s. per week	Dec. 10
Municipal Training Instructors in Woodwork	School Board for London	Instructors 100l.; Assistant Instructors 80l.	do.
District Surveyor of Roads	Lancashire County Council	200l., increasing to 300l. per annum	Dec. 13

Those marked with an asterisk (*) are advertised in this Number.

Competitions, — Contracts, pp. iv. vi. viii. & x.

Public Appointments, xix.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under, nor, unless in some exceptional cases and for special reasons.]

* Denotes accepted. † Denotes provisionally accepted.

BARNSELY.—For the erection of out-buildings, &c., Locke Park. Mr. J. Henry Taylor, C.E., Manor House, Barnsley.—
Peter Dolby, Barnsley £122 5

BISHOP AUCKLAND.—For the erection of hospital buildings, Helmington-row, for Auckland, Sheldon, and Wallington Joint Hospital Board. Mr. Wm. Perkins, architect, Victoria-street, Bishop Auckland:—
M. Ayton, £102 0 0 G. L. Bell, £29,396 0 0
F. J. White, 20,285 0 0 Walton Bros.,
G. Westgarth, 9,657 5 9 Crockford, 9,060 0 0
Hudson, 9,515 15 14 T. Manners, 9,057 0 0
J. C. Nichol, 9,440 0 0

BLAIRGOWRIE (N.B.).—For the erection of an infectious diseases hospital near Blairgowrie. Messrs. L. & J. Falconer, architects, Blairgowrie. Quantities by the architects:—

Masonry.

Jas. Cargill, £1,781 15 0 John Howie, £1,531 0 0
Adam Hill, 1,588 5 6 Crichton & Co., 1,497 10 0
Craib & Ballentine, 1,569 19 0 Jas. McLeish,
Gray & Sons, 1,550 0 0 Rattray*, 1,423 0 0

Carpentry and Joinery.

Alex. Scott, £1,145 0 0 David Stewart, £905 0 0
J. Davidson, 1,130 10 0 W. T. Robertson, 808 6 6
J. Shaw, 1,077 15 0 W. A. Sim, 804 0 0
Bruce & Son, 977 0 0 Steven & Son, 872 0 0
John Adam, 968 0 0 Thos. Doig, jun., 877 0 0
Leslie & Hay, 961 0 0 Rattray*, 872 0 0
J. F. McRitchie, 949 15 0

Plumbing.

J. Clark, £951 9 9 W. Templeman, £865 0 0
Doig & Son, 831 15 6
C. & Co., Ltd., 925 0 0 G. P. Kidd, 781 0 0
T. M. Dewar, 807 0 0 Robert Kidd,
Milne & Sons, 885 0 0 Blairgowrie*, 760 0 0

Slating.

Jas. Duncan, £317 9 4 John Walker, £199 17 6
R. T. Craigie, 305 0 0 Duncan & Co., 181 17 9
Leith & Son, 205 0 0 Son, Rattray*, 100 10 0
W. Donaldson, 204 1 2 Brand & Sons, 181 17 9

Plastering.

Mitchell & Son, £347 7 5 J. Bell, £238 7 6
A. McRitchie, 325 17 5 Wm. Sidey,
P. Donaldson, 247 18 1 Aylth*, 230 3 0

Asphalting.

Flood & Co., £51 10 0
Briggs & Son, Dundee, 46 4 11

Painting.

C. L. Bonar, £211 4 5 J. Irvine, £171 12 2
Douglas & Son, 175 18 0 Barrie & Gold, 108 0 0
G. Cowie, 13 3 8 C. Robertson, 167 17 11
P. K. Donald, 116 0 0 John Burton, 93 10 0
Jas. Birrell, 129 12 6 John Ferrier, 93 0 0
Douglas & Son, 125 10 10 Peter Stewart,
Sons, 125 10 10 Aylth*, 83 3 1

Grates.

J. M. Muir, £41 8 0 Wm. Kirkwood, £45 6 6
Tosh & Son, 38 2 6 Sinclair & Son,
Wm. Moncur, 37 19 0 Aylth*, 34 5 0

Stoves.

Mustrave & Co., £73 5 6
McDonald, Steven, & Co., Glasgow*, 59 2 0

Window Blinds.

Robt. Denholm, £21 12 9 Westwood & Son,
Jas. Purgavie, 13 1 6 Perth*, £16 5 5

Boundary Walls.

Jas. McLeish, Rattray*, £223

BRIDLINGTON.—For the erection of a villa residence, Belgrave-road. Mr. Samuel Dyer, architect, 39, Quay-road, Bridlington:—
Smallwood & Shaw, £672 0 0 Fred Flintoft, £68 10 0
Ainsous Gardam, 660 0 0 Wm. Barnes, 628 10 0
Alfred Wiles, 613 0 0 Thos. Spink, 600 0 0
A. A. Both, 615 0 0 Ed. Corner, 560 0 0
E. F. Vennors, 644 0 0 Francis Postill,
Frank Kneeshaw, 639 0 0 The Crescent*, 494 0 0

COLCHESTER.—For two houses with shops in Calver-street, Colchester. Mr. W. Scargill, architect. Quantities by Mr. R. Horne:—
C. J. Scott, £1,990 T. J. Ward, £1,750
Dupont, 1,920 A. Dias*, 1,670
Beaum xnt., 1,910 [All of Colchester.]

CROYDON.—For three houses, Milgrave-road, Park-lane. Mr. A. Broad, architect, 22, George-street, Croydon:—
D. W. Barker*, £2,850

HAMPTON (Middlesex).—For the erection of five cottages, Rosehill Estate, for the Urban District Council. Mr. S. H. Chambers, Surveyor, Public Offices, Hampton:—
Holliday & Green-wood, £22,075 1
Higby & Rabson, 20,095
Potter Bros., 20,021
Smith & Son, Ltd, 18,974
Cromptley Bros., Ltd, 18,160
Bailey & Fry, Ltd, 18,824
Cooper & Sons,
Ltd., 18,665
J. F. Collinson, 18,657

M. King, £19,000
G. Gray, 18,411
I. J. Wise, 17,682
E. Patterson, 17,889
Nash & Nash, 17,871
Cain & Son, 17,843
A. M. Coles, 17,574
Newland & Higgs, 17,497
Barker & Co., New-
ington, 17,701

KINSALE (Ireland).—For the erection of thirteen cottages, &c., for the Rural District Council:—
For Three Cottages.

W. Buttmore, Garretstown, Ballinspittle*, £150

LEEDS.—For the construction of an aqueduct tunnel (2½ miles), Clifton-with-Noxwood, for the Corporation:—
J. E. Kay, Huddersfield*, £73 741

LONDON.—For laying new fire mains at the Corn-wallis-road Workhouse, Holloway, for the Guardians of St. Mary, Islington. Mr. William Smith, architect, 65, Chancery-lane:—
Moorwood & Sons, £475 5 Merryweather &
Shand Mason, 458 3 Sons, £401 2
May, 410 0 Harris, 389 0
Harrold & Son, 395 6

LONDON.—Accepted for gravel required by the London County Council:—
Fine Gravel.

	Per yard.
Battersea Park—C. Neal	6 0
Kenning Park—J. Guyatt	6 3
Gravel Co.—The Crawford Sand and	6 4
Trotting Common—J. Guyatt	5 6
Wandsworth Common—G. Neal	6 0
Dulwich Park—The Crawford Sand and	6 4
Gravel Co.	6 2
Ladywell Recreation Ground—The Crawford	6 2
Sand and Gravel Co.	6 10
Peckham Rye and Park—The Crawford	8 9
Royal Victoria Gardens—Weston & Sons.	6 10
Telegraph Hill—The Crawford Sand and	7 0
Gravel Co.	7 0
Hamstead Heath—H. Barnaby	7 0
Ravenscourt Park—G. Neal	7 0
Waterloo Park—H. Barnaby	7 0
Wormwood Scrubs—Weston & Sons	7 0
Bethnal Green Gardens—H. Barnaby	6 0
Cisold-clark—J. E. Clark	6 0
Highbury Park—J. E. Clark	6 0
Hackney Commons—H. Barnaby	6 0
Highbury Fields—J. E. Clark	6 0
Island Gardens—H. Barnaby	7 0
Victoria Park—L. Sommerfield	7 6
East End Churchyards—H. Barnaby	7 6

Coarse Gravel.

	Per yard.
Battersea Park—Weston & Sons	4 11
Dulwich Park—Weston & Sons	5 11
Finsbury Park—J. E. Clark	7 5

LONDON.—For new Police Station at Molyneux-street. Mr. J. Dixon Butler, Police Surveyor:—
Credit.

	£
Killy & Gayford	19,700
C. Ansell	19,548
F. & H. F. Higgs	19,250
Lascelles & Co.	19,177
Clarke & Bracey	18,670
Grove & Sons	18,630
C. E. Allen	18,750
Holloway Bros.	18,650
Lathby Bros.	18,616
B. E. Nightingale	18,310
Abby & Horner	18,251
H. Lovatt	18,000
Higgs & Hill	17,894
Lawrance & Sons	17,771

MONGEWELL.—For new school and teacher's house at Mongewell, Oxon, for the School Board of Mongewell and North Stoke. Messrs. Hoare & Wheeler, architects. Quantities by Messrs. Henry Cooper & Sons, Reading:—
H. Godwin, £2,172 0 0 Brasher &
Cooper & Son, 1,875 0 0 Son, £1,751 7 7
H. Howden, 1,872 0 0 Boxall & Son, 1,740 0 0
McCarthy E. Hoshier & Son, 1,577 12 8
Bitt, 1,778 0 0 J. Cow, Stoke-
J. Smallbone, 1,771 0 0 104*, 1,575 12 8

NEWTON ABBOT (Devon).—For the erection of a nurses' home at the workhouse, for the Guardians. Mr. Samuel Sgar, architect, Union-street, Newton Abbot:—
P. A. A. Stacey, £1,410 0 H. Mills, £1,340 0
P. G. Zedley, 1,409 0 G. Hicks, New-
Farker Bros., 1,250 10 10 Abbot*, 1,248 0
L. Earne, 1,395 0 W. Brenton, 1,265 0

ST. ALBANS.—For new shop and sundry additions to adjoining premises, corner of Verulam-road and Spencer-street, for Mr. W. Kentish. Mr. S. Doddmeade, Edmunds, architect and surveyor, 73, Victoria-street, St. Albans, and London:—
Goodchild & Sons, £1,495 Vail & Co., £1,425
W. Sharp, 460 1 Modified and accepted.

ST. ALBANS.—For pair of villa residences, Upton-avenue, Spencer Park Estate, for Mr. W. Edwards. Mr. S. Doddmeade Edmunds, architect and surveyor, St. Albans:—
Goodchild & Sons*, £695

ST. ALBANS.—For pair of villa residences, Ellenheim-road, St. Albans, for Mr. J. F. Coutts. Mr. S. D. Edmunds, archt. & surv., St. Albans:—
Goodchild & Sons*, £1,190

ST. ALBANS.—For detached residence, Clarence-road, St. Albans, for Mr. G. R. Purdie. Mr. S. D. Edmunds, architect, &c., St. Albans:—
Goodchild & Sons*, £665

ST. ALBANS.—For pair of villa residences with stabling, corner of Granville and Grimstone roads, for Mr. J. A. Pratt. Mr. S. D. Edmunds, architect and surveyor, St. Albans. Quantities by the architect:—
G. Archer, £1,448 0 H. J. Skelton, 1,382 4 7
Miskin & Sons, 1,445 0 Goodchild*, 1,125 0 0
E. Dunham, 1,394 0 Sons, 1,125 0 0
J. Elwood, 1,277 4 6 Vail & Co., 1,108 10 0
J. Andrew, 1,250 0 [All of St. Albans.]

SLINFOLD.—For the erection of a cottage, Slinfold, for Sergeant-Major T. Knight, Southsea. Mr. C. H. Burrows, architect, 6, West-street, H. rsham:—
G. Potter, £635 0 Hull & Redford, £348 0
Murrell Bros., 375 0 Reeves & Port., 311 0
Lindfield & Son, 367 0 T. Ayling, 300 0
Hillman & Murrell, 361 9 G. Marden, The
Potter Bros., 350 0 Haven, Billings-
Rowland Bros., 349 0 Hurst*, 280 0

STOCKPORT.—For additions to tramcar sheds, Mersey-quare, for the Corporation. Mr. John Atkinson, C.E., St. Peter's-gate, Stockport:—
W. C. Broad-
D. Eadie, £1,475 0 J. Briggs, £1,211 16 10
H. Bardsley, 1,285 10 0 T. & W., 1,186 0 0
D. Mullaney, 1,237 0 0 Meadows,
Georges-rd., 1,177 0 0

WERRINGTON.—For Werrington water supply:—
C. J. Nevitt, £441 16 8 H. P. Embrey,
Sharp & Sons, 900 0 0 Ltd., £388 16 6
W. Williams, 849 17 0 F. Barker, 886 0 0
Thos. Vale, 840 0 0 Wyatt Bros.,
Whitchurch*, 785 0 0

WOODFORD.—For the erection of school buildings, Snake-lane, for the School Board. Mr. E. Tidman, architect, 74, Victoria-street, S.W. Quantities by Messrs. J. S. Lee & Sons, 33, Craven-street, W.C.:—
T. Townsend & A. E. Symes, £178,798 0 0
Colles, 18,745 0 0
Oak Building Co., 20,295 0 0 R. Willmott,
W. H. T. Kelland, 19,900 0 0 H. retre & Fover, 18,500 0 0
Stevens, Basiow, 17,973 0 0
P. Harnard, 19,491 0 0 Ernest West, 17,845 15
Appley & Son, 19,300 0 0 H. J. Carter, 17,684 0
G. Sharp, 19,012 0 0 T. Almond & Son, 17,577 0
Sands, Palmer, 17,400 0 0 T. C. Read, 17,400 0
Myall & Upson, 16,456 0 0
McKay & Co., 18,910 0 0 Welis & Sons,
A. W. Robins, 18,630 0 Buckhurst Hill*, 16,345 1
* Modified.

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following lists of tenders. Mr. T. J. Bailey is the Board's Architect:—

The interiors of the following schools will be cleaned between December 13, 1902, and January 3, 1903:—

ABBEY-STREET.—
Elkington & Sons, £220 10 Silk & Son, £126
Viney & Stone, 194 0 G. Barker, 124
Haydon & Sons, 134 0 G. Wales*, 116

ADVS-ROAD.—
Harrises & Co., £446 0 Sayer & Son, £280 10
Mitchell & Son, 308 0 Black & Son, 276 0
H. Line, 306 0 Maxwell Bros., Ltd., 243 0
J. & C. Bowyer, 294 0 Kice & Son*, 231 0
W. V. Goad, 292 0

ATLEY-ROAD.—
A. E. Symes, £375 0 0 Elkington & Sons, £288 15 4
Sulk & Son, 358 0 0 A. W. Derby, 276 10 0
A. J. Stiffell, 357 0 0 Gibb & Co., 260 0 0
Viney & Stone, 351 0 0 J. F. Holliday*, 255 11 0
Vigor & Co., 367 10 0

RASNETT-ROAD.—
General Builders, Ltd, £193 E. Flood, £155
Martin, Wells, & Co., Ltd, 190 Hulled & Co., 146
E. B. Tucker, 163 C. Gurling*, 145
K. S. Ronald, 160

PATTERSEA PARK-ROAD.—
Green & Twiley, £311 General Builders, Ltd, £293
J. & M. Patrick, 340 0 E. Tripp, 241
R. S. Ronald, 300 J. R. Sims, 234
Lathby Bros., 298 E. Flood*, 232

BELLENDE-ROAD.—
Black & Son, £297 Sayer & Son, £252
Rice & Son, 289 J. F. Ford, 241
H. Line, 276 Maxwell Bros., Ltd., 239
W. J. Howie, 259 W. Hooper*, 215
J. & C. Bowyer, 267

BERNER-STREET.—
Viney & Stone, £312 0 Vigor & Co., £219
J. F. Holliday, 288 18 G. Barker, 215
Barrett & Power, 253 0 Haydon & Sons*, 206 0
Gibb & Co., 245 0

CAMDEN-STREET (special) and MEDBURN-STREET (Junior boys).—
C. & W. Hunnings, £126 0 T. Cruwys, £109
Wall & Co., 121 0 Stevens Bros., 99 10
Marchant & Hirst, 110 0

[See also next page.]

CHOUVERT-ROAD:-
W. V. Goad £305 0
H. Line 260 0
J. & C. Bowyer 251 0
Black & Son 241 0
W. J. Howie 231 0

CURTAIN-ROAD:-
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Viney & Stone 156 0
Johnson & Co. 162 10
Stevens Bros. 158 10

DUNCOMBE-ROAD:-
C. & W. Hunnington £446 8
McCormick & Sons 385 0
J. Stewart 372 16

FAIR-STREET:-
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Smith & Sons, Ltd. 280 0
Johnson & Co. 263 10
Sayer & Son 258 10

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F. Chidley 133 13
W. Chappell 125 0

"FROGMORE" :-
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Green & Twilley 82 0
Hudson Bros. 67 0

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Willmott & Son 231 15
Shurnam & Sons, Ltd. 230 0
Silk & Son 213 0

HARWOOD-ROAD:-
Curd & Sons £210 0
W. Hammond 203 0
J. R. Sims 147 0

HATFIELD-STREET:-
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W. Downs 279 0
Harries & Co. 270 0
Belcher & Co., Ltd. 257 15

LAXON-STREET:-
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H. J. Williams 314 10
Harries & Co. 287 0

LOMBARD-WALL:-
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Holliday & Greenwood, Ltd. 227 0
Hayter & Son 187 0

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The Builder.

VOL. LXXXIII.—No. 3193.

DECEMBER 11, 1902.

ILLUSTRATIONS.

Entrance and Wrought-iron Gates, Colchester Town Hall	From a Photograph.
Interior, Stelling Hall	Messrs. Armstrong & Wright, Architects.
Stelling Hall, Northumberland	Messrs. Armstrong & Wright, Architects.
Cowley Manor, Gloucestershire: Piazza and Porch	Mr. R. A. Briggs, F.R.I.B.A., Architect.
Portion of Proposed Street of Flats, Dulwich	Mr. J. W. Rhodes, Architect.
Design for Hall, Country House	Mr. Gervase Bailey, Architect.

Blocks in Text.

Diagrams Illustrating Transport on Roads	Page 545	Cowley Manor: Plans	Page 556
Stelling Hall, Northumberland: Plan of Ground Floor	556	Proposed Street of Flats, Dulwich, S.E.	557

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Modern Water-Colour Art.



HE peculiarly English art of water-colour painting has had a far shorter history than that of oil-painting, but the differences in technique between

the earliest and the latest examples of water-colour are far greater, in that comparatively short time, than between the earliest and the latest examples of oil-painting. The distinction is probably largely due to the much more restricted palette of the earlier water-colour painters. Early oil-painting was as bright and as various in its colour schemes as modern oil-painting; but with the early water-colour painters, Girtin and his immediate predecessors, the palette was very limited; the colours that could be worked with the medium of water were few, and those who practised the then rising art were compelled to a sober colouring. Subsequently, water-colour gained the same range and variety as oil colour; and being a more free and tractable medium, gave the opportunity for many new experimental developments of style and handling.

This varied and mobile character of the art is illustrated more than usual in the present exhibition of the Society of Painters in Water Colours; a very good one, as we remarked last week, and especially interesting in regard to the work of some of its most recent members. The Society's exhibition is by far the most representative one of the water-colour art of the day; and never, if we judge by the present exhibition, has this art been more indubitably alive, more keen in search of new effects and new classes of subject, than at the present moment. Whether this enterprising spirit is altogether so satisfactory in its results as the more sober and uniform work of a generation ago is another matter; but it is at all events full of life and vigour.

One thing that is satisfactory in the recent exhibitions of the Society is that what may be called "drawing-master's art" is

dying out. By the phrase we mean that kind of water-colour painting which consists in the constant repetition of a fixed effect; a certain treatment of foreground, a certain arrangement of colour and composition on a conventional system, which is repeated as a kind of lesson got by heart. The late Mr. Richardson's large drawings were a type of this class of art; and the Society still retains one or two old members, whom it would be unkind to particularise, who still present us year after year with the same repetition of a once-learned trick of effect; but they are in a very small minority now. At the period which is now nearly a generation back the two brothers, G. A. Fripp and Alfred Fripp, represented the best of the landscape water-colour school of their day, but in a very different manner. G. A. Fripp's carefully studied landscapes, in a style totally free from tricks of effect, represented for the most part pictures which might also have been painted in oils; his occasional oil paintings very much resembled his water colours done on a larger scale. Alfred Fripp's works were more characterised by the qualities peculiar to watercolour; a certain brightness and transparency of effect, not representing so much the actual appearance of nature, as nature translated into terms of water colour. This peculiarly *spirituel* effect of light tints and transparency, which can only be realised in water-colour, offers a temptation to the artist to an over-refinement, from which one of the finest of the Society's present exhibitors, Mr. Albert Goodwin, has not escaped. As we have before remarked, his pictures of cities and cathedrals, beautiful as they are, are rather too like dream-pictures; never more so than in his "Lincoln" (11) of this year. The effect is charming, but we cannot possibly imagine Lincoln cathedral ever really appearing in these soft and enamelled demi-tints, and the idea of solidity proper to a great building is refined away. "Cairo" (12) may perhaps be more real, but it is noticeable that Cairo and Lincoln are treated with exactly the same tones and atmospheric effect, in spite of the inevitable difference of climate, sunlight, material, and weathering. There is some-

thing a little effeminate in an art like this, however charming in its way. His larger and more powerful drawing of "Venice," hung above these, is a far more true and vigorous performance.

The school of broad and truthful landscape effect of which G. A. Fripp was formerly the best representative in the ranks of the Society, may be said to be carried on, but carried a little further, by Mr. Eyre Walker, Mr. Cuthbert Rigby, and Mr. Colin B. Philip, the first-named especially; but both Mr. Rigby and Mr. Philip are more distinctly water-colourists in their handling than was their predecessor. Without refining away nature into a kind of beautiful mirage, as Mr. Goodwin is apt to do at times, Mr. Eyre Walker fully avails himself of the power of water-colour to give delicate and aerial effects of distance. There could hardly be a more perfect example of style in water-colour than his "Autumn Day on Dartmoor" (31), with its beautifully graduated distances and its fine composition as a whole. Mr. Cuthbert Rigby is somewhat less a water-colourist in style; his effects might be imitated in oil; but he is always a conscientious interpreter of nature. The apparition of two nude figures in his woodland scene "The Water Ouzel" (72) is somewhat startling from an artist who seldom introduces a figure at all; nor are they sufficiently successful for congratulation. With these three artists (though Mr. Philip is perhaps not quite at his best this year) we are within the realm of what may be called honest transcription of Nature, not without an eye to poetry of effect. The transgression of the line, though in opposite directions, is exemplified in two works by Mr. J. W. North and Mr. Gregory. Mr. North professes to paint "The Glorious Woods and Meadows Green" (14), but (just as Mr. Goodwin does with Lincoln) he gives us a scene which is not the colour or the appearance of actual Nature, but Nature translated into Mr. North's handling. One does not deny the beauty of the effect (remembering Turner's "Don't you wish you could see it?"), but it is what may be called over-poetising Nature. The over-prosaic extreme is represented in Mr. Gregory's

large and carefully-worked landscape "In North Wales" (40), where every detail is most carefully finished, but the whole leaves one perfectly cold, for "soul is wanting there."

To come to some of the more recent members, Miss Fortescue-Brickdale, who if we mistake not exhibits here for the first time, has the place of honour at the top of the room with a rather large and very carefully composed decorative allegory, "The Three Daughters of Time" (71). Miss Brickdale is a little too fond of puzzle titles to her works, nor can we fix exactly upon the intended meaning in this work, susceptible of two or three interpretations; but that is of little consequence in one's enjoyment of a really fine decorative painting, effective both in colour and composition, and to which each one may attach his own poetic meaning. The figures are grouped in front of an arcade, behind which is a twilight landscape bounded by a long level line of evening light which assists in uniting the whole composition. This work gives a more prominent place to decorative allegorical design than it has before taken in the Society's exhibitions; and the tendency to give an increasing place to decorative design is shown again in the prominent position given to the "Strawberry Thief" (28) of Mr. Louis, best known as a designer for stained glass; this is quite a stained-glass design in general character, though it has true water-colour quality in execution. Mr. James Paterson is an artist with a way of his own—somewhat "blot-tisque" in manner; but his principal work, "The Gate La Paz, Orotava" (89), sketchy as it may be called, is really a remarkable inspiration in respect of colour; of course it is a manner, and a strongly-marked one; but it is interesting to meet with something so entirely new and unhackneyed in its way. Among the other works of special interest at the top of the room (where most of the ultra-modern work is collected), are Mr. Robert Little's very small but really grand bit of landscape effect, "Redgauntlet Country" (47), and Mrs. Stanhope Forbes's remarkable brown landscape "The Little Fern-cutters" (58), a twilight scene in a country lane, with a wonderfully true effect of evening air and light over the dark shoulder of the hill; a work of genius. In strange contrast to these comes the equally individual work of another recent member, Mr. Walter West, "The Silver Mirror" (95); an early Georgian lady seated in an interior on a dark polished floor, with a large mirror with a chased silver frame on the wall behind her; the effect of lighting and the treatment of the decorative accessories are what make the picture, though the figure is very carefully painted; the subject seems slight enough, but the treatment has a distinct novelty and ability which compel attention. Both in this and his other work the lady's arms seem too small and thin to be in scale with the figure. Mr. Anning Bell, of coloured sculpture fame, surprises us by a group of two figures under the title "Rose-water," which is a remarkable study in colour; and Mrs. Allingham, who exhibits two or three of the rural subjects with which her name is most associated, has also sought for new ground in Venice, and exhibits two Venetian scenes; in one of these, "On the Zattere" (152), the minute group of ships in the distance is studied with the same care that is bestowed

on the figures and cats in her cottage scenes; but in both these Venetian subjects the artist seems not to have known exactly what to do with her foregrounds.

Among the larger works of the year is one of importance both in subject and in style of execution. It represents a kind of work seldom undertaken in water-colour and seldom seen at the exhibitions of the Society. This is Mr. E. R. Hughes' large and striking picture entitled "A Dream Idyll" (22), in which a black winged horse soars in the air in a moonlight sky, above the domes and turrets of a city seen below. On his back sits a nude figure of a beautiful woman with long yellow hair streaming behind her on the wind. No meaning or legend is assigned to the picture; it is simply a *tour de force* of execution, and as such most remarkable. The figure is finely and firmly drawn and modelled; the light effect is most powerfully managed; the nearer wing of the flying horse, between the spectator and the moon, being dark, the further wing shimmering in full moonlight, which also falls full on the nude figure, brought out in startlingly bright contrast to the dark steed. The effect of the moonlight and the fleecy clouds is also given with great power and reality. Whether the result on the spectator's mind is commensurate with the ability displayed—whether so much brilliant workmanship was worth bestowing on such a mere fantasy—may perhaps be questioned; but of the splendid success of the execution there can be no doubt. On the opposite wall another large work of a different character may be contrasted with this; Mr. Tom Lloyd's evening scene under the rather prosaic title "A Dusty Lane" (109). This is a most beautifully executed evening scene in the country; the last remains of golden sunset light in the sky; the only incident being the presence of two calves driven by a girl down a road in the foreground. The figure of the girl has something of the feeling of Fred. Walker's rustic figures; and it seems rather a pity that a scene which in itself is full of the poetry of nature should be somewhat reduced to prose by the commonplace title and the presence of the cattle. As regards execution it is a beautiful work—one of the artist's best productions; but we should have preferred it with the figure alone, and as a title we might suggest Rosetti's lines—

"And see the gold air and the silver fade,
And the last bird fly into the last light."

The execution of the work was worth a higher subject and sentiment than the catalogue attaches to it.

Architectural subjects, or subjects into which buildings enter, are well represented in the exhibition, in the drawings of Mr. Barratt, Mr. R. W. Allan, Mr. Herbert Marshall, Mr. S. J. Hodson, and Mr. Rooke; indeed it is remarkable how large a place this class of subjects holds in modern water-colour art, and how much better and less conventionally they are treated than in former days. One work of this class is sufficiently important to demand special mention; the large study of the front of Wells Cathedral by Mr. T. M. Rooke (223), which is to be presented by subscription to the Birmingham Fine Art Gallery. What is the special interest of Birmingham in a drawing of Wells Cathedral is not obvious; but the artist may be congratulated on having produced a work which is not

only powerful in pictorial effect but which represents a most careful and conscientious study of the details of the architecture. We observe, for instance, that the series of Resurrection subjects in the upper portion of the front, small as they are in actual size on the drawing, are all quite accurate and recognisable to those who are familiar with them. We have not seen for a long time a finer specimen of illustrative architectural drawing.

There are many other works in the exhibition that might have been mentioned; but our object has been to take the opportunity of drawing attention to the very varied interest to be found in modern water-colour art as illustrated in this exhibition, and the indication of continued life and enterprise which it displays.

TRANSPORT ON ROADS.



AMONG subjects deserving the most serious consideration, none is of greater importance than that of road locomotion. Sub-division of the general subject is necessary to distinguish the different methods by which suitable provision may be made for the varying requirements of those who live in towns on one hand, and in rural districts on the other. In some respects, the needs of these two classes of the population are generally similar, while in others they differ widely. For the moment our attention is directed to that particular department of road locomotion which relates to the transport of merchandise or agricultural products from town to town, or from country districts to commercial centres. The traction-engine covers merely a portion of the ground available for mechanical transport, and there is now a clear mandate for lighter vehicles of the self-propelled type, in addition to the older form of road locomotive. Railways will probably remain the cheapest system of carriage for long distances, but for strictly local traffic the heavy proportion borne by terminal charges, as compared with freight, constitutes a serious drawback. The relation between these charges is approximately shown by the following figures, based on the statistics contained in the Parliamentary Blue Book of 1892:—

Distance in Miles	10	20	30	60	130
Conveyance (Pence per Mile).....	2'90	2'85	2'80	2'60	2'00
Terminal Charges (Pence per Mile)....	6	3	2	1	5

Another disadvantage inseparable from the railway system is the delay caused by "breaking bulk," and by subsequent delivery in carts and vans. It is therefore quite clear that services of motor-cars for light traffic, and of motor-vans, and road locomotives with trailers, for heavy traffic alone, ought to be appreciated in all parts of the country. Railway services are not always favourable to agriculturalists; they are apt to be disorganised on occasions; and, while tending to accumulate population along certain lines of communication, they do comparatively little towards the development of outlying districts. What we really want, and want urgently, in the present day is an auxiliary system, making use of the highways and byways, bringing back prosperity to decaying towns and villages, and encouraging people in general to revert to the land as a means of livelihood.

These desirable ends may be brought within measurable distance by the adequate utilisation of the 100,000 miles of roadways existing in this country. One essential factor for consideration is the nature of the surface presented by the highways themselves, and although we can never hope to obtain and to maintain those ideally perfect surfaces which may be desired by makers of mechanically propelled vehicles, there is reason to believe that the practice of road-making and maintenance will closely follow the development of road transport. On a level hard road surface there is no appreciable resistance to the motion of a wheel; when the surface is soft the wheel causes compression of the particles immediately in front, producing a wedge-shaped wave which adds largely to the resistance to be overcome by mechanical power; and when the surface is bumpy there is also waste of power. These three conditions are shown in *a*, *b*, and *c* fig. 1. Many devices have been sug-

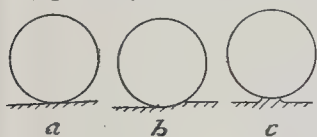


Fig. 1.

gested for the purpose of minimising shocks and for preventing the lifting of vehicles when traversing uneven roads. Springs under the body of the carriage and various forms of resilient tyres are the most familiar remedies, but these are not unattended with disadvantages. The reasonable use of springs is, no doubt, to be commended in nearly every case, but elastic tyres are not always suitable, especially for heavy traffic. There have been many attempts to introduce a satisfactory form of spring wheel, but so far as we are aware, the only successful solution of this problem is presented by the spring wheel patented by Mr. Holroyd-Smith.

The principle of this invention will be understood by reference to fig. 2, where a is

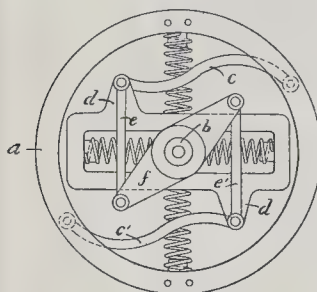


Fig. 2.—Mr. Holroyd-Smith's Wheel.

the hub of a wheel from which spokes proceed to the rim, but are not shown in the diagram; c_1 , c' are levers hinged at one end to a , and at the other to a frame d' , forming a connecting link between the two levers. Then d can move vertically but not horizontally in reference to a . Near the junctions of c and c' with the frame d' , two other levers, e , e' , are hinged, the other ends of which are hinged to the link f keyed to the axle b . Thus b can move horizontally but not vertically in reference to d ; but inasmuch as d can

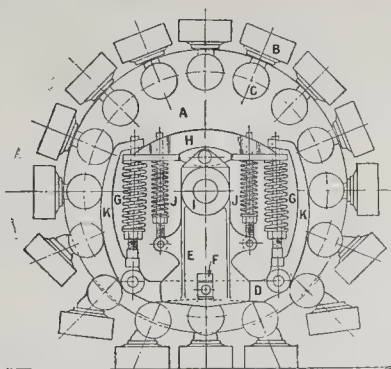


Fig. 3.—Mr. Diplock's "Ped-rail" Wheel.

move vertically, it follows that *b* can move anywhere outward in its relation to *a*, and thus a perfect radial movement is secured. This invention seems to give the necessary amount of elasticity without involving a departure from the iron tyres, which are considered essential for heavy road traction, and another important feature is that the action of the levers and springs permits the vehicle to continue its forward motion for a limited space when the wheel encounters any small obstacle on the road. The result is that the obstacle is more readily passed, for the same reason that the forward inclination of a man's body facilitates the ascent of a step. The most recent attempt to smooth away the difficulties attending highway locomotion is to be found in what is termed by its inventor, the "Ped-rail" system. One chief features in this, is the adoption of a wheel, in which the ordinary rim is displaced by a number of feet, each attached by a universal ball-joint to a short telescopic leg, which is pivoted, so that when extended it can swing in a plane parallel with that of the wheel face. The main features of this peculiar wheel are shown in fig. 3, which is taken from a book written by the inventor.* In the figure, A is a disc keyed to the driving axle, B is one of the feet pivoted so that it may turn to suit any road surface, C is a small wheel or roller, D is a rail pivoted so that it can rise and fall in a slot F in the guide E, forming part of the axle-box I. The rail D supports the vehicle by the springs G pressing against the lever H and pivoted to the op of the axle-box I. The two inner springs J serve to steady the lever H, and the two guides K, are for leading the rollers C under the rail D. The disc A revolves, but the axle-box and its dependent parts do not. The consequence is that the rollers successively strike the guide K, which pushes out the telescopic legs, thereby permitting the feet to turn on their ball-joints and to fall one after the other with their flat surfaces on the road. The bottom of the rail is slightly arched to allow for the pivoting action of the short legs as they pass below the rail. In this system feet are placed on the road, each foot supporting a roller, while a short rail carrying the load is levered along by the legs and feet. An engine fitted with four

such driving wheels is practically a walking machine; the feet come down horizontally or at any required angle, according to the nature of the road surface; the engine will walk uphill or downhill, up and down stairs, or over obstructions of moderate height. Owing to its elephant-like action, an engine of this type has great tractive power, and, according to a report by Professor Hele-Shaw, it should be capable of drawing from 150 to 200 tons on a level road.

The Ped-rail engine is a most ingenious invention, and we have no doubt it may be usefully employed under favouring conditions. One thing against it is that when the speed of three miles an hour is exceeded the feet do not fall flat on the road because the force of gravity is insufficient for overcoming centrifugal and other forces. It is true that by the addition of controlling mechanism to the legs and feet the latter are compelled to come down flat on their soles, and the inventor claims that the Ped-rail may therefore be run at any reasonable speed. In this connexion we may say that everything depends upon the interpretation of the adjective, and bearing in mind the fact that centrifugal force—and consequent strain to the mechanism—must necessarily increase as speed is augmented, we very much doubt if it would be wise to adopt a speed of more than four to five miles an hour. Even in the original form of construction there are seven working parts per foot, equal to 144 parts per wheel and 576 per engine, while in a wagon there are 126 working parts in the feet of each wheel. Hence, in a train consisting of one engine and eight two-wheeled waggons, there would be 2,016 working parts in the feet alone, exclusive of other mechanism. In the improved form of foot there would be 640 additional working parts per engine, and 280 per wagon, making 2,880 additional working parts in a train. Altogether the feet alone in a train of nine vehicles would have 4,896 working parts, all liable to disorganisation by wear and strain. Clearly, then, this does not seem the sort of machine to run at anything beyond a crawling pace. Granting the high capacity of a Ped-rail train, the places are few where goods can be collected for transport in 100-ton lots, as contemplated by the inventor; and, even if existing legislation could be altered to permit trains of nine vehicles to crawl along public highways, the innovation would be an intolerable nuisance. An aggravation

* "A New System of Heavy Goods Transport on Common Roads." By Bramah Joseph Diplock. London: Longmans, Green, & Co. 1902.

would be caused at every hill, where, as the inventor admits, it would be necessary for the engine to go up first with one or two waggons, and then to pull up the others in instalments by the aid of a winding drum attached to the engine. We are sorry to speak thus of the proposed engine, because in many ways it seems worthy of high commendation.

As for the complete utilisation of the highways for the general advantage of the country, it is probable that this end will be attained by the adoption of mechanically propelled vans for heavy traffic, capable of carrying from 4 tons to 5 tons each at speeds of six miles an hour and upwards, or from 3 tons to 12 tons by the addition of trailers; and by the establishment of transport services for the conveyance of parcels and light goods in motor cars capable of travelling at a speed of at least fifteen miles an hour. An experiment of the former class has already been made in Lancashire, where a motor carrier service is running regularly between Liverpool and Blackburn, via Preston. The car has a capacity of 4 tons, and a trailer attached carries an additional weight of 2 tons, the journey of about forty miles being frequently performed in less than six hours. The Road Carrying Company, which conducts this service, is now preparing to make extensions of the system, and to establish a similar system at Bristol. Lighter services for the rapid delivery of parcels and perishable goods and produce have been started in some districts, but not yet on any extensive scale. In this direction, however, there is a clear opening for enterprise, which would be profitable to its inaugurators and acceptable to the public.

NOTES.

The London Water Bill. THE London Water Bill has now, for all practical purposes, become law, and the Metropolitan Water Board and its public water supply. The result of the discussions in the House of Commons during the last few days has been to lessen the size of the Water Board and to give the London County Council a larger representation; but, though diminished from its original number of seventy-three, it is still much too large. Nothing can be more anomalous than that the Government should create a special body to manage the water supply of London at the very time when they are giving to County and Municipal Councils the control of education, and when they are threatening to put an end to the London School Board. The water supply of London and the suburbs could perfectly well and more economically be managed by a committee of the London County Council, and a certain number of selected representatives of the outside districts, than by the body which has now been created. Since Birmingham, Liverpool, and other great towns manage their water supply through their Town Councils, it is obvious that sooner or later the powers of the new Water Board will be transferred to the County Council, and, therefore, we can only look upon the Act in this respect as being a temporary measure. In the recent discussions no one had a good word to say for the Water Board, except the President of the Local Government Board. However, it will be in favour of the County

Council that the purchase should be carried out by a special Board, and that the new arrangement should be got by it into working order, and, doubtless, public opinion will soon demand that the control of the water supply should be handed over to its real representatives.

Municipal Trading. WE have from time to time in these columns drawn public attention to the subject of municipal trading, and endeavoured to set forth the reasons why Municipalities should not be allowed so to extend their functions and the evils attending such a system, and it is with some satisfaction that we observe public attention is at last being directed to this question. This subject was debated at the recent meeting under the auspices of the London Municipal Society, under the presidency of Sir Edward Clarke, and, although the objections to the system were not on this occasion debated, the sense of the meeting seems to have been that it was at once essential that the subject should receive thorough investigation, and that such investigation could only be secured by the appointment of a Royal Commission. It seems to have been conceded that municipal trading had already advanced to such an extent that it was now too late to hope to eradicate it, and (like the motor-car) it had to be faced, and that it was a subject which ought to have received more attention in its early stages, and now control and direction were all that could be hoped for. Sir Edward Clarke deprecated any profits secured by the Municipalities being allocated to the reduction of the rates, but recommended that they should alone be devoted to the improvement of the adventure. Judging, however, from the results attained by our privately-managed railway and other companies, the profits obtained from such undertakings, if they are properly managed, should far exceed any sum that could be beneficially expended on the undertaking itself, and a reduction in prices or fares would only cause greater injury to private enterprise. In our issue of September 20 we dealt at some length with many of the objections to be urged against the system of municipal trading, and to the arguments thus summarised we may add the further point that municipal trading only encourages the increase of the local indebtedness, which already bids fair to eclipse the National Debt.

Amending Specifications of Patents. IN the case of *Woolfe v. The Automatic Picture Gallery Limited*, an important question for patentees was decided by the Court of Appeal. The point for determination was whether the power given a patentee by Section 18 of the Patents Act, 1883, to amend his specification by "disclaimer, correction or explanation" was taken away by Sub-Section 10 of the same section as amended by the Act of 1888, which enacts that "the foregoing provisions of this section do not apply when and so long as any action for infringement or for revocation of a patent is pending," in which event the patentee is relegated to Section 19, which only allows the patentee to amend by disclaimer with leave of the Court. In this case the patentee had applied under Section 18 to amend his specification by striking out certain claims;

and this application was made on April 1, 1901. On April 3 the defendants had presented a petition for the revocation of the patentee's patent, and on the 14th the original application to amend was granted by the Comptroller, and it was contended, since the application was granted after the action was instituted, Sub-Section 10 applied, and the amendment could not be made. The Court, however, held that as the application to amend was made before the action was brought, Sub-Section 10 did not apply, and the amendment was properly made. The Court pointed out that to hold otherwise would very seriously limit the provisions of the Act, as, after the application to amend had been made, the mere institution of an action would render the patentee unable to amend, except by disclaimer, until it was too late and his patent had been declared bad. The new Bill dealing with patents, which has now passed in the Commons, and had also been considered, by the House of Lords and referred back with certain amendments, does not deal with this question directly, but it introduces a change in the law which may render amendments of existing patents of less frequency, for it places on the Examiners of Patents, in addition to the merely formal examination of specifications at present required, the duty of inquiring whether the invention has been wholly or in part claimed or described in any complete specification published and deposited in the Patent Office within the previous fifty years, and the applicant is to be informed of the fact, and has the opportunity then given him to amend his specification. It is to be observed, however, that this search is not to constitute any guarantee by the Board of Trade of the validity of the patent.

Wooden Cottages in Rural Districts. WE were glad to see from the letter of our correspondent, Mr. Till, in our last number, that the Local Government Board is beginning to take a strong line on the subject of wooden cottages, for there cannot be a doubt that they provide a solution, to some extent, of the housing problem in rural districts. The cost of materials and labour necessarily makes those who erect brick cottages more chary of size and materials. Any one who will take the trouble to go carefully over a county and compare cottages erected 150 years ago with those of the present day will generally find the former better built and so warmer in winter and cooler in summer. Some Rural District Councils actually prohibit thatch, though this form of roofing is probably of all others the most suitable for cottages. Of course, wooden cottages must not be allowed to be used after they have got into an unfit state; it is certain, however, that a good many brick cottages ought long ago to have been demolished as unfit for human habitation. It is to be hoped that the publicity which has been given to Mr. Till's case and the Dartford Rural District Council will have called so much attention to the question of wooden cottages that it may cause their adoption in many parts of England.

Restrictions on "Altering" Premises. IT may fairly be presumed that most laymen would unhesitatingly have pronounced an illuminated clock placed outside a watch-maker's and jeweller's shop not to constitute such an addition to the structure as to

amount to an "alteration of the premises" within the meaning of a restrictive covenant in a lease, yet the opinion of the Court of Appeal has had to be taken on this point in the case of *Bickmore v. Dimmer*, and that Court has set aside the judgment of the Court below, by which a mandatory injunction had been granted, at the suit of the lessor, for the removal of such a clock. The Court of Appeal has, moreover, done something to prevent such litigation in the future by not only deciding that this particular addition to the premises did not amount to an alteration within the meaning of the lease, but by also laying down some rules as to how such covenants should in general be construed. In the first place, the addition or operation must be one which alters the structure or form of the building, and then the purpose for which the building was let must be regarded, and the covenant not only permits such things as are essential for that purpose, but also extends to things useful or convenient for carrying on the business in a reasonable and proper manner.

Electrical Engineering.

MR. SWINBURNE in his presidential address to the Institution of Electrical Engineers last week, took as his subject the "Limits of Electrical Engineering," and treated it in a novel and suggestive manner. He pointed out that there was very little room for improvement in dynamos and transformers, as the percentage loss in converting energy from one form to another is now very small. The importance of cheap water power had been greatly exaggerated. It may be said that in electro-metallurgical processes the whole cost is practically the electrical energy used. We should therefore expect that aluminium, carbides, electrolytic soda and bleach, &c., would be made near water-power stations. Yet, even in these cases, there are factories which make them by steam-driven plant. We have to place against the cheaper power the extra cost of carriage and labour which often turns the scale. Taking calcium carbide, for example, he showed that doubling the cost of the electrical energy used only added on 10 per cent. to the price. However great may be the future improvements in steam engines, their efficiency will not be much increased unless engines are used which have two working fluids. There is a much larger margin for improvement with regard to gas engines. "Electricity direct from coal" Mr. Swinburne regards as impossible. The ordinary glow lamp is very far from perfection; its efficiency, considered as a source of light, is very small. More refractory conductors might be used for the filaments of lamps, and some progress had been made in this direction. He mentioned that carbides, metals, and electrolytic substances had been used with satisfactory results. It is also possible to get light radiation directly from electricity, as in the Cooper-Hewitt lamp, where the light is given by the passage of the current through mercury vapour.

Colour Photography.

AN interesting lecture on "Colour Photography" was delivered by Mr. Richard Kerr at the London Institution on the 4th inst. Nothing of a novel character was announced or exhibited, but several series of very

beautiful lantern slides illustrative of the success of Ives, Lumière, Joly, and others in their efforts to obtain photographs of objects in their natural colours were exhibited. Photographs projected by light passed through violet, blue, green, and red screens, respectively, were first shown side by side, and then by superposing the coloured screens the object photographed was shown in its natural colours. Reference was also made to the method of producing photographs in colour by superposing a series of photographs obtained upon transparent films dipped in suitable aniline dyes, the colours to be superposed being red, blue, and yellow, as in colour printing by the "three colour" process. Mr. Kerr concluded with the statement that the details of a process by which even amateurs may produce photographs of objects in their natural colours will shortly be made public. We fear, however, that vendors of photographs showing objects in colour will still have to depend largely upon hand painting for the production of the most attractive and most permanent photographic pictures.

Incandescent Lighting with Low-grade Gas.

ON Monday last Professor Lewes delivered the third of his course of four lectures upon "The Future of Coal Gas and Allied Illuminants" before the Society of Arts. Referring to the statement made by certain investigators that the light emitted by an incandescent mantle decreases with the calorific power of the gas supplied to the burner, Professor Lewes showed that, on the contrary, the same intensity of light can be obtained from a mixture of coal-gas and water-gas of comparatively low calorific value as from coal-gas alone, provided that the supply of air admitted through the air-holes of the burner be reduced as required. When discussing the subject of gas stoves, Professor Lewes ascribed the increasing popularity of gas for heating purposes to the fact that the gas companies are taking into their own hands the business of selling and letting out gas stoves on hire, with the result that the use of stoves of inferior make is discouraged. We were glad to note that the lecturer spoke in very strong terms against the use of any form of fuelless stove in a dwelling-room, for the boldness with which some of the vendors of fuelless stoves continue to assert that the atmosphere of a room is in no way vitiated by the use of the particular brand of stove they offer for sale renders plain speaking from a recognised authority on the subject very necessary.

The Old Palace of Henry VIII.

NO. 17, Fleet-street (the freehold of which was purchased by the L.C.C.) is now being demolished. The dangerous state of the building rendered this necessary, and the L.C.C. is doing all that is possible in retaining the original staircase and preserving the plaster ceiling and carved wall panelling in the old Council Chamber. The ceiling and panelling will be removed and refitted in the restored room which will be opened to the public. The restorations are in the hands of Sir Purdon Clarke, and are well worthy of his care. The present overhanging front is proved to be only a mask to the original front, which will be restored after the mask has been removed. The

back part of the building is completed, and has been fitted as toilet saloons by Mr. John Carter. The basement saloon is arranged on the American system, and on this floor is placed a complete laundry and drying-room. All concerned are to be congratulated on their efforts to preserve as much as possible of this interesting fragment of Old London.

Exhibition of Table Silver.

AN interesting exhibition of table silver and plate is now being held at the Fine Art Society's Gallery in New Bond-street. Some of the cases of silver are on loan, but most of the exhibits are for sale. A fine collection is that by Mr. Percy Macquoid, who is himself responsible for the arrangement of the exhibition, and also for the interesting prefatory remarks to the catalogue. He here observes that—

"though we are in the habit of associating the use of the knife, fork, and spoon together, the dates assigned for their introduction are by no means contemporaneous, the spoon being by many centuries the earliest invention of the three, as silver spoons were in use amongst the Romans even in this country, as Sir John Evans's example (Case A, No. 16) testifies. The table did not come into existence until the end of the fifteenth century, while the fork was not used in conjunction with the knife, in this country, until the middle of the sixteenth century, the dagger and spoon being found sufficient for all purposes during mediæval times."

A very large proportion of the collection consists of spoons to which age has added its charm to already beautiful form. Although there is a family likeness running through the periods marked by distinguishing features—the earliest forms in the beginning of the fifteenth century having blunt-ended handles, later the bowl still being very long and pear-shaped—the end of the handles are finished by some object, such as a knob, acorn, lion, or a head; and, later again, by a small figure representing one of the twelve Apostles; and then by the seal top, which stayed in fashion until near the end of the seventeenth century, when the bowl became an oval and the handle became flat; this developed to the "rat-tail" of our great-grandfathers, giving place eventually to the any-style-you-like of the present day. In the old days a spoon, knife, or fork were individual possessions, not one of a set, and thus there is the charm of variety and individual craftsmanship in anything that was made. The evolution of the knife from the dagger, and the introduction of the fork from Italy in the fifteenth century, and its subsequent development, are fascinating objects of study. To possess table plate is to hold one of the most personal links with the manners of our ancestors, and the collection of pieces is a fascinating pursuit. Of the individual pieces at the exhibition it is impossible here to speak. What is noticeable is that the most common and useful articles please the eye most, such as the salts, caddies, candlesticks, wine cups and tankards; which is not without a lesson for the present day.

At the Bishopgate Institute Mrs. Coppie's Miss Nancy Knaggs (Mrs. Drawings. Arthur Coppie) is exhibiting

some water-colours. She has chosen her subjects from the most charming bits of the English coast, but including also a good many studies from Venice. All are treated in the same broad and effective style of

brush and colour, charming in many ways, but it is difficult to believe that the colour and effect of Whitby and Venice are so much alike. Had the show been confined to Venetian studies one might have been persuaded that Miss Knaggs had caught a new trick of the Venetian atmosphere, but the tell-tale English coast sketches are too near, and their influence has prevented that abandon which is the true note of inspiration. Miss Knaggs' preference for the evening light is noticeable, and the effect of the sunset and afterglow on moorland and water is painted with a decision that is masterly. The studies of English fishing villages are also full of feeling.

Workington Public Library Competition.
An architect who applied for the conditions of this competition has sent us the reply of the secretary, to the following effect:—

"No copies of site, plan, &c., have been sent out unless a deposit of one guinea has been made. You must forward the same by return, otherwise you will be too late."

This is one of the cases in which no public statement was made as to whether an assessor would be appointed; so that architects are expected to pay a guinea to find out whether the competition is one into which they could enter, with the probable result of finding their guinea wasted.

THE ARCHITECTURAL ASSOCIATION.

An ordinary fortnightly meeting of the Architectural Association was held on Friday last week in the Meeting Room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, W., Mr. Louis Ambler, Vice-President, in the chair.

The minutes having been read and confirmed, the following gentlemen were elected members of the Association: Messrs. L. J. Prestwich, E. W. Trounson, R. Gammell, G. Seward Turner, and T. S. Inglis.

The following gentlemen were, on the motion of the Chairman, elected by acclamation: Messrs. G. T. Hine, F. W. Pomeroy, T. Raffles Davison, and J. S. Gibson.

The following gentlemen were reinstated: Messrs. Lewis Solomon and Herbert Hooper.

Mr. R. S. Balfour, Hon. Secretary, then announced the following donations to the library: "How to Estimate," by J. T. Rea, presented by Mr. B. T. Balford; "English Interior Woodwork of the Sixteenth, Seventeenth, and Eighteenth Centuries," presented by Mr. B. T. Balford; Ruskin's "Stones of Venice," presented by Mr. Lancelot Simmons. A vote of thanks was accorded to the donors.

Mr. Balfour also announced that a meeting of the Discussion Section would be held on December 10, when a paper would be read by Mr. J. S. Blunt on "Crosses."

He also announced that the lectures on "Classic Ornament" by Mr. B. F. Fletcher would commence on December 15.

Mr. J. S. Gibson then read the following paper on "Architectural Practice, Real and Ideal":—

Architectural Practice, Real and Ideal.

This subject does not need any introduction to this audience, it is perhaps too closely connected to us all to be appreciated at its proper value. The things of our everyday life are apt to get a little out of perspective, and an attempt to put them into their real relation to the other parts of our environment may be of value.

Architectural practice of some sort is always with us, and as a rule we take it as a matter of course, like the rising of the sun, and hardly question its rightness or wrongness, its fitness or unfitness for our time. In so far as we think on any important subjects, we are influenced by two impulses, one to accept things as we find them and the other to inquire into them and discover if possible the reason of their being. A healthy curiosity into the

abstract question of architectural practice is a desirable thing, but I am afraid few would so consider it if applied to the mysteries of any individual practice; so in this brief essay on the subject we will try not to offend any honest fellow architect.

It has always appeared to me as very peculiar that the pupil who passes three years in his master's office and, say, another five or six years as assistant, should rarely hear a word on the all-important matter of how to begin and carry on the practice of his profession. Considerable time and labour on the part of the master are often devoted to make him an efficient draughtsman, to give him a workman-like grasp of construction, to instil within him a knowledge of the simpler methods of planning, and to awaken an appreciation of the great achievements in design, while no attention is given to the more intimate relations between parties, common to all practices.

Some men I know have been exceedingly kind to their former assistants, and have greatly helped them with advice when they have had to deal with a difficult question, but this is usually after they have commenced practice on their own account; but, for the life of me, I cannot see why the experience necessary to deal with many of these difficulties should not be gained in their masters' offices. There are a thousand and one questions involved in our relations with contractors, public bodies, fellow-architects, and clients that might very profitably be discussed in the presence of our assistants, and in which they might take part.

Let us now give a few moments to the consideration of the time antecedent to practice, the pupil and assistantship period, if I may so designate it. This must be a period of enthusiasm for the work; the glamour and poetry that the spirit of youth alone can impart must be pre-eminent. Compared with the sculptor or the painter you must have more enthusiasm, for their handiwork is the realisation of their ideals, while yours has to be carried out by other hands before it can be judged or appreciated, and at this early stage the chance of this being done is still remote.

The architect's early training is also a much more arduous and complicated one, and I do not think we can reasonably expect to do with less than six or eight years of really hard and earnest labour, but at the end of that period we ought to have such a grasp of our work as will enable us to deal successfully with the problems given us to solve. During the second half of this initial stage a considerable amount of measured work from good examples, irrespective of styles, should be done, together with sketches which get as near as possible to the heart of the design and leave the art of merely pretty drawing severely alone. A good motto for this period might be "Draw often and accurately." The mind should be in a receptive condition, so that each new experience should find soil in which to take root and room to grow. The world has grown so tiny now, that visits to the various architectural centres of Europe may be easily accomplished at this period, and the beneficial effects of the study of the old masterpieces is invaluable.

We have now arrived at the stage at which the man has spent energy, time, and money in acquiring the facility to plan and design, his mind directed into the right channels likely to lead to the development of his most cherished art, and he is confronted with the necessity of using this experience as a means of earning his livelihood. By what methods may he make his capacities known to those desirous of building.

In countries where the mass of the people know something of art, and value its beneficial effect on every-day life—say in France—it is considered a part of the Government's duties to see that the most meritorious and gifted students are rewarded by commissions to paint pictures, design buildings, and execute sculptures on all occasions when public works of this kind are required, and I am glad to think they are often required in such countries. But we manage things differently on this side of the Channel: our Governments think their duty accomplished by making one of their partisans First Commissioner of Works, and this estimable gentleman usually dances to the tune piped by the permanent officials, whose sympathy with, and knowledge of, the arts are painfully evident by their works scattered throughout this long-suffering country.

There are times—intermittent, it is true—when the political mind doubts the omniscience

of the official mind, and the political mind boldly resolves to go outside the Government offices for the design of some important building. Until a few years ago it was the custom to throw these matters open to all competitors, and, as a rule, the result justified this action. But of late years these competitions have been restricted to the men whose experience extends over a considerable number of years, and so this avenue is now practically closed to the young architect. From the Government, then, the beginner need not look for any help to establish himself.

A man's personal friends, in the majority of cases, may perhaps be the means of giving him the first few chances that go to prove the stuff he is made of, and if there is any real good in his work, it will bring more in its train. It is during this early period that many men compete for work of all kinds, and by so doing gain an experience in planning and design that is worth the labour and time expended, although they may bring no other reward.

When we think of the fearful and wonderful arrangements in the planning of public buildings, and the more fearful architectural embellishments of these plans which were the painful results of early efforts, we cannot be too thankful that these things never got beyond the paper stage, and that an unappreciative assessor passed them by and thus saved us from having to live down an early indiscretion.

Competitions are not unmixt blessings to the profession, but we must admit that the buildings erected under this method compare favourably as a whole with the average of works erected without competition. I should certainly advise all men, for the first few years of their practice, to take part in well-conducted competitions, but be sure the conditions are fair, the assessor competent, and the subject one they know something about. And as soon as the state of their practice warrants it, I should also advise them to let competitions alone.

There are many amusing and curious ways of obtaining a practice, and for all of us it is a serious question of determining how to start on our career. But it has to be settled at an early stage, or else it will effectually settle us. Some cut the Gordian knot by leaving the ranks and embarking into the maelstrom of "trade"; these are the wise but inartistic ones. Some rely on the artistic blindness of the general public, and run lucrative drawing manufactories on business-like lines. These are the shrewd and "practical" ones. Some have relatives who are something big in the City of finance or Society, and these push their architectural appendages in the same manner as they do shares, or officers in the army. What Lord Melbourne said about the bestowal of the Order of the Garter, that "There's no damned merit about it," we may safely say in reference to the practice of these fortunate ones. Some drift into that refuge of mediocrity, an official appointment in a Government office, and in the Office of the Architect, or in the departments to what they can to spread the commonplace over the land; these can hardly be said to practise, either really or ideally. Some enter into competitions, throwing all their energies and skill therein, in the hope that merit will be rewarded. These are the sanguine ones, and sometimes they are not disappointed. Some enter into partnerships with clever men of business, who "manage" the clients while they manage the office. These are the timid ones, likeable fellows who think the chief end of life is to get a cornice perfectly proportioned or a skirting-board properly moulded. Some attach themselves to the land, and, backed by financiers, erect enormous piles of vulgarly commonplace type, whose chief quality is bulk, and whose erection in some slight degree justifies the short leasehold system of land tenure; these are the wily ones. Some develop an absorbing interest in rights of light, and devote precious time to the intricacies of party structures and then pass away full of years and riches; these are the canny ones. Some renounce art and become crafty, finding that the public will pay more willingly for the abnormal than the artistic; these denounce style, balance, composition, rhythm, grace, and are sharp-sighted leaders of the blind. Some determine to live for art's sake, and usually die for it instead; these are the foolish and artistic ones.

These are but a few of the thousand and one ways of practising our profession, and each of you must one day settle this great question for yourself.

Turning to the realities of practice one may say "happy is the man who knows nothing of them," for the whims and vagaries of the client are sometimes as difficult to deal with as the prejudices of the architect.

Among the first troubles likely to assail you are the reconciliation of the wants of the client with the amount of money he is willing to spend. In this matter it is well to show as kindly as possible the impracticability of expecting 5,000*l.* worth of accommodation for 3,000*l.* cash. Never estimate your buildings too low; it will prove easier to have a margin to meet the changing views of your client, rather than a deficit to ask him to wipe off.

Having satisfactorily settled the money question, you can, with a merry heart, set about the designing of your house; and if your client expresses a strong preference for any unusual disposition of rooms, you must give this your best consideration, for, after all, he is the person who is to live in them. If you have hit on any particularly good arrangement, do not throw it at the good man, but lead him gently to it, and thereby gain his approval, for this is more often won by strategy than by force. Always be ready with examples of similar cases, and if these are already known to your client so much the better, for then he feels on safer ground; all clients prefer experience to experiment. When discussing any question never imagine that force of language will atone for lack of reason. You will often find your client expressing his views on the architectural styles, and, if he desires you to design him a house which shall be Palladian Renaissance outside and English Gothic inside, do not regard him so much as a lunatic as one who requires careful treatment, as his appetite for styles may be omnivorous.

Having matured your design and written your specification, do not think that your worries are ended. Under the present system of competitive tendering for work, you may find yourself face to face with a builder who solemnly assures you that Smith's blue lias lime is much stronger and better than Brown's Portland cement, that drain pipes are best jointed with clay, and that footings should rest on the solid earth without the intervention of any concrete under them. Should you meet such a man, no doubt you will inform him of your good old trusted prejudices, and stick to the specification. Having taken a firm stand in your dealings with a builder of this kind, maintain this attitude to the end, and you will generally succeed in getting a creditable job for your client, although at some trouble to yourself. But we must not forget that we are paid for the trouble involved in getting our buildings properly erected, as well as for designing them.

One of the surprises of practices in their early stages, is the extraordinarily easy manner in which variations can be made on contracts during execution, so that, when the accounts come in they often surprise the architect more than any other person. The apparently innocent suggestion to "omit the moulded beam and side brackets" over an opening, and just "put in a couple of semicircular arches with a column and two pilasters," has, in some mysterious way, been expanded into about five pages of a bill of extras, the total of which makes the architect gasp. The one safe rule in all these matters is to make a drawing and get a price fixed before any work is done. If, however, you have made the variation without a price having been previously fixed, you may rely upon one friend in your extremity, the quantity surveyor. He is the man who can pull you through. How he does it I do not pretend to know; perhaps he has no bowels of compassion as far as builders are concerned; perhaps there is some Freemasonry of which you and I are ignorant; but, at any rate, he will usually succeed in making a bill more palatable to your client and yourself, and we cannot be too grateful to him for these services.

In your dealings with your client, as with your builder, make up your mind on the matter in hand, and never depart from your determination. Do not be so foolish as to expect to get your own way always; you will be a lucky man if you get it occasionally, but if you show signs of indecision of character, depend upon it, you will never get it at all. Should your client, upon any vital matter, prefer his way to yours, let him clearly know that the responsibility for success or failure rests on him.

If your work be at a distance, and frequent

visits are impracticable, do not be surprised at the variations the builder will quite innocently make on your designs. Some of the most charming results are often thus accidentally obtained.

Years ago a fellow architect said to me, "It's a poor design that does not admit of improvement in execution," and the ripening experience of the translation of drawings into solids will suggest the variations that are improvements. Do not worry too much about the finish of your drawings. The work itself is the heart of the matter, and, above all things, do not over-elaborate the details of your drawings. A multiplicity of detail does not ensure a fitness of quality, and I had rather see one good architrave round every door of a house than an abundant variety of commonplace sections. You may dash off sketches of facades and interiors; many of the happiest inspirations are the most evanescent, but as you grow older you will find it harder to let your full sizes go out of the office. These are the final stages in your part of the work and by them you will be, in a great measure, judged.

The requirements of modern civilisation are so varied and complex and we live at such a rapid pace, that even the practice of architecture has been invaded by "specialists" who apparently imagine that a thorough knowledge of technical details will compensate for a lack of knowledge of the art of their profession. There is hardly any modern pretender so lacking in justification by their works as that of the architectural expert or specialist. It may be argued that this is the only scientific method of dealing with modern complicated requirements; if so, its scientific efficiency hardly justifies its artistic barrenness. My earnest advice to you is to make your practice cover as wide a field as possible; shun specialism, however lucrative it may appear.

Within the scope of a moderate practice you will find extensive demands made upon your knowledge. Apart from the capacity to design, there must be the ability to design within the limits imposed by the requirements of the Building Acts of London, Provincial and Urban Authorities, to utilise in the best way the properties of steel, iron, and concrete, as well as the older building materials, stone, brick, and wood. You must also be conversant with the latest patents in pavement lights, have a knowledge of the virtues of burglar proof sash fasteners and give a warranty that your door knobs will never come off the spindle.

Besides this all-embracing knowledge that is required of us, a new danger is rising up, born of our advancing civilisation. We are now in the glorious days of trusts and combines, when everything is on a colossal scale, especially the capitalisation, and no doubt the inherent poverty of our profession is the only thing that, thus far, has saved us. Think of the waste of energy going on in the artistic world to-day, of painters and sculptors creating pictures and statues and trying to find a market for them—often in vain. Imagine the immense savings that could be effected by a Pierpont Morgan buying out the output of Sargent, Whistler, Shannon, Swan, Guthrie, Lavery, Brock, Gilbert, Frampton, and putting these artists on regular employment at a fixed wage, under healthy conditions in a factory complying with all the requirements of the Factories Act, whatever these may be. Saved from the rapacities of the "dealer," in Bond-street and out of it, what magnificent works these men would turn out, while the public would no longer have to go to the dealers to be advised as to the safest thing into which they might invest their money, as if works of art were mining shares and dealt in for the rise or fall of an active market. The only bar to the success of such a scheme comes, strangely enough, from the artists themselves.

I have talked so long on some of the realities that little time is now left in which to speak of the ideal practice. It is like the promised land—before our eyes, but never beneath our feet. Of what would such a practice consist? we ask, and every one's temperament will dictate a different answer.

The ideal practice must surely be that which ensures the evolution of the individual in the advancement of his art. To progress along parallel lines with your art must be a desirable thing, though it can hardly be said that, as a rule, our practice affords many facilities of this kind. Some requirements necessary to this

end are common to many of us; these may be summarised as follows:—

Work which is congenial to our temperament, and in which a healthy interest may be taken.

Time to think out our problems as a whole, and evolve slowly their detail. Absence of all "rush and worry."

An appreciation of the good points in our designs by those for whom the work is done.

A few assistants, good men and true, who will carry the knowledge gained a step further on their own account.

I could guess the young practitioner's ideal to be, that his buildings would turn out as fine as his conception of them, but the hard facts of reality destroy the charm of those imaginings.

I could guess the middle-aged practitioner's ideal to be, to begin again, with all the vigour and enthusiasm of youth, coupled with the matured experience of his years, but this combination is impossible of realisation.

I could guess the old man's ideal to be, to be spared to practise for a few years that great art to the threshold of which many years of travel has brought him, but the inexorable summons comes, he steps across another threshold, and the door closes behind him for ever.

As far as the necessities of living will permit us, I think we should do all we can to realise our ideal practice, to advance the science and art of our calling, to do justice to our clients, our builders, and ourselves, and to uphold the honour and dignity of our profession.

Mr. Cole A. Adams, in proposing a vote of thanks, said that Mr. Gibson had gone over all the points which experience told them were likely to arise. As to giving pupils and assistants hints upon the conduct of business and practice, the more that was done the better. A great many men passed through their pupillage and as assistants without getting a proper knowledge of how to manage the business of their profession when they started on their own account. He had always given his pupils and assistants opportunities for acquiring this knowledge, and he discussed with them the various problems which came up for solution, and he found that pupils and assistants were glad of the opportunity.

Mr. A. O. Collard seconded the vote of thanks. The relationship of architects to pupils and assistants was a question which must have occurred to all of them. In the days of pupillage probably the mind was not so receptive of facts and business points, and was more given to relaxation and pleasure; but the more opportunity assistants had of discussing office problems the better; and it was to be hoped that Mr. Gibson's views would be taken up by architects. Older architects felt that the poetry of an architect's life did not cease with youth; if it did, there would certainly be less to live for. The poetry of an architect's life stayed with him until he stepped across the threshold referred to by Mr. Gibson, and if it were not so their work would be far less interesting than it is. A vein of philosophy and humour ran through Mr. Gibson's paper which made it most delightful to listen to, and while the paper was being read it had occurred to him that the manner adopted by some doctors was one which might be adopted by architects—and really was often adopted by them—*i.e.*, "the bedside manner." Amongst doctors, he believed, it was necessary that the ear of the patient should be secured, and his feelings calmed, before the unpleasant medicine were administered or the operation performed. Mr. Gibson remarked that it was no use trying to force ideas on to the client, and that when the architect approached the client in a delicate manner, as a doctor did his patients, he would, in ninety-nine cases out of a hundred, get his own way, and that was one reason why some architects had been so successful. It was not because they were so able in design and proportion as that they were able to make their ideas and their plans palatable to the client. Papers of this sort were usually read by comparatively young men; if they could only get a really old and successful practitioner—one who had retired from practice, preferably—to confess to them as to the methods by which he had achieved success, they might arrive at some very useful conclusions. It would be most interesting to know by what methods clients and work were got, for it was no use designing unless their designs could be put into execution. Compe-

titions were of great use to many men, but architects would be well advised to give heed to what Mr. Gibson had said on the subject. A few days ago Mr. G. Bankart had read a paper before the Discussion Section of the Association. Mr. Bankart was an architect, apparently, as well as a craftsman, although his paper dealt very largely with the craftsman's point of view. Now, the object of gentlemen like Mr. Bankart seemed to be to revolutionise the architectural profession, and to compel architects to enter more practically into the work of the craftsman, and actually do the work of the various trades. He did not know where they got their ideas from, or what were their actual motives, but he could not help remembering that in the early days there were, under the Roman Empire, architectural colleges which sent out workmen of every description to various parts of the empire, and there these workmen carried out work, beautiful remains of which were found from time to time. When the Roman Empire came to an end, Rome emptied itself, practically, to escape the savage hordes which overran it, and shortly after the work of the men—the Comacine masters. They spread themselves all over Europe, and their methods might, with advantage, be adopted by the craftsmen of to-day. There was a paragraph from an Italian writer's book, translated by Leader Scott, which was really worth drawing attention to:—

"All members were instructed in their duties to Society, and taught to live faithful to God and Government; to lend themselves to the public good and fraternal charity. In the dark times which were slowly becoming enlightened they communicated to each other ideas on architecture, buildings, stone-cutting, the choice of materials, and good taste in design. Strength, force, and beauty were their symbols. Bishops, Princes, men of high rank who studied architecture, fraternised with them."

They were a remarkable order, and if their methods could, in any way, be practised to-day it would surely be an admirable thing, though he did not propose taking up mediæval customs, for, of course, things had to be brought up to date; but the methods of the Comacine masters were worthy of notice and study.

Mr. E. Greenop, in supporting the vote of thanks, said Mr. Gibson had given them a notion of an ideal architectural practice from the point of view of comfort. From that point of view he would go further than Mr. Gibson, for he thought that an ideal architectural practice would be something like this: a series of commissions (half a dozen in a lifetime, say), an unlimited amount of money; and a client who would not interfere. During the progress of the work the architect to have an opportunity of altering it as much as he liked, and, when completed, of pulling it all down if he were not satisfied with it, and re-erecting it. Even then something more would be necessary, *i.e.*, to be indifferent to the criticisms of his brother architects. That was an ideal from the comfortable point of view. If he were asked to present a beginner with an ideal commission from his (the speaker's) point of view, he should do so more or less in this way: he would give him a site in the heart of the City of London, with party walls on three sides involving there separate disputes, and, of course, involving underpinning; he would then let him find that he had no bottom at 15 ft., though his foundations were shown on the drawings at, say, 15 in.; he should, of course, have a few really substantial light and air claims, and find that he had made a deadly enemy of the District Surveyor; he should get his building up, say, half way, and then be threatened by the London County Council with an order to pull it all down as being beyond the building line; and, finally, if ever the building were completed, have the client refusing to recognise the large bill of extras he would undoubtedly have, and also his bill of fees. A man having had those difficulties would have learnt something. They all went into real life with an ideal before them. He did, and he remembered it was a cold day in January, with three inches of snow on the ground. His master took him down with him to the railway sidings in the east end of London, and kept him the whole day measuring. His experience from the start had been of the real variety. The suggestion that assistants should actually sit in the room with the principal, and hear the conversation with

the clients, was an admirable one from the pupil's point of view, and it was done in several offices he knew of; but he could imagine several architects' offices where the principals were glad if, when the client called, the pupils happened to be out at lunch. He made it a practice, when he was a pupil and also an assistant, whenever he was sent to do anything, always to think it out on the assumption that the whole of the responsibility was his, and he spared no pains to form an idea of what he should do if he were acting for himself; and when, eventually, he stepped into his own office he felt more or less at ease in dealing with problems that had to be dealt with. Mr. Gibson was rather hard on the Government officials. A retired General once advised him, if he had ambition, to serve the public and not the Government, and, as that gentleman was in receipt of 2,000l. per annum for doing nothing he thought he ought to know. Before a Government architect was condemned, however, the pigeon-holes should be searched for proposals that had been put on one side by the authorities. He did not agree with Mr. Gibson's enology of the quantity surveyor, or the extent to which he was used. The quantity surveyor was the architect's undertaker; he came in and decently buried the architect's mistakes—that was why he was so useful. As to finished drawings, he always looked with suspicion upon them, especially if they were drawn in fine lines. He liked to see a drawing written all over—preferably with ink and an ordinary pen; that showed that business was meant. As to Mr. Gibson's eloquent peroration, he (the speaker) thought that the ideal and the real were the same thing. The real was full of difficulties, and the ideal should be also. He had never yet met a man who, at any point, had reached his ideal; when he did, he should feel inclined to say that the ideal that that man had cherished was not worth cherishing.

Mr. C. H. Brodie said it seemed to him that the prevalence of the idea that pupils and assistants ought not to know much about the business affairs of the architect and the client was responsible for a good deal that happened in the profession. He could not see at all why pupils should not be present at business interviews in the office and on the job—not always, of course, but generally; and if architects gave up the attitude of suspicion and reticence, which too often characterised them, it would be better for the profession as a whole. Again, why should an architect, in taking a pupil, put a clause in the articles to the effect that the pupil shall not practice within so many miles of the principal's office when he had served his articles? Why should the pupil not? It was a gross interference with the liberty of the subject, and it indicated a belief that the pupil would one day do the principal some "dirty trick." He knew some architects who would only take an assistant for a definite period, and who insisted on an agreement that, if the assistant started practice within a certain number of years, that it should not be within a certain distance of the principal's office. That was unjust and improper suspicion. All architects ought to be anxious that pupils and assistants from their offices should go out into the world and do great things, and be proud of their pupils if they did. That was the attitude of the best architects in past days. He agreed with Mr. Greenop about the quantity surveyor. The quantity surveyor was so useful because he got over the architect's difficulties so nicely, and knew how things should be done. Too often the young architect who got into difficulties did not know these things, for they were not made part of his training; but the quantity surveyor did know, and for that reason he had attained to his present high position. The man who started in practice without having been for some years chief assistant in an architect's office, and without having passed a considerable amount of time on the works, ran a great risk, and such men often brought the profession into disrepute. In reference to Mr. Gibson's remarks about the railway bridges all over the country which might have been beautiful, Mr. Gibson oddly enough spoke of that while referring to the real and not the ideal. Now, was it possible, in this railway age, to have the man who constructed, say, 270 miles of railway possessed of the knowledge or the time to consider the local materials which the railway would run through? It could not be expected. One was compelled to ask why it was that public authorities placed more reliance upon engineers than they

did upon architects. In his opinion, it was again because the engineer was the man who knew; the engineer knew the capabilities of the materials he was using—its strength and the best uses to which it could be put; and he felt strongly that young architects ought to try to get the same knowledge, and if they did they would stand a chance of being relied on in the same way. The young architect should be able to dissect a building as the doctor knew how to dissect a body; and then he would be able to deal with difficulties unaided. Then practice would become very real, and the amalgamation of the real and the ideal would be an accomplished fact.

The Chairman, in putting the vote of thanks, said that the difficulty of how to get work, and when got, how to carry it on, was a very real one; but it seemed to him that the thought of it was too prevalent with the pupil and the young assistant. He thought they should devote themselves more to learning how to carry out work, and less to how they could get it. If they had the capacity to do work, the work would somehow come. He thought that six or seven years in an architect's office was too short a time for the average assistant. For ordinary young architects, with only ordinary capacities and facilities, ten years was about the length of time they should be in an architect's office before commencing practice on their own account. Of course there were exceptions, and a man of University education who had learnt how to learn, and to learn quickly, might be able to learn as much in three years as the average man could learn in six. He agreed with Mr. Brodie that it was very desirable for the man about to commence practice to have been managing assistant in an architect's office. There were cases of so-called architects, particularly in the country—men who were really surveyors and land agents and engineers—taking architectural work, which they were really not fitted to carry out; but they generally employed capable young architects who practically did all the architectural work for them. What the so-called architect did was to receive the instructions of the client and have the work carried out by the assistant, and that, of course, was often a stepping stone for the young architect. As to the study of the masterpieces of architecture both in England and abroad, he thought that should be accompanied by a study of the masterpieces in sculpture and painting, more particularly decorative painting in buildings. One always hoped to have the opportunity of erecting public buildings, and to have sculpture and painting to embellish these buildings. As to pupils and assistants having facilities for learning how to conduct a practice, that depended a great deal on the office and the architect. He knew of many cases where the principal made a practice of discussing almost everything with the assistants, though that was in small offices as a rule. He thought it was more important that the assistants should be present at interviews than the pupils, for it was not likely that a pupil would often start practice immediately after his pupillage. He did not think Mr. Brodie's experience about the clause in agreements as to pupils not practising within a certain distance of the principal's office was usual, and he quite agreed that such a clause should not be inserted. As to the "bedside manner," or persuasiveness, a great deal could often be got to agree with the architect by the exercise of a little tact. As to quantity surveyors, he disagreed with the statement that architects did not write their own specifications. That was quite contrary to his experience, and he could not understand how an architect could leave such an important matter to the quantity surveyor. It depended on the builder whether the quantity surveyor got one out of difficulties, and he had known builders give way more to the architect than they would to the quantity surveyor. Many builders regarded quantity surveyors as their born enemies. It was, as Mr. Gibson said, largely by details that one's work was appreciated or otherwise by one's fellow-architects. Of course, one first considered proportion, mass, and grouping, but works were largely judged by detail. As to bridges and engineers, the engineers' profession was one of science entirely, whereas the architect's was a combination of science and art, and the difficulty of combining the two was very often very great; but it was a matter of regret that, even in the design of the small bridges Mr. Brodie

had referred to, architects were not employed jointly with the engineer. In so many cases all that was necessary was a simple arch of stone or brick; the whole question was having a design of good proportion and shape—also good detail, if any, though there need hardly be any in such simple structures. It spoilt a road in many cases to have two piers, one on each side, and a lattice girder, or worse still, a plain solid deep girder, stretched across the road. As to what Mr. Collard said about the Cornacine masters, he did not see why it should be assumed that they were all simple craftsmen; no doubt some were architects. Mr. Reginald Blomfield read in that room some time ago a paper in which he pointed out that when one spoke of craftsmen, one should remember that the architect was the chief craftsman of all; he had to learn the craft of designing buildings and there was no reason why an architect should be considered as apart and distinct from the craftsman.

The vote of thanks having been heartily agreed to,

Mr. Gibson, in reply, said as to the length of time a man should serve as pupil and assistant, he was practically of the same opinion as the Chairman. He (the speaker) put it at three years as a pupil and five or six as an assistant. He thought it would be best for the profession if men started in practice at, say, the age of 27 to 30, and if many small practices were the rule in this country instead of a few large ones. If that were so, he thought we should produce better architects, better architecture, and a much more healthy and independent profession. He was entirely against one man with thirty to fifty assistants, no matter what the practice, or how clever the man. He was entirely in favour of small offices and sufficient practice to enable a man to live comfortably. As to the ideal practice, that would always be someone else's practice—not one's own, which was continually marred by the difficulty of carrying it on; but in spite of difficulties there was sufficient charm in it to make it enjoyable and worth while doing one's best to attain some ideal perfection in it if possible. As to the advisability of architects developing the "bedside" manner, that had also another aspect. All doctors did not develop that charming bedside manner which tended to the enlargement of their practice, and the cultivation of that manner could be carried to excess. He had never, in the course of his experience, come across articles that would prohibit pupils or assistants practising within a certain specified radius of the employers' office, and he would advise any man to refuse to sign any such clause, under all circumstances. The thing was positively iniquitous. The world was big enough to hold all and big enough to hold one's pupils and assistants next door to one, and any attempt to prohibit them doing so presupposed the idea that one's assistants would do something to undermine their late employer's practice, or perform some ungentlemanly action, which was the last thing they ought even to suppose them capable of doing. Regarding the remarks that the ideal state was one in which the architect would have unlimited money, &c., and the power to knock his building down and begin again if he did not feel satisfied with the result, that reminded him of an actual experience of his some twenty-five years ago. He visited an outlying cemetery in Scotland, where a wealthy portrait painter was erecting a cemetery-chapel in memory of his wife. The painter was a man of considerable note, and he was very enthusiastic and earnest about the work he was doing, and he started it without any drawings or plans whatever. He employed the local mason and carpenter (as a matter of fact the only wood in the building was in the roof; the rest was of local red stone, with walls from 3 ft. to 8 ft. thick, with galleries and passages in between and some beautiful arcades. The work was in progress for perhaps ten years). He (the speaker) was invited to become a sculptor, but he declined, and then he was told that the local workmen were given flowers or leaves and told to make copies of them for the decoration, the result being very Byzantine; the men did what they thought best. This painter-architect pulled the place down over and over again; he thought nothing, after the walls had gone up 14 ft. or 15 ft., of pulling them down to within 2 ft. or 3 ft. of the ground and starting over again. If any of them were

ever in Forfarshire, they ought to visit the place, for it was very interesting, and probably some 100,000, was spent upon it. It was a building done irrespective of cost or architectural style, and was largely the product of a man who trained up a small body of men to do the best that was in them. Judged by architectural standards, he did not think it could be called a success, but there was an amount of vitality in it which was well worth seeing. Quantity surveyors were men whose ability architects were occasionally very glad to take advantage of. But he did not think it was quite the proper thing to say that the quantity surveyor played the part of undertaker and decently buried all the architects' mistakes. There were times and things which were unforeseen to all (which no ordinary care or experience could foresee) and it was then that the quantity surveyor came along, and by the exercise of common sense made not only the client but the architect see that what the builder desired was only reasonable and just. He (the speaker) had often discovered that some builders were more willing to place themselves in the hands of an architect in whom they had confidence than in the hands of a quantity surveyor—not because they had less confidence in the quantity surveyor, but probably for other reasons. Even building work was not reduced to such an exact science that one could appreciate to the almost penny every bit of work executed, and how that should be paid for; and it was a pleasing and right thing for the builders to have confidence in the architect.

The Chairman announced that the next meeting would be held on December 19, when Mr. W. Bidlake will read a paper on "The Study and Delineation of Old Buildings."

The meeting then terminated.

MAGAZINES AND REVIEWS.

In the *Art Journal* Mr. E. Dillon continues his article on "Turner's Last Swiss Drawings," with three sets of twin illustrations showing how strangely Turner varied in the painting of what are nominally the same scenes. A short article by Mr. Fred. Miller, "A Note on Some Lady Photographers," contains among other things some sensible remarks in regard to the modern effort to rank photography as an art in the same sense that painting is an art, and on some of the methods employed with this (as we think) futile object. Admitting that "a highly pictorial effect can be given to a photograph in quite legitimate ways," the writer adds—

"But there is always danger ahead, for the least exaggeration or false note is fatal. It is very tempting to a well-equipped photographer to endeavour to trench upon the painter's ground, but a photograph has to be a print from a negative when all is said and done; there is no escaping it. Too many show photographs seem to wish to hide themselves beneath a sham pictorialness, to pretend to be a smudgily-executed chalk or sepia drawing, but it seems to me that all the 'fakes' ever devised only accentuate the very thing their authors wish to leave behind. A photograph is a rendering in black and white, and where you have to get 'colour' by the opposition of light with dark the absence of brilliancy is a fatal defect."

Those who have studied so-called artistic photographs in exhibitions will know how much to the point is this criticism. As is remarked further on, an artist can select what he pleases out of the matter for him; the camera cannot select; all that can be done is to arrange the material before the exposure is made. If this were borne in mind, we should not hear so much about the achievements of artistic photography, or see such struggles made to realise what is supposed to be artistic quality. "Chip-carving," dealt with and illustrated by Mr. M. E. Reeks, is not a very interesting or valuable form of artistic work, though it has the merit of providing an easy amusement for the amateur carver. Mrs. Bruce Clarke's article on "Modern Amateurs in Lace" is more interesting, and the illustrations show some very good examples, especially Miss Ensor's and Miss Robinson's "needle-point," very different in method but both showing the true lace character. We do not share the writer's admiration for the "tape-lace," of which an example is given at the end of the article; it has more the character of embroidery than lace. An article on the modern Italian painter, Morelli, is contributed by Professor Melani, who writes with patriotic

enthusiasm; but there is a suspicion of theatrical character in the works illustrated; and then, with modern Italian painting one never knows what sort of colour one will find when one comes from engravings to the originals. An etching of Mr. Abbey's fine and poetical picture, "O Mistress Mine," forms the frontispiece to the number. One need feel no doubt about the colour there, at all events.

In the *Magazine of Art*, Mr. Val Prinsep concludes his charming imaginary conversation between ancient and modern artists met in the other world. We are only sorry it is concluded; it is admirably carried out and full of good suggestions. At the vanishing of the vision the writer gives his own conclusion as to the lesson to be derived from the conversation—to combine with the modern realism the old beautiful handling. This is partly founded on the remarks of Titian and Reynolds in regard to Millais's "North-West Passage." "The execution," says Reynolds, "is very remarkable, almost marvellous, in the man's head and other passages. The whole seems to me to want bringing together. . . . The effect seems to be achieved in a somewhat barbaric way, and seems rather the result of hazard than of that artistic forethought which ought to be the result of a great artist's acquirement." The whole of the remarks attributed to Titian and Reynolds on the picture form a very good bit of criticism. Mr. Val Prinsep should give us some more imaginary conversations. The work of Mr. T. R. Spence, as "designer, decorator, and architect," forms the subject of a review by Mr. F. Hamilton Jackson, and Sir Ernest A. Waterlow contributes an article on the highly interesting question "How to choose a subject for a landscape picture"; the first question being, is it really a matter of choice or of happy accident; does the painter seek out his subject or does it come to him by a happy accident? It may be either; there is no rule. Sir Ernest has something to say in regard to the rule of painting everything from nature on the spot, which was first enforced by the pre-Raphaelites. A more thorough acquaintance with the details of nature may, he admits, be acquired by this process, but it is at the sacrifice of many of the higher qualities which go to make a landscape painting; which are impossible of attainment under this rule. "Day by day was the large canvas carried out into the open, the diligent artist being quite satisfied if by the end of the day he had completed a square inch or two of it. Everything else had to be sacrificed, which, though valuable enough in a separate study, were distinctly out of place and disturbing to the harmony of a large composition." He does not add, as he surely might have done, that the light and colour of the scene must be different under each differing condition of atmosphere. Ruskin's famous dictum to go to Nature "selecting nothing and rejecting nothing" (which, as the writer observes, Ruskin constantly contradicted in practice and in criticism), "is fraught with considerable danger to the enthusiastic beginner if taken too literally." It may perhaps be said that this is the way to begin but not the way to end; it is only a means to the end. Pictures, in the true sense of the word, will not thus be made. An article on "Pictorial Postcards" gives a number of more or less charming examples, chiefly Continental. In the review of Mr. Kondy's book on Mr. Walter Crane we should have expected that something would have been said in deprecation of the extravagantly laudatory tone of the book, which would make out Mr. Crane to be the central artistic genius of the day.

The *Berlin Architekturwelt* devotes a good many illustrations to exterior, interiors, and decorative details of a "Ministerial-Gebäude" at Rudolstadt, of which Herr A. Hartung, of Berlin, is the architect. This is a curious building, for the front and back do not seem to belong to each other, in the least; the front is a masonry elevation on somewhat classic lines, though very freely treated; the back elevation is a composition in plain brick interspersed with large blank spaces of white cement, with a very odd appearance. The whole is original in treatment, but no one at a glance would ever suppose that these two portions were a part of the same building. The interior seems to have been designed and finished with care, but with a good deal of the eccentricity of the "new art." The plan is a quadrangle with a 'central court, and corridors

run round the inner side. A competition design for a theatre for Freiburg in Breisgau, by Herr Walter Henschel, shown in a line perspective drawing, exhibits a certain rather crude originality; the treatment of the lofty stage block is powerful; the weak point is the manner in which the auditorium portion is connected with or rather backed up against it. A new house, No. 13 in the Ringbahn-strasse, by Herr Paul Pué, in spite of its very weak and ugly gable finish, is distinctly clever. Among the miscellaneous illustrations are two rather fine bas-reliefs for sepulchral monuments, by Herr Franz Metzner.

In the *Nineteenth Century* Mr. Sidney Low writes a long article going very fully into the subject of "The Tangle of London Locomotion"; it is a well-considered *résumé* of the whole bearings of the question of means of locomotion, routes for railways, and the most desirable methods of constructing them. In view of the dilatory manner in which improvements of this nature go on in London, he cites the example of Boston (U.S.A.), where the whole subject was put into the hands of a "Rapid Transit Commission," which went to work with a will, and in a few years reduced transit in Boston (so we are assured) to an excellent and well-ordered system. This committee consisted only of six professional men—lawyers, engineers, and valuation experts—who were well paid for their services, and were expected to give the whole or the greater part of their time to the work. This certainly seems a quicker way of getting a system carried out than by the slow preliminaries of a Parliamentary Committee of the usual English type. The suggestion that there should be a comprehensive scheme for the whole of London, under one general control, each portion to be carried out in relation to the whole, is the more common sense of the matter; it is absurd to allow single companies to carry out single lines quite irrespective of any general scheme. Mr. Low comments also on the strange want of wide streets in London, Portland-place being our only 100-ft. street in mid-London, and that more than a century old, while Paris in the meantime has carried out at least twelve miles of avenues and boulevards of 100 ft. wide and upwards. In the same issue is an article by Mrs. Kemp-Welch on the curious subject of "The Woman-headed Serpent in Art," of which she traces out the history, and the connexion between the Classic and the Medieval idea in regard to it.

Macmillan contains a most picturesquely written article by Mr. Percy Lubbock under the title "An Amateur in Rome"; the word "amateur" not being used to imply that the writer is a connoisseur in art or archaeology, but rather the reverse—that he is but an amateur, a "lover," of Rome, with no special archaeological knowledge; he confesses indeed that he went to Rome "with a fine idea of hating all good archaeologists and their researches," regarding them as "scraping and tickling people" who spoiled the poetry of the place. But he who went to scold seems to have remained to pray; he had never been told that the excavated Forum was beautiful: he had been told a great many times that it was "interesting," but this was a point of view that fell to a secondary place from the moment of his first view of the place in its present condition. The sight of the Forum in the sunshine and liquid twilight of a May evening constitutes "one of the keenest and simplest pleasures in Rome." The following quotation will give an idea of the spirit of an article which we have read with great pleasure and sympathy:—

"Not very long ago these columns stood waist-deep in green and tangled slopes, which carelessly buried what has now been laboriously uncovered. That was a curious graveyard of dead commerce, dead eloquence, and dead religion, with three pillars of a temple for its memorial stone. But this is better; you touch the past more intimately here; yet it flies before you, and suddenly turns to bricks and broken stones at your feet, like a mummy that crumbles to dust when its rest is pried into.

But it is not only bricks and stones when, upon a glowing evening in May, you turn the corner of the Senator's palace, and look down on it from the steps of the Capitol; or when you emerge from the dank chambers of Caligula's house, upon a dim and earthy platform of the Palatine, and find a shapeless broken bust glimmering greenly beside you in the twilight, and look down into the great open space of the Forum, where the blue shadows are gathering and floating in the hollows and creeping stealthily up the columns, at length smothering the delicate ornament at their tops; when the great flat wall of

the Capitol and its tower grows blanker and darker, till it is only an outline against the streaming gold and rose and green of the sunset, and the whole air, divinely grey, hangs breathless for a moment in the cool of approaching night. It is very real just then, as you touch with your hand the stones that had vanished and now are found again, the tokens of a nation not much better or worse than another, but transformed into something rare and strange by the note of inaccessibility, the passion for what is on the other side, that attracts and bewilders us; and it is only in a chance moment, by the familiar influences of the day and night that are always with us, that this unguided instinct finds its fulfilment."

In the *Cornhill Magazine* is a poem by Mrs. Woods, better in feeling than in literary execution, under the title "The Builders: a Nocturne in Westminster Abbey." It does not deal, except in a secondary sense, with the material builders of the Abbey, but with the thought of all the men who sleep there who have helped to build the Empire, and also touches on the vastly extended associations with the building in the present day compared with the time when it was founded. The poem is not really, therefore, directly related to architecture at all; but it embodies a fine thought in connexion with an ancient and now world-renowned building.

Under "The Field of Art" *Scribner's Magazine* considers the question of "A Proposed Department of Fine Art in Columbia University." The writer of the article, Mr. W. H. Low, seems to consider that to establish anything like an art training school in the University would be going beyond its proper sphere, but that much good might be done by an Art Department which would give what studios and training-schools do not give—a knowledge of the history and of the characteristics of the various schools of art, a scientific knowledge of materials (pigments, &c.), and a study of what may be called the philosophy of art. All this, he suggests, might come into the scope of University teaching; but not the formation of a studio or atelier. We should be inclined to say that the technical knowledge of materials was also an extra-University subject, though the history and philosophy of art should be quite within its scope.

In the *Century* the formidable title "The Making of the Universe" is prefixed to a short article by Mr. J. H. Fresco, Observer at the Harvard College Observatory, on the formation and changes of nebulae, their relation to planetary forms and movements, and the movements of "fixed stars" as far as observed. To those who have never paid any attention to the subject this outline of it may be of value, as coming from an authoritative source, but it contains nothing which may not in the present day be called familiar knowledge, or what ought to be familiar. An engraving by Mr. Timothy Cole from a Madonna by Morales (No. 5 of "Wood Engravings of Old Spanish Masters") is an example of clearly-worked, fine, delicate line engraving such as it is refreshing to come across in these days of mechanical reproductions. Such an engraving is a work of art in itself, independently of its representation of the original picture.

Harper contains no subjects this month connected with art or science, unless we may mention a chromolithograph frontispiece of an illustration by Mr. Abbey of "Goneril and Regan," in which however the chromolithograph process must have missed the expression of the faces, for there is nothing in them characteristic of the wicked sisters; it is a fine piece of colour as far as the costume is concerned.

The *Genealogical Magazine* contains articles on "The Symbolic Side of Heraldry" by Mr. Cecil Wade, who laments the want of any authoritative lexicon of acknowledged heraldic symbolism, and one on "The Heraldic Reformation," which proposed "reformation" appears to consist in going back to the pre-Tudor period for all authoritative armoury, and ignoring everything since that period. The writer of the article takes a wider view, and protests against this antiquarianism. The issue contains two examples of heraldic bookplates, designed by Miss Helard, which are in the true spirit of decorative bookplate design, though they rather lack beauty and finish in the details.

Knowledge contains an article by Mr. J. B. Dale on the "Comets of 1903," and one by Mr. Maunders (the Editor) on "The Southern Horn of the Crescent Moon," accompanied by a very fine photograph to a large scale. With this number *Knowledge* completes its quarter-

century of existence, and we wish it continued prosperity.

The *Gentleman's Magazine* and the *Revue Générale* contain nothing this month which it is within our province to comment on.

ROYAL ACADEMY STUDENTS' WORKS.

It cannot be said that this is a very good year for students' work at the Royal Academy; and for once the principal architectural prize design, generally of rather secondary interest, may be said to be the best thing of the year, unless we except the draped figure prize. The subject for the architectural travelling studentship, "A Picture Gallery for a Country Town," has been gained by Mr. J. B. Fulton, who may be said to be first and the rest nowhere: there is a mature character about his design, while all the rest are exceedingly youthful in treatment, and two of the competitors have made the mistake of erecting a lofty centre building towering above the side galleries, from which it would of course intercept the light. Whether Mr. Fulton's design suggests the idea of "a country town" may however be questioned; the size is that for a small town, the architectural treatment rather suggests a large one. Mr. Darke obtains the upper school prize for "a set of architectural designs," in this case a design for the entrance to a church, very well drawn and very refined in feeling; two other designs, Nos. 192 and 194, have also considerable merit, the former is a very good piece of drawing. It is noticeable, as a sign of the times, that all these designs for a church entrance are in Classic style. The prize for "the plan of a building" is this year given, rather illogically, for the plan of a formal garden, for which Mr. A. W. Blomfield obtains the prize; his plan, unlike another hung beside it, shows a sense of the importance of simplicity and of large spaces, and not breaking up the ground too much.

In sculpture the subject for the principal prize, a model of a design, was "Hagar and Ishmael," and a lady, Miss Buzzard, has obtained the first prize for a group which is expressive in action—Hagar as if gazing over the land in search of possible help; but we do not think the work equal to what we have sometimes seen for this prize.

In the competition for the cartoon of a draped figure, subject, "A Sybil," Mr. Walter E. Webster has obtained the silver medal and prize for a figure which is quite superior, in feeling and in its classic repose of line, to all the rest. The Creswick prize for landscape has tempted a good many competitors, but the subject given was a poor one, "A Tangled Hedge, Treated as a Foreground," probably the idea was to lead the competitors to a close study of foreground detail, but it is hardly a very inspiring subject. A lady Miss Catherine Oulless, takes the prize, and deservedly (the women students are evidently running the men hard in the race); her landscape is not only a good composition, but is free from that rawness and crudity of greens which is the besetting weakness of the student landscape-painter. No. 18, which shows a study of a hedge filling up the greater part of the canvas, with a glimpse of distant sea in the corner, has much merit and shows a great deal of careful study of detail.

The competition for the design for the decoration of a public building, which is, perhaps, the competition which interests us most, is disappointing this year. The subject was "Dawn." The design by Mr. W. E. G. Solomon, to which the prize has been awarded, is undoubtedly the best in colour and conception, but as a decorative picture it is by no means satisfactory; it has no repose and no concentration of motif or composition; the figures seemed scattered about at random, which should never be the case in a decorative picture. One or two of the other designs show a better idea of composition, but then they are weak in drawing and colour. There have been much better designs for this prize in former years than anything that is to be seen this year.

NEWINGTON WORKHOUSE.—Newington Workhouse has been enlarged, and on the 4th inst. the new buildings, consisting of relief offices, dispensary, married couples' quarters, a nurses' home, and a nursery, were formally opened. The buildings have been erected by Messrs. John Marsland & Son from the designs of Mr. G. D. Stevenson.

BRITISH ASSOCIATION OF WATERWORKS ENGINEERS.

The members of the British Association of Waterworks Engineers met for their seventh annual winter meeting at the rooms of the Geological Society, Burlington House, W., on Saturday, December 6. Mr. Griffiths, C.E. (Leicester), President, occupied the chair, and among those present were Messrs. G. R. H. Swindlehurst (Bolton), F. J. Bancroft (Hull), C. Gilbey (Bath), Professor H. Robinson (Westminster), C. Sainty (Windsor), W. Ingham (Torquay), Jones (Leyton), W. H. Humphreys (York), J. Shaw (Boston), T. Molyneux (Stockport), Jones (Pontypridd), Callin (Lichfield), Percy Griffith, Secretary, and others.

During the sitting the President announced that Mr. R. H. Swindlehurst, of Bolton, had been elected President of the Association for the coming year, and it was decided to hold the next summer meeting at Bolton.

Mr. Humphreys (York) then read the following paper on—

Coating of Cast-iron Pipes.

If an apology were required for introducing a subject of such apparently minor detail of waterworks engineering as the above, the author thinks it sufficient to call attention to a case which, in his own practice, required weeks of unremitting attention, much worry and expense, the wasting of large quantities of water when it could ill be spared, and the inconvenience caused by the repeated shutting off of an extensive district, thus proving the subject to be one of sufficient importance to require the very careful consideration of all interested in waterworks management.

The circumstances were as follows: Early last year an extension of mains was carried into a country district to supply a large military camp, a village, and numerous houses and farms *en route*. The extension comprised 1,250 yards of 9-in., over 6,000 yards of 6-in., and 1,300 yards of 3-in. cast-iron pipes, coated according to the usual specification. All the pipes were laid at a depth of 3 ft., the 9-in. and 3-in. under macadamised roads, the 6-in. partly under macadam, partly under a cinder footpath, but for much the greater distance under the grass which fringed the roadside. The subsoil under the footpath and the grass, wherein the 6-in. were laid, was first of clay and marl, but afterwards, and for more than half the distance, of light sand with a slight admixture of marl. The specification referring to the coating required that "before the pipes became affected by rust they should be immersed in a bath of Dr. Angus Smith's bituminous composition, so as to produce, both within and without the pipes, a smooth and even covering of dry, hard, and irremovable black varnish."

The pipes were jointed with hemp-yarn and molten lead, valves and hydrants being fixed at about every 500 yards for flushing, and incidentally to afford a temporary supply to the camp by means of hose-pipes during the progress of the main-laying, as much as 4,000 yards of hose being in use at one time.

The first section of the main was brought into use on April 7, and from that date until July 15—a period of ninety-nine days—no complaint whatever was received as to the condition of the water. On the latter date, however, complaint was made that for three or four days previously the water had had a taste and smell of tar, which appeared somewhat strange when occurring so long after the pipe line had been completed. Some slight indication of such taste and smell might have been forthcoming, without creating surprise, at the commencement of the use of the main, but certainly not so long afterwards. The temperature for several days previously had been extremely high, and about one-half of the pipes being laid in the light soil referred to, and on the north side of the road, where the sun had full power, it appeared possible that these circumstances might, in some measure, account for the trouble then occurring. Moreover, only a limited quantity of water was then being used from the main, as the camp was practically empty, this causing the water to be more or less stationary in the pipes. Samples were immediately procured, and they fully justified the complaints, as, in addition to the smell and taste of tar, there was a large quantity of matter in suspension, which, on careful examination, proved to be red oxide—an unmistakable sign of corrosion having set up within the pipes. Steps were immediately taken to have the mains thoroughly flushed,

and samples of the water analysed for the purpose of reassuring the consumers. The professional analyst certified that the water was pure and free from contamination, but had a tarry taste and smell, due, no doubt, to the coating of the pipes, and which he thought would soon wear off, and that meanwhile there was nothing injurious in the samples. Analyses of many samples of water made in our own laboratory bore out this testimony. In the meantime the main was well flushed in the neighbourhood where the evil appeared the most pronounced, but for the first two days this scarcely had an appreciable effect; increased efforts, however, effected some improvement during the next three days, but failed to entirely remove it. Only the 6-in. and 3-in. pipes were affected, there being no complaint along the line of the 9-in. pipes, though all came from the same foundry and were delivered at the same time. The flushing was then somewhat relaxed, it being hoped the evil might disappear of its own accord; but such was not, however, the case, as two days later the taste and smell reappeared stronger than ever, rendering the water quite unusable for drinking and cooking purposes. It then became necessary to take stronger measures; and a 6-in. branch was fixed near the end of the main, so as to empty it into a stream, and three additional hydrants were also fixed. This branch was kept full open for twelve hours, so that a rush of fresh water from the works could pour through the main and effectually cleanse it. This, however, although tried again and again, failed to altogether remove the taste. The main was then shut off entirely, all the hydrants were opened, and every drop of water taken out of the main by means of hand pumps. A fresh supply, under the highest pressure, was then sent through the pipes, and this method proved to be the most effective, as during the next day samples were taken from every tap, and with two exceptions not the slightest trace of taste or smell could be found. These favourable conditions, unfortunately, lasted only for a very few days, as the taste reappeared, notwithstanding that the flushing was never entirely discontinued. Improvement followed the continuous flushing; but it appeared to be quite hopeless to expect to eradicate the evil by those means only, but that it would have to work out its own cure, which it eventually did, as, early in September, after fifty-eight days of endless trouble, the taste disappeared altogether. During all these operations the consumers were put to much inconvenience, yet they, with kindly consideration, appeared to be quite satisfied that the fault was not chargeable to the Company, and that every means were being adopted to remedy it.

Fortunately in this case the source of supply is practically unlimited, but it can easily be imagined how few authorities were, during the extreme drought of last summer (1901), in a position to spare the great quantities of water necessary for the purpose of remedying the results arising from a fault, which can only have occurred through great carelessness, in coating the pipes. The questions naturally arising are:—

What was the origin of the evil? Was all done that could reasonably be done to effect a remedy? How can a recurrence be avoided?

The evil appeared to arise from imperfect coating due to the fact that the pipes must have been badly corroded before being coated; or the taste and smell of the water had possibly been accentuated, and its action upon the coating perhaps been accelerated, by the great heat prevailing at the time. Frequent tests were made with thermometers placed in the ground near the pipes and in the water running from the hydrants, but they scarcely justified the acceptance of the latter theory. The firm who had supplied the pipes were unable to offer any explanation of the cause, especially in face of the fact that the pipes had been in use some considerable time. Their process of coating is thus explained in their own words: "We use the best ingredients to be had in the shape of coal tar and creosote oil. The usual proportion is about 3 parts tar to 1 of oil, but that is not absolute. It has to be varied according to circumstances. The pipes were immersed in the solution at boiling point, and retained in the boiling liquid for twenty to thirty minutes, thereafter being gradually withdrawn in order that the solution would thin off and drain back and harden on the pipes. We are coating thousands of tons of pipes, and sending large

lots to various towns in the North, and we have never had a complaint—not one—from any of these quarters that we remember of, of the character we have received this morning." They maintained that the pipes were quite clean when coated; they would not, in fact, admit any fault, and they declined to give a guarantee against any such fault occurring in future consignments. Inquiries addressed to other firms who had tendered for the pipes elicited the following reply from probably the largest pipe-founders in the country:—

"We beg to say that the process we employ is that which has always gone under the head of Dr. Angus Smith's composition, and we never deviate from the specification. The pipes are heated to 300 deg. in a stove, and then plunged into the composition, which is kept at boiling point. We certainly should not give a guarantee that under no circumstances would water affect the coating, because we conceive it possible that there are waters whose qualities would affect this or any coating, but we are quite sure that in, say, 999 cases out of 1,000 the water could not be affected. We have not recently received any complaints on this question, and the writer, who has been with this firm for more than thirty-five years, only remembers in the whole of his experience two cases, in both of which it was maintained that the defect was caused through certain qualities in the water, and wore off after the pipes had been flushed rather longer than it is usual to do."

One firm alone had received a similar complaint, although they had supplied many thousands of tons of pipes for waterworks purposes. They must obviously have exercised extreme care in their coating processes, although the replies disclosed differences in practice by the various firms.

The works of innumerable authorities have been searched, but beyond the baldest reference to the necessity of coating, the subject is only treated in any detail by Tudsberry and Brightmore, who give a few particulars, and by Burton, who goes into greater detail, and says: "Every pipe as soon as possible after it has left the mould—if possible, before it is cold—should be dressed and cleaned of all sand, dust, &c., and then treated with Dr. Angus Smith's composition. This is a varnish of coal tar, pitch, and oil. The varnish should be heated in a tank large enough to take the largest pipe to a temperature of 400 deg. Fahr. It is sometimes specified that the pipes be dipped cold, and be left in the bath till they reach the same temperature as the iron varnish. It is, however, probably best to specify that they be heated also to about 400 deg. Fahr., and be dipped for five minutes. They are then removed and stood on end to drain. The surface of the coating should be quite black and retain a bright gloss. The coating should adhere so firmly to the surface of the pipe that it shall be impossible to remove it by mechanical means without removing some of the iron with it. The reason why it is made a condition that the pipes be coated as soon as possible after they are cast is that if they were not there is a chance that they may rust, and the composition will not adhere over rust. This is a matter of great importance, for on the efficiency of the coating depends greatly, in some cases almost entirely, the life of the pipe. With really efficient coating the life of a pipe may be indefinite. With imperfect coating a pipe will, in some soils, be completely eaten through in a few years."

The few remarks in Tudsberry and Brightmore's work are pertinent, for they say that "if applied to clean metal the composition possesses remarkably adhesive and durable properties—preserving the iron from corrosion for many years. But if, as too frequently happens, the castings are exposed to the atmosphere before being coated, and so become oxidised, the whole process is useless and might as well be dispensed with. Coating pipes with gas tar or other similar substances is a futile operation."† The process as described by them requires the pipes to be heated to 600 deg. Fahr., and then dipped in the solution of pitch, asphalt, resin, and linseed oil while the latter is at a temperature of 500 deg. Fahr.

From a careful consideration of all the circumstances, little doubt remains but that when the pipes were coated they had become

* "The Water Supply of Towns, &c." By W. K. Burton. Page 238.

† "Waterworks Engineering," By J. H. Tudsberry and A. W. Brightmore. Page 343.

badly corroded; and to this cause may be ascribed most of the trouble experienced. Moreover, the defect of the coating is serious, because it will tend to materially reduce the life of the pipes.

As to whether the best means were taken to remedy the evil, is a question which must be judged in accordance with the circumstances and results together. The flushing appeared to have very trifling effect; it somewhat removed the taste from the water; apparently, the real cure was only effected by getting rid of the objectionable coating, and by a lower temperature; but when it requires so long a period as fifty-eight days, as in this case, it is a matter of serious importance.

The author has only heard of two other cases, in one of which a long length of large-sized trunk main had to be relaid; but now that the subject is before the Association, many similar cases may be brought to light, in which event it seems desirable that steps should be taken by waterworks engineers to render such conditions well-nigh impossible. Engineers are very much in the hands of the founders, it being frequently impossible, owing to the distance and time required, to attend at the foundry to inspect the whole process. In America the supervision is to a great extent done by "inspection companies," whose inspectors attend at the foundries on behalf of the water authorities to guarantee that the processes of casting and coating are properly carried out. Were there such firms or companies here whose integrity could be relied upon, and whose fees were reasonable, there might be a good field for their work.

Dr. Smith's composition appears to have secured almost universal adoption, being also in use on the Continent and in America. . . . There appears to be an indefiniteness about the exact composition of the material, and the manner of applying it necessary to properly and effectively coat pipes, and the author suggests that the best reliable data should be obtained by the Association, and a standard adopted and recommended for use by pipe-foundries in order to obtain uniformity of practice.

Since the foregoing was written (in October, 1901), additional experience on this subject has been gained, which may be briefly recapitulated without any unnecessary detail. From the termination of the 6-in. main referred to a further extension of 2,100 yards of the same sized pipe was laid, and 1,200 yards of 3-in. branching therefrom. The pipes were obtained from a different foundry to the former, and special attention was requested to be given to the coating. The delivery of pipes commenced in October, 1901, and continued until and inclusive of December; they were laid, as before, in a trench 3 ft. deep, the subsoil for the most part consisting of light sandy loam. The work was completed and the water dug out at Christmas, 1901. From then until June 1902, no complaint whatever was received as to the condition of the water. It then became apparent that our old enemy had returned, and the trouble having in this case occurred so long after the pipes had been laid seemed to suggest that the increased temperature of the water in the summer months had affected the coating, which had probably not become sufficiently hardened. The temperature of the water, which for some time before had not risen above 55 deg. Fahr., now exceeded that figure, and for many days varied between 56 deg. and 60 deg. A few samples of the coating were obtained, and were found not to have hardened. Makers do not appear to stock large quantities of these pipes, and as a result they have to be brought straight away from the foundries; are, perhaps, laid immediately, the coating not having sufficient time to become properly set. It would, of course, be interesting to know what time should be allowed for this purpose, but the method of coating varies so much with different makers that no doubt the actual period would be exceedingly difficult to estimate generally.

In this second experience the red oxide was not so prominent as in the former, although traces of it were found; there was also no evidence whatever that the coating was peeling.

The previous extension gave us no concern whatever, samples of water taken therefrom being quite tasteless and beautifully clear. For about six hours each day during the remainder of June, the whole of July, and part of August large quantities of water were

flushed through the hydrants, but although this modified the taste, it did not entirely remove it. From the middle of August to about September 12 intermittent flushing of about two hours per day sufficed; and finally, on September 19, the trouble disappeared, the temperature of the water being then about 55 deg. Fahr., thus proving the difficulty to depend to some extent upon the summer temperature. The interior of the pipes was examined in three places, and the coating found intact, but rather soft. It was therefore concluded that the coating, probably being of inferior quality, had not become sufficiently hardened, although—curiously enough—it took eight months before the quality of the water was affected. The pipes were delivered on the ground for the most part in October, and yet in June—eight months later—the coating was found to be so soft as to affect the taste of the water immediately the temperature slightly increased.

Shortly after the completion of the mains just referred to, another extension of nearly 2,300 yards of 6-in. main was laid from the 9-in. main before mentioned. The pipes were obtained from a large foundry in the Midlands, and were newly cast, the coating, of course, being also new. They were laid along a country road running parallel to the road wherein the 6-in. pipes mentioned in the first part of this paper were laid. The subsoil was similar, the depth of trench, caulking, and all other conditions were also identical in both cases. These pipes were brought into use in May, and yet we have not, from first to last, received a single complaint of any moment as to the condition of the water; although, as will be noticed, the period covered in this case was practically the same as that in which so much trouble was experienced in the other case. This obviously indicated that inferior coating had been applied by the pipe-foundries in both the previous cases.

In the first part of this paper some authorities on the subject of coating were referred to, which may usefully be supplemented by others which have since come under the author's notice. Humber, as in most other things, goes thoroughly into this subject, and his opinion, although expressed many years ago, stands good to-day. He mentions some experiments that were made in France in 1866 with a coating for preserving iron, consisting of a mixture of sulphur, resin, tar, gutta-percha, minium, blanche de céruse, and turpentine. Iron plates coated with this solution had remained in sea water for twelve months without any sign of corrosion. He mentions other coatings which had been tried without success. He also briefly describes the process of applying Angus Smith's solution. In the first process the pipes are removed direct from the sand, and heated in a stove to a temperature of between 300 deg. and 400 deg. Fahr., when they are immersed in a cauldron containing heated gas tar, Burgundy pitch, oil, and a certain proportion of resin. After remaining some time in the cauldron they are lifted almost vertically out of the liquid, and held above it until the surplus liquid has run off. The second process was to immerse the pipes into the cauldron cold, the composition being maintained at a temperature of 400 deg. Fahr., and the pipes remaining therein for about half an hour, when they were supposed to have reached the same temperature as the liquid. He (Humber) considered this to be more effective, because the pores of the iron became enlarged, and the coating therefore permeated the metal more effectively, and was retained when the iron cooled; whereas in the first process there was the difficulty of heating all parts of the pipes equally; and, further, as the composition came in contact with the highly heated pipes it was injured, and consequently dipped cold. Humber, however, very sagely remarks that much depends on the mode of dipping, the time the pipes are allowed to remain immersed, and the quality and proportions of the material of which the composition is made up, as well as the condition of the metal. Where this coating process appears to have failed was owing to the want of proper care in having the pipes cleared of rust, and in removing the volatile oils from the composition when the cauldron is first filled. The composition thickens and deteriorates after a certain number of pipes have been dipped, and its efficiency can only be kept up by frequent additions of fresh composition, and by occa-

sionally emptying the cauldron and refilling it with fresh ingredients.

Before closing this paper, it may prove interesting to give a short résumé of what our American brethren have done in the way of experiments and research in this subject. The most thorough investigation and experiments on record are those made by Mr. Thomas H. Wiggin, and placed before the Boston Society of Civil Engineers in 1899. On the question of the temperature of the pipes when dipped, Mr. Wiggin says that this is a vital factor in the character of the coating. If the pipe is too hot, the coating becomes brittle, and may even be reduced to an earthy carbonaceous residuum; while if, on the other hand, the pipe is too cool, a thicker coating is formed, which will not harden, and will run in warm weather. Thin pipes must be immersed at a higher temperature than thick ones, because the thin metal does not hold the heat so long, and the distillation is more rapid on first contact with the mixture. His experiments in endeavouring to ascertain the temperatures of the pipes before dipping are interesting, because an ordinary thermometer was of no use, nor was he able to find an electrical device for the purpose. Various chemicals which undergo a definite change at certain fixed temperatures were experimented with, and from those experiments he concluded that pipes, just before coating, were, as a rule, considerably over 300 deg. Fahr., but that the actual temperature of the pipes, when they were dipped, was usually left to the discretion and judgment of the man in charge. His investigations included the use of dead oil (obtained in the distillation of coal tar at high temperatures) and many experiments with different proportions of tar, pitch, linseed oil, and asphalt, all with varying degrees of success. Some of the special coatings used in the United States enabled Mr. Wiggin to make some interesting tests, one of which may be reproduced, as it may prove useful to members and others. The test was made in the test as "P and B" is composed of asphalt and candle-tar pitch, the latter obtained by the distillation of animal fats, and on cast-iron pipes it gives a coating very similar to asphalt coating, neither hard, brittle, glossy, nor very tenacious. Different varnishes are referred to, but he considered their usefulness to be very limited, unless as dips, which is impossible, owing to their rapid evaporation.

1. *Test for Brittleness.*—Most of the specimens were tested by hammering to see whether the coating was liable to fly off in handling the pipes.

2. *Test for Porosity.*—It is known that tubercles start at minute holes in coating. It was thought that if acid did not injure the coating material itself, it would give a test of the porosity of coatings by attacking the metal through the pores. Specimens of coated iron were put in glass jars containing a mixture of 1 part muriatic acid and 2 parts water. At the same time samples of the coating materials alone were put into other glass jars with acid of the same strength. Great activity was immediately apparent in the case of the coated iron, and a disagreeable gas, with a sweetish odour, was evolved. The coating materials alone, on the other hand, were apparently not acted upon. Their appearance, and the appearance of the acid in which they were submerged, remained the same to the end of the test, which was almost as long as the test of the coated iron. The coatings were all badly undermined, and all but a specimen of Sabin's japan peeled off in many places. The iron was dissolved to a depth of $\frac{1}{4}$ in. in places, especially at the corners.

The relative value of the various specimens is shown by the following table, the first being the least injured by the test:—

Acid Tests of Coatings for Porosity.		
Coating.	Time exposed. Days.	Remarks.
1. Sabin japan	55	Specimen said to have been rusty before being coated.
2. Crude tar	55	
3. Tar and linseed	55	No distinction possible.
4. Alcatraz asphalt, pitch, and linseed	60	
5. Mineral dip (Assyrian Asphalt Co.)	55	
6. P. and B. dip (Standard Paint Co.)	55	Totally destroyed.
7. Alcatraz asphalt	55	
8. All the varnishes	55	tried

Only one specimen of each coating was tested.

Mr. Gandy, of the Staveley Iron Co., who has had considerable experience in this subject, has kindly promised to supply the author with sample pipes variously coated for experimental purposes, the results of which, if thought sufficiently interesting, may be placed before the Association at another meeting; in the meantime Mr. Gandy has supplied to the author for purposes of testing three 4-in. cups 6 in. deep, one coated with the solution as ordinarily used by his Company, the other two coated with blacksmith's varnish applied hot in one case and cold in the other. Each was filled with water and left standing at a temperature of 58 deg. for forty hours. A distinctly perceptible taste and smell occurred in the cup treated with blacksmith's varnish cold, whilst no smell or taste could be detected in the others. These trials have since been repeated with temperatures varying from 58 deg. to 62 deg., but with the same result, in every case the coating remaining hard and brittle throughout.

In the discussion which followed, The President said he was of opinion that the evil complained of at York might be remedied if the proper details of Dr. Angus Smith's composition for the coating of pipes were adhered to. The work of filling the cauldron was left to labourers, who did not put in the proper quantities to give the right consistency to the coating. There was nothing dangerous to health in the water, but it was objectionable to consumers.

Mr. Bancroft, Hull, considered that the origin of the evil was clear. The pipes were probably stock pipes, and the coating had been put on after they had been tested in water, and the coating had not properly adhered to them. He had had a little experience of similar complaints, but they occurred directly after the pipes were laid and did not require three months to develop. If sections were cut out of the main they would probably show that the coating had been removed in patches.

Mr. Molyneux, Stockport, said he noticed in each case it was the 6-in. main that the taste came from, and it was laid in a very light subsoil. It would be interesting to know the temperature of the subsoil, as it struck him that had something to do with the removal of the coating from the pipes.

Mr. Lewis agreed with the President that the failure of the coating was due to the composition not being kept to the proper quality. There was an excess of one thing or another in it, and then the temperature of the ground softened it and allowed the friction to take it off.

Mr. Chapman, Jersey, said that he had had a similar experience with a 350 yards length of 3-in. main. After the main had been laid a short time they found the coating was peeling off and coming away in patches about the size of a penny. There were complaints of a disagreeable taste in the water; but by constant flushing the whole thing was got rid of.

Mr. Jones, Leyton, said the experience of Mr. Humphreys was very interesting, but was not unique. He had had several cases of water taking up some particles of the material with which the pipes were coated and causing an unpleasant taste. It was very disagreeable, no doubt, but it was not unhealthy. Whether it was desirable to continue the testing of pipes by hydraulic pressure was a very important question. He thought it ought to be abandoned, and no water put in pipes till after they had been dipped.

Mr. Catlin, Lichfield, said in the case of a 4-in. main laid last January the taste of the tar still remained in the water in that particular district, although his workmen had frequently flushed it out.

Mr. Dewhurst, Chelmsford, mentioned a case in which pipes kept in stock eighteen months gave no taste of tar, but new pipes direct from the foundry gave a taste to the water.

Mr. Ingham, Torquay, thought Dr. Angus Smith's specification was generally not carried out in the present day. The gas engineers had something to do with this in abstracting a lot of by-products which Dr. Smith intended to be left in the composition. He found with a soft water that a large amount of carbonic acid and free ammonia would affect the coating in certain temperatures.

Mr. Humphreys replied to the discussion, and read a letter from Mr. Gandy, manager of the Staveley Coal and Iron Co., who stated that he had had three tests made in the laboratory. In two cases the coating had been

affected, the distilled water being of a reddish-brown, with particles of red oxide in suspension; and in the remaining case the water was fairly pure, with only the slightest opaqueness and without any taste or smell. The coating was still bright and glossy.

Mr. T. Molyneux then read a paper descriptive of softening plant at Wilmslow, Stockport Waterworks.

The President said the Archbutt-Deeley process had been successfully introduced for softening water along the line of the Midland Railway. It had also been adopted at Swadlincote, and he believed it was giving very good results. He believed where only hard water was available, the supply might be considerably improved by so softening it as to make it better adapted for domestic and trade purposes.

Mr. Whittaker, London, expressed regret at the absence of Mr. Matthews, who had done such good work in this direction at Southampton. He did not think people in the South of England would trouble about softening water with only 13 deg. of hardness.

Mr. Bancroft, Hull, looked upon it as a perfect waste to doctor the water in this manner. It was well known that a hard water was better for health than a soft water.

Mr. Jones, Leyton, thought the chief recommendation of the Archbutt-Deeley process was the small space which it occupied.

Mr. Molyneux, in reply, said they had trades, like hatters and dyers, who required a soft water, and when the Corporation acquired the works a clause was put in the Act that they should effectually soften and clarify the water supplied by them.

A paper was then read by Mr. John Shaw on "The Detection and Prevention of Underground Pollution."

Mr. Whittaker, London, said the subject was a very big one, and the question was whether they were able at present to take proper precautionary measures without some further legislation or investigation into the matter. He did not see at present how, without some assistance, a proper protecting area could be got. Immediately a water company or a Local Authority was known to want an area to protect its area it was wonderful how the price went up. Until the land could be got at a reasonable rate, it was impossible to expect many authorities to do very much. He hoped something would be done to put authorities in the power to do something without fining them for doing it.

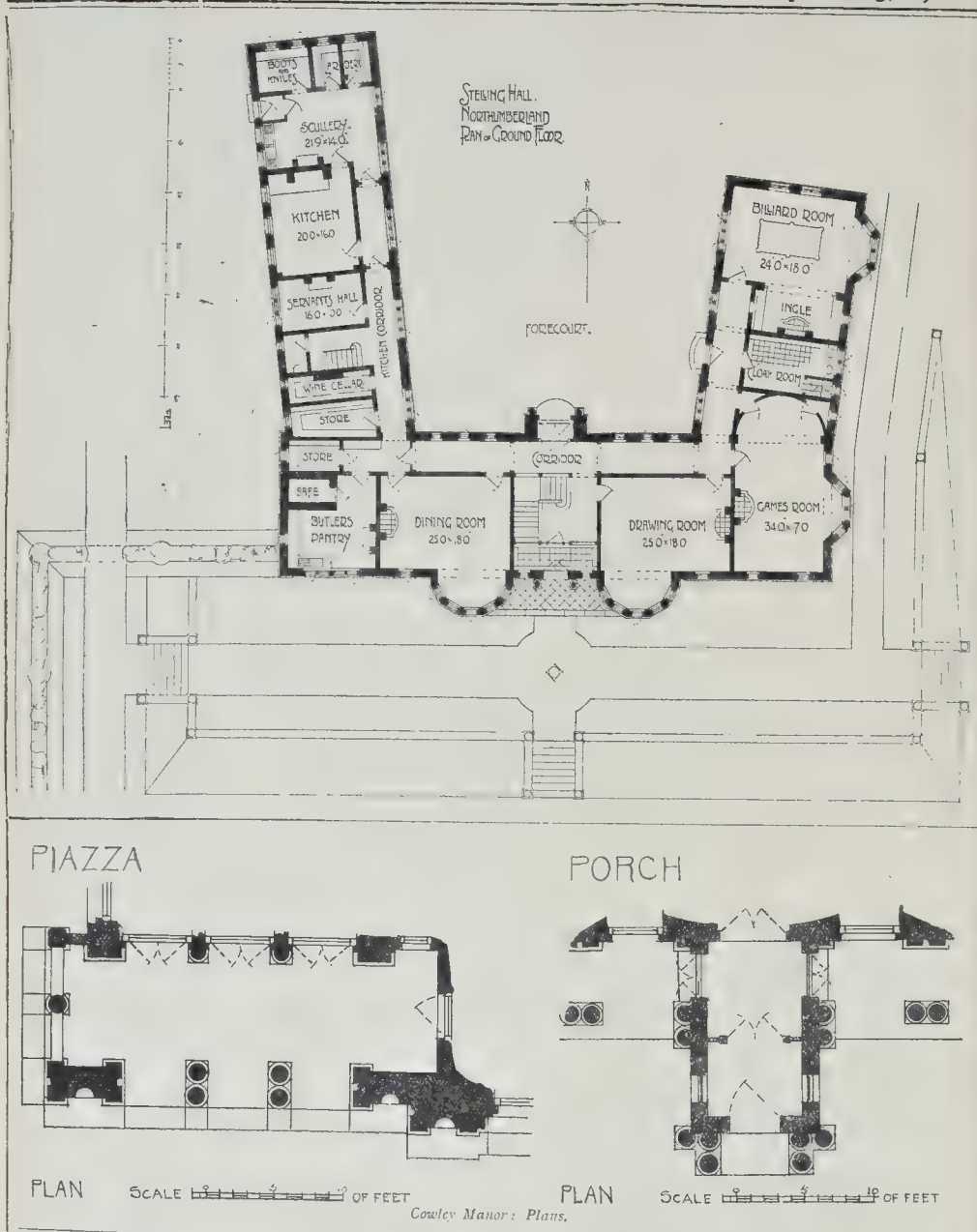
Mr. Ingham, Torquay, and Mr. Jones, Leyton, having made a few remarks, Mr. Shaw replied, and the proceedings terminated.

ARCHÆOLOGICAL SOCIETIES.

ROYAL ARCHÆOLOGICAL INSTITUTE.—At the general meeting on Wednesday, the 3rd inst., Sir Henry Horwath, President, in the chair, Mr. C. R. Peers read a paper on the Benedictine Nunnery of Little Marlow, Bucks. After a notice of what documentary evidence exists as to the foundation and history of the house, he suggested that the De Clare family seemed to have the best claim to be considered the founders, and that the probable date of foundation was the end of the twelfth or beginning of the thirteenth century. The remains of the buildings consisted of little more than the lowest course of the walls, and the site had been cleared of all fallen walling, so that very few details were available for the purpose of accurately dating the remains which exist. The actual site of the building had been unknown, and was accidentally discovered in the spring of 1902, in the course of making a road. Eventually the complete plan of the nunnery was excavated under Mr. Peers's superintendence. The buildings consist of an aisleless church with north transept and eastern chapel, and a western tower, a cloister on the south, having on its east side the chapter-house and warming-house, with dorter over, and the re-dorter south of the dorter; on the south side the passage to the infirmary, and the frater with the kitchen at its south-west angle, and on the west side the cellar and guest-hall. To the south of the frater is the infirmary, with a building on its south side which was partly a latrine and partly, it would seem, the quarters of the sister in charge of the infirmary. All buildings had been of simple character, with probably little decorative detail, and none had been vaulted. Local chalk served as ashlar throughout, and was in part replaced by thin

red roofing tiles in the quoins. The general date of the buildings seemed to be the beginning of the thirteenth century, the kitchen, infirmary, and west tower and transept of the church being subsequent additions. A good series of glazed paving tiles found on the site were exhibited. Mr. St. John Hope, Mr. Vaughan Williams, and the President took part in the discussion.—Mr. F. W. Reader and Mr. A. S. Kennard contributed a paper on "Pile Structures near London Wall." On the north of London Wall recent excavations have disclosed a portion of a bed of the ancient stream of the Wall brook, at a depth of about 20 ft. below the present level of the street. In this the remains of pile structures have been discovered. This portion of the stream is the continuation of that discovered by General Pitt-Rivers, then Colonel Lane-Fox, in 1866 on the south side of London Wall. General Pitt-Rivers then pointed out that the numerous piles which occurred there indicated that they had served as supports for dwellings, and that they were associated with Roman relics. He found no trace of the superstructures, and that all the piles had rotted off at about 2 ft. above the river bottom. The recent discoveries amply confirm the observations of this distinguished explorer, and the piles in this part being perfectly preserved, and in some cases their tops were morticed into horizontal beams overlying them. These piles measured 4 ft. to 6 ft. in length, 7 in. to 10 in. in width at the top, and were connected by planks so placed as to form walls of irregular compartments, which were filled up with earth and rubbish. In this way a foundation or platform was raised in the bed of the stream about 4 ft. high, upon which the dwellings were built. The planks were well made, many being upwards of 6 ft. in length, and averaging from 1 ft. to 2 ft. in width, and about 1½ in. thick. None of these planks were fastened to the piles with nails. Many pieces of morticed and shaped wood containing nails, as well as great quantities of loose nails, were in the soil overlying the platform, and show that the superstructures were of timber. No signs of plaster, and only a few fragments of tiles, were found. All the relics associated with the structures are of Romano-British period, and nothing was discovered which could be referred to an earlier age. Among the objects which were exhibited was a remarkable enamelled bronze fibula or brooch in the form of a fish, several implements of iron, the sole of a Roman shoe (caliga) studded with hobnails, a lead seal with the letters L.V., pins of bronze and bone, &c. There were large quantities of pottery, fragments of the recognised Romano-British wares, and Red Samian was plentiful, though mostly of the plainer descriptions. One of those bone implements, so commonly found in London, and which are supposed to have been used in making pins, was found at this level. Another specimen was exhibited which came from Moorfields, found at a depth of 20 ft., and in the sand underlying the deposit of the swamp, so that, although the majority of these implements appear to belong to Mediaeval times, their origin seems to be of earlier date. Attention was drawn to the large number of human skulls that have been found on this site. In the portion of the Wallbrook south of the wall a deposit of peat was formed in Roman times, but on the north the Roman layer was chiefly sand and river silt, over which the peat was formed at a period later than that on the south. It is concluded, therefore, that the stream was partially blocked up by the building of the wall, which cut off a portion of the water supply from the north and restrained the tide on the south, causing the exposure of the upper part of the pile structures within the wall, while to the north of the city the water accumulated and the piles were thus much better preserved. A careful examination of the organic remains of the deposits provided confirmatory evidence.

ARCHITECTURAL MUSEUM.—An extraordinary meeting of the members of the Royal Architectural Museum has been called for Friday next, the 19th inst., at four o'clock, Tuiton-street, Westminster, to affix the common seal of the Royal Architectural Museum to an agreement between the Museum and the Architectural Association, and to appoint a liquidator. After the special business, presentations will be made to Mr. J. P. Seddon and Mr. Maurice B. Adams in recognition of their services to the Royal Architectural Museum. Sir Wm. Emerson, President, will take the chair.



Illustrations.

ENTRANCE AND WROUGHT-IRON GATES, COLCHESTER TOWN HALL.

THIS illustration of one of the entrances to the new Town Hall at Colchester is given mainly with the object of showing the wrought-iron gates, which were executed by Messrs. Starkie Gardner & Co. from the design of the architect, Mr. J. Belcher.

The shield in the left-hand gate displays the arms of the town of Colchester; the raven on the other shield is the crest of the Portreeve of Colchester.

The carved figures over the doorway are by Mr. Fabbrucci and Mr. McCrossan.

STELLING HALL, NORTHUMBERLAND.

THIS house, which stands upon the site of the old hall which was pulled down some three years ago, is built of stone rubble with rough-cast dashed with Colchester gravel, and fine ashlar stone dressings. The roofs are covered with dark-red sand-faced Staffordshire tiles, and the external woodwork is painted white.

The windows are fitted with metal casements with Crown glass in lead glazing, manufactured by Messrs. Henry Hope & Sons, of Birmingham, who are also responsible for the heating and hot-water services.

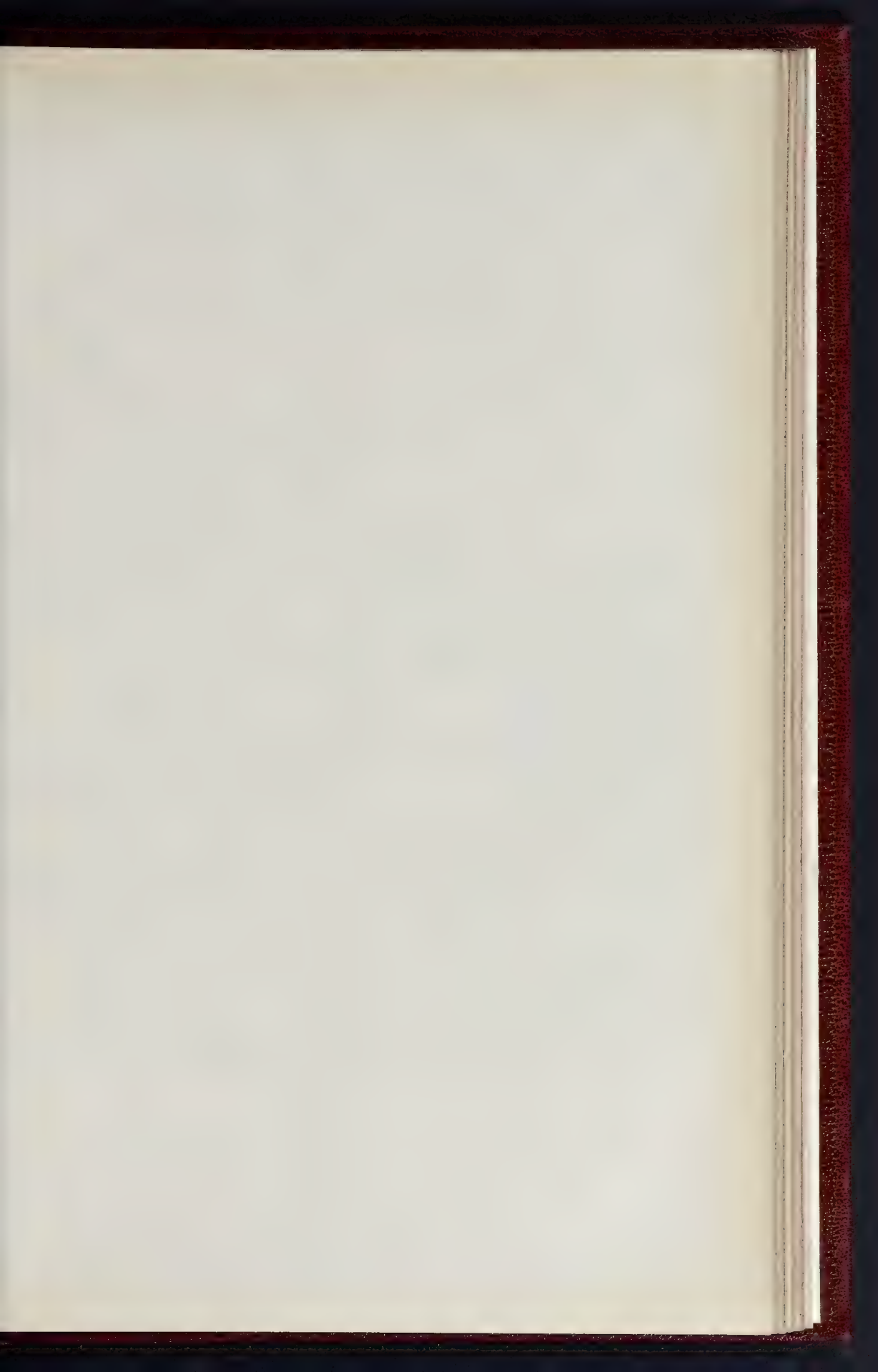
The staircase is of oak. The main rooms and corridors are fitted with panelling, dadoes, and mounted pieces of oak. The fireplace openings and hearths are laid with old Dutch tiles. The oakwork, which is of very fine

quality, was carried out by Messrs. Garvie & Sons, of Aberdeen.

The general contractors were Messrs. Cooper & Henderson, of Jarrow; the architects, Messrs. Armstrong & Wright, of Newcastle-on-Tyne.

COWLEY MANOR, GLOUCESTERSHIRE.

THESE illustrations show the new porch and piazza at the above, a very small portion of the extensive alterations which have been carried out lately and are now completed. The house, which is illustrated in an old plate of the *Building News*, April 15, 1858, appears to have been a Georgian one of three stories, square on plan, containing about fifteen rooms, and during 1856-8 was considerably added to from the designs of the late Mr. G. Somers Clarke.

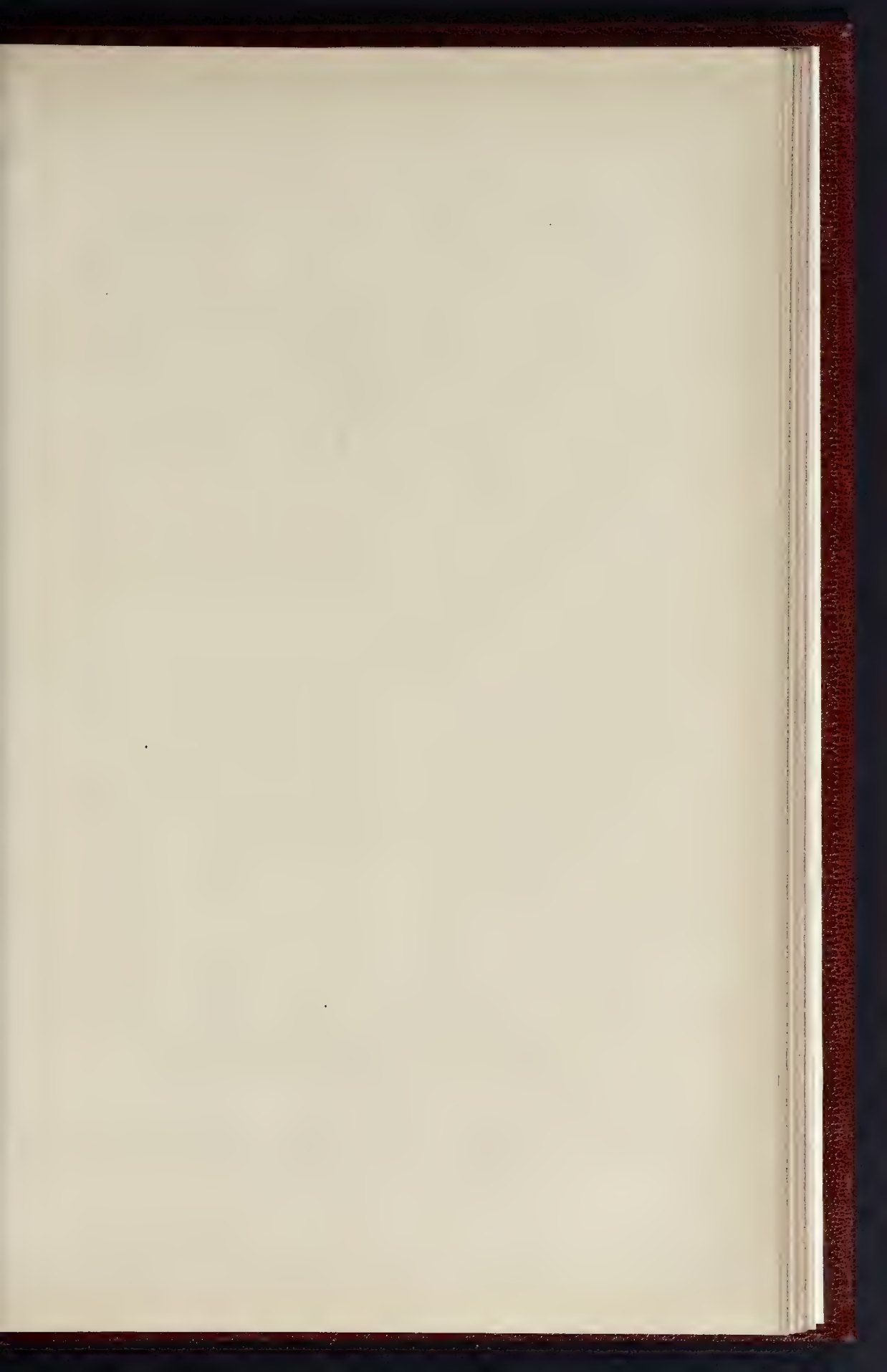




STELLING HALL, NORTHUMBERLAND



PHOTO LITHO SPRAGUE & CO. L^Y A & S EAST HARDING STREET KETTER LANE E C

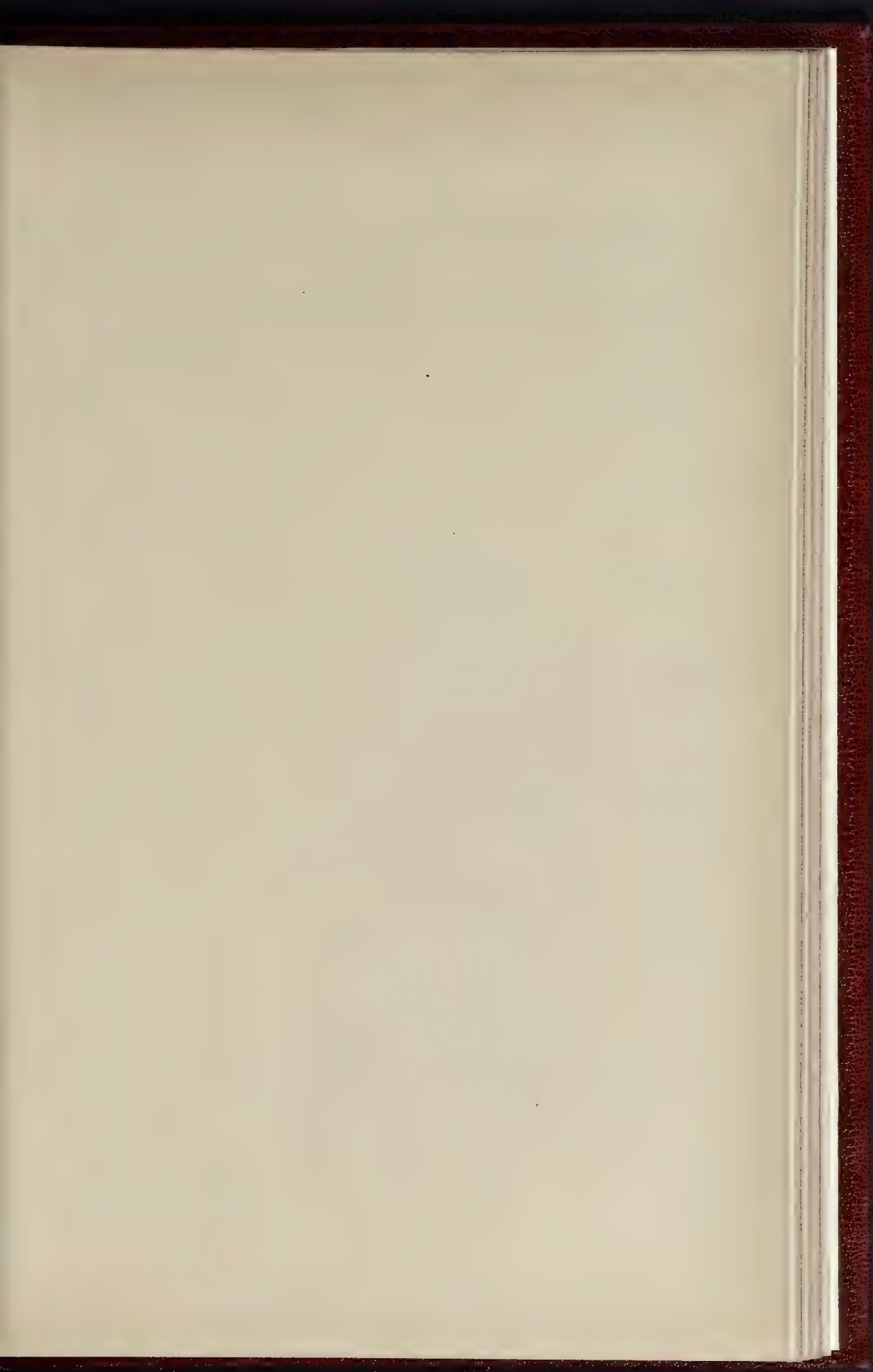


COWLEY MANSION CLOUCESTERSHIRE
THE PLAZZA R. J. P. FRIBA. ARCHT.



COWLEY MANOR CLOUCESTERSHIRE
THE PORCH RALPH BRIGGS FRIBA ARCHT





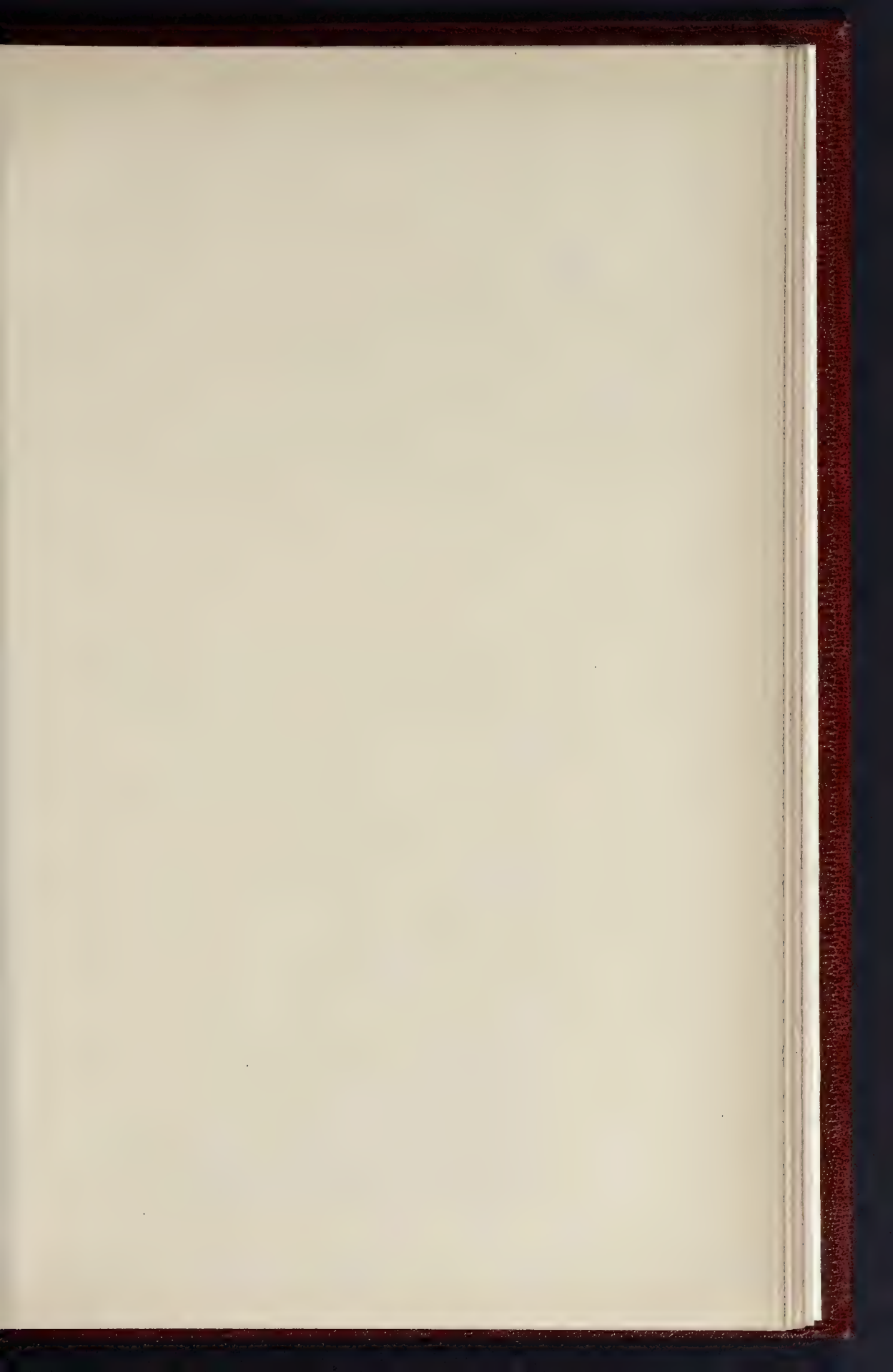


ENTRANCE AND WROUGHT-IRON GATES, COLCHESTER TOWN HALL.



Sprague & Co., Ltd., Printers, 4 & 5 East Harding St., E.C.

INTERIOR: STELLING HALL, NORTHUMBERLAND —MESSRS. ARMSTRONG & WRIGHT, ARCHITECTS.

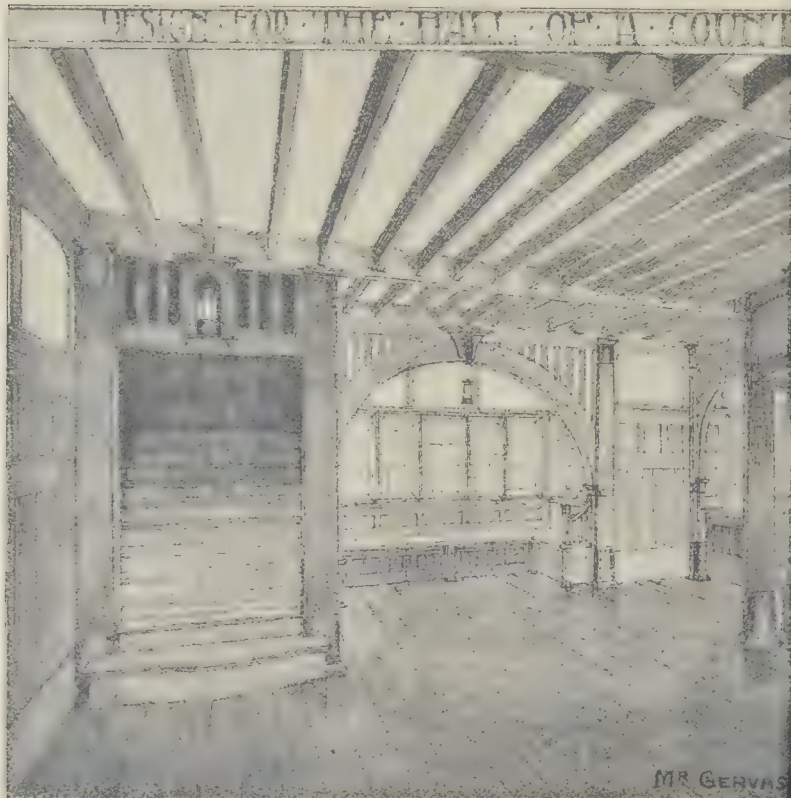


PORTION OF A PROPOSED STREET



John W. Rhodes

DESIGN FOR THE HALL OF A COURT



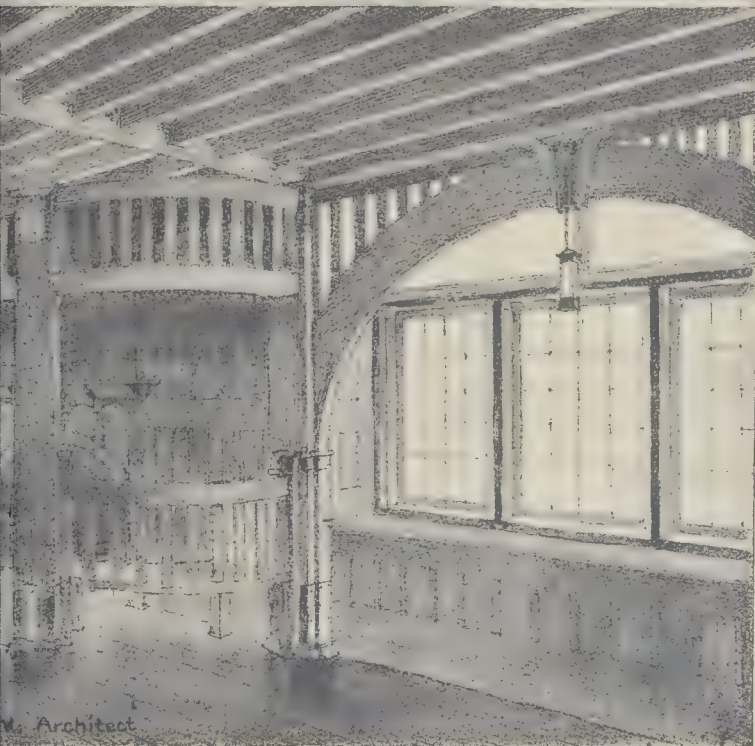
MR. GENVAS

IN DULWICH, LONDON.

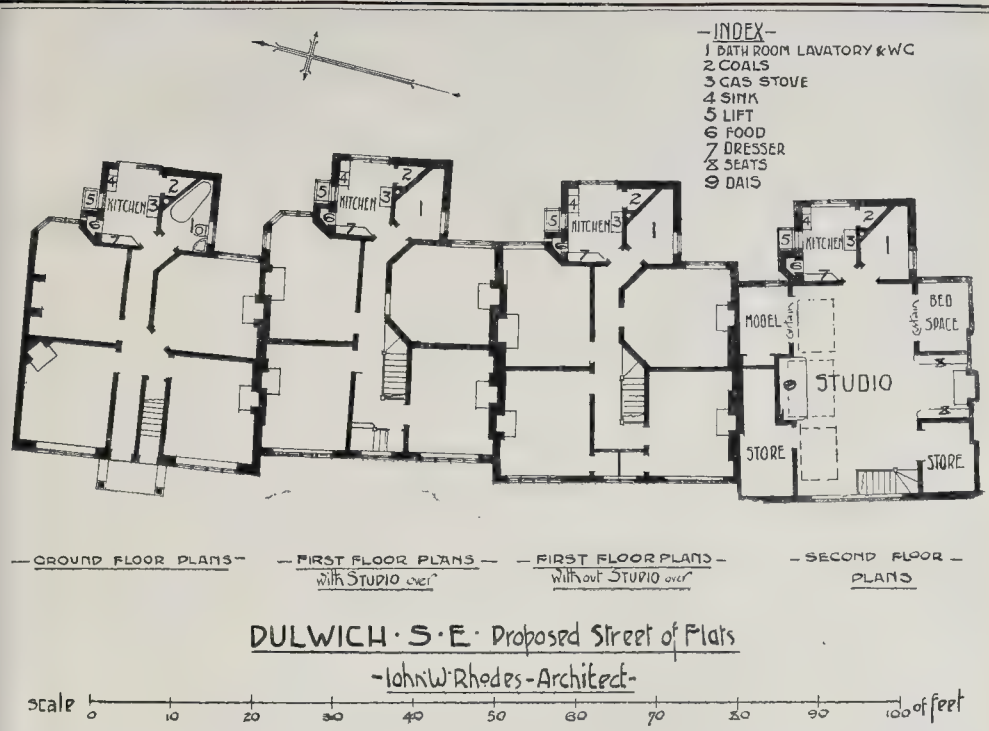


: London

HOUSE: IN STAINED DEAL AND LACQUERED COPPER



Architect



Two years ago further extensive additions were designed, and have since been carried out under the supervision of Mr. R. A. Briggs, comprising a new dining-room 42 ft. by 23 ft., a new billiard-room and a sitting-room, about eighteen new bedrooms, a conservatory and a ballroom, 65 ft. by 31 ft., also the remodelling of the kitchen offices, with considerable additions. The walls are faced with ashlar in Birdlip stone, with Hollington stone dressings. The dining-room billiard-room, and hall have been panelled in mahogany, with heavily carved shields and swags over the mantelpieces in limewood. A new staircase in mahogany has been added. The ceilings are heavily enriched in plaster, the enriched work in the dining-room being gilt. The ballroom walls inside are panelled and painted white, the panels above the dado being filled with silk.

Messrs. T. Parnell & Son, of Rugby, were the general contractors. Messrs. H. H. Martyn & Co., of Cheltenham, carried out the panellings, staircase, carving, and the plaster coved enriched ceiling in the ballroom. Messrs. T. Jackson & Sons, of 49, Rathbone-place, W., worked the moulded and enriched ceilings and friezes in the dining-room, billiard-room, and hall. To Messrs. Clements & Co., of 51, Great Russell-street, W., was entrusted the general warming, and also the ventilation. Mr. A. H. Hodnett acted as clerk of works. The illustrations are from water-colour drawings by Mr. H. F. Waring, and were exhibited in last year's Royal Academy Exhibition.

PROPOSED STREET OF FLATS, DULWICH.

THIS picturesque row of small houses in flats is designed by Mr. J. W. Rhodes (London). As the plan shows, the two higher gables are intended to contain studios.

DESIGN FOR THE HALL OF A COUNTRY HOUSE.

THIS drawing, which was exhibited at the Royal Academy of 1900, is intended as a rather heavy wooden treatment of a sitting-room hall of the farm house type of country house. The materials were to be deal, oak-stained and beeswaxed, and thin copper sheathing, the copper to be lacquered.

G. BAILEY.

ASSOCIATION OF MANAGERS OF SEWAGE DISPOSAL WORKS.

THE first dinner of this newly formed Society was held under the presidency of Dr. P. Rideal, F.I.C., on Friday evening in last week at the Holborn Restaurant. Amongst those present were Dr. G. Reid (Medical Officer of Health for Northampton), Dr. L. Parkes (Sanitary Institute), Lieut.-Colonel Jones, V.C., Mr. W. D. Scott Moncrieff, Mr. I. Young (Chairman, Sanitary Inspectors' Association), Mr. G. Latham, &c.

Mr. Croll submitted the toast of "The President of the Association," and expressed the great appreciation of the members of the services of Dr. Rideal during the first year of the Association. The greater portion of their time had been taken up so far in drawing up rules and in other matters incidental to the establishment of a new society, but now they were thoroughly started, and hoped to hold frequent meetings in the coming year. One matter they meant to push forward was that of sewage managers becoming entitled to superannuation. Mr. Croll also referred in eulogistic terms to the services rendered by Mr. C. H. Ball, the secretary.

Dr. Rideal, in reply, said he had felt it a high honour to be elected the first President of the Association, and he considered the Association had done very well for the first year. In the summer they had a day at the Parkes Museum and in visiting two typical works, where they learned a good deal. A pioneer meeting had been held in Manchester, and a branch established there, and there was also a desire to establish a similar branch in Yorkshire. Their membership was at present eighty-eight, which was a very good muster for a young association. It would, no doubt, be difficult to define what the qualifications for the manager of a sewage disposal works were. At first he was a farm labourer, and then a market gardener, and then a bit of an engineer; next he had to become a chemist, and very shortly he would have to become a qualified medical man to be licensed under the Vivisection Act to inject pathogenic organisms into guinea-pigs. Those multifarious duties really made it difficult to say what class of men were qualified to belong to the Association, and also difficult to predict what class of men would be the managers in the future. So far, however, the eighty-eight managers in the

Association had combined together with the object of qualifying in all their multifarious duties, and of meeting to discuss the difficult problems before them. In May, 1898, a Royal Commission was appointed to inquire into the problem of sewage disposal, and to find if it were possible to displace the old sewage farms by what was called modern bacteriological methods. Three years afterwards the Commission issued a Report, and said that the old-fashioned methods of finally disposing of sewage on land were not absolutely necessary, but that the newer bacteriological methods might be used, with proper safeguards. They who were concerned in the matter thought that a definition of the machinery by which a satisfactory effluent could be obtained would meet the case, and thought it was only necessary then to study these modern bacteriological methods to get over the difficulties of those towns which found it hard to get land for sewage disposal. When, however, the Local Government Board was approached, that body said, "This is an interim Report, and it says these newer bacteriological methods can only be used with proper safeguards." The problem thus became that of what are proper safeguards; the Local Government Board did not give them much help, and they were anxiously awaiting the final Report of the Royal Commission. There had, however, been a second Report, which told them that the different processes and methods of treatment are not under discussion at the present, but that they must judge of the effluent as being a thing which contained no pathogenic organisms. When they came to deal with pathogenic organisms, they found it was an organism which, when injected into a guinea-pig, caused its death. That was the effluent they must not discharge into any river or estuary in England, and it showed that their duties were entirely changed if that second Report was of any value. It was such problems as these and others that the Association would have to consider.

Lieutenant-Colonel Jones, V.C., proposed "Kindred Associations," and referring to the treatment of sewage, said he was greatly inclined to believe in the passage in the Book of Job, viz., "Who can make an unclean thing clean? Not any man." In the Charter of the Civil Engineers an engineer was defined as one who follows and applies the laws of Nature to the use and convenience of man, and that

was all they could do in regard to the treatment of sewage.

Dr. Louis Parkes, in response, remarked that if sewage managers were going to be all the President had said, they would be in future Admirable Crichtons, and the Association would take a high place amongst the learned societies. A little common sense must be introduced into the question of bacteriological treatment, and none ought to expect drinking water to be obtained from the effluent.

Mr. I. Young also replied to the toast.

The toast of "The Visitors" was proposed by Mr. Ashton, and acknowledged by Dr. Reid, who said he declined to believe that sewage could be converted into drinking water; and by Mr. Martin (Exeter), who pointed out that the position of a sewage manager was too often made one of unnecessary difficulty, inasmuch as he had the river inspector on the one hand watching his effluent, and on the other hand his Town Council was complaining of the large expense of chemicals.

The Chairman next proposed "The President and Council Elect," and congratulated the Association on having Mr. Scott Moncrieff, who was one of the pioneers of the modern method of sewage disposal, as its second President.

Mr. Scott Moncrieff, in reply, said that while it was true that others were responsible for a great deal of the work sewage managers had to do, yet the fact remained that the sewage managers were personally responsible for the carrying out of the solution of one of the most important problems modern civilisation had to deal with. It was quite certain that if they did not successfully deal with that problem it would deal with them in a most drastic manner in the form of polluted rivers, a heightened death-rate, and the waste of vast material resources. He supposed that none of them were dealing with the problem with exactly the same appliances and methods, and thus it was the more important that the various facts should be collected, so that a common experience might lead to a comparison of results. The Local Government Board was the Government Department responsible for sanctioning the expenditure of public money for such works as they had to deal with, and behind the Local Government Board was the practising engineer. It was positively the business of such a Government Department and of such a profession as the practising engineer to be ocular. The engineer must give up what he knew and dispose of his knowledge, but they knew that the Government Department and the practising engineer had failed to find a final solution of this great problem in the sense that a final solution had been found in such questions as locomotion and lighting. With regard to the sewage problem, the voices of the oracles had been somewhat shaky of late, and also somewhat incomprehensible, and so another oracle was called in in the shape of a Royal Commission. The second Report of that Commission was no report at all, for it consisted of ten reports of officers of the Commission, and contained no guidance. They dealt with such subjects as the oxidation of sterile sewage, the Manchester experiments, bacteriological standards with relation to effluents, anthrax in Yeovil sewage, the longevity of the bacillus typhosus in sewage, the effect of filtration in reducing the number of bacteria in sewage effluents, the pollution of the River Severn, the self-purification of the River Severn, and some of the chief methods used in the bacteriological examination of sewage effluents. He did not say those subjects were outside the scope of the Commission, but they were practically all subjects of academic interest, and the officers ought to have been employed in attempting to answer much more pressing questions which practical sewage managers had to deal with. It seemed to him that there were four simple questions to be answered:—(1) What is the best kind of material for the filtration of the crude effluent? (2) What is the best means of distributing the liquid? (3) What is the proper period which ought to take place between each change of the liquid? And (4) What is the proper quantity of air in order to produce the highest standard of oxidation in the final effluent? That all those questions would be answered satisfactorily he had not the slightest doubt; but whether the Royal Commission would supply them remained to be seen. Personally, he doubted if it would. He was satisfied that they were near the final solution, and that it was not

unlikely that the Birmingham Corporation would be the first to find it.

The toast of "The Press" concluded the proceedings.

THE SURVEYORS' INSTITUTION.

An ordinary general meeting of this Institution was held on Monday afternoon at four o'clock, at No. 12, Great George-street, S.W. (Mr. Arthur Vernon, President, in the chair), when a paper was read by Mr. J. W. Tyler on "Estate Duty Valuations and Agricultural Property."

The hon. secretary, Mr. Penfold, announced some donations to the library and the library fund, and a vote of thanks was accorded to the donors.

The Chairman said that the meeting was being held in the afternoon in response to a request of some of the country members, who found it difficult to attend the evening meetings. Considering the weather, he was sure the meeting was a representative one.

Mr. Tyler then read his paper, which dealt with the Finance Act of 1894, in regard to the incidence of the estate duty upon agricultural estates. He explained that by Section 7, Sub-section 5, second paragraph, special limitations are set to the liability of agricultural property to the estate duty, and this is done by the somewhat rough and ready method of providing that no excess of value of an agricultural estate above a certain standard is to be taken into account in assessing such an estate to the estate duty. In his opinion the policy of making concessions to the owners of agricultural property, would not receive much adverse criticism from members of the Institution, but he anticipated that there would be considerable doubt whether the method adopted by the legislature in this instance was calculated to be of a very satisfactory nature. It was, in his opinion, illogical, to say the least of it; and moreover, the benefits secured were, he ventured to think, felt, as a general rule, by those who stood least in need of them. He then dealt with the following points: The valuation; annual value deductions and net annual value; capital value; addition to capital value; and settlement of disputes.

On the motion of Mr. Dixon, seconded by Mr. A. Brown, and supported by Messrs. J. R. Eve (who was not in favour of the early hour of the meeting: "These meetings should be in play-time and not in work-time"), Burrows, G. Langridge, Crawley, J. Walker, a hearty vote of thanks was accorded to Mr. Tyler, who replied.

The Chairman announced that the next meeting will be held on January 12, when Mr. Scole will read a paper on "Rural Drainage and Sewage Disposal."

The meeting then terminated.

THE SANITARY INSPECTORS' ASSOCIATION.

The monthly meeting of this Association was held on Saturday last week at the Carpenters' Hall, E.C., Mr. Young, Chairman, presiding.

With reference to the resolution adopted at a previous meeting, complaining of the evidence given by Dr. Wynter Blythe with regard to the water test, the Chairman said the following letter had been received from the Secretary of the Sanitary Institute:—

"Your letter of October 10, with reference to the evidence given by Dr. Wynter Blythe in the Southwark drainage case, was laid before the Council at their last meeting, and I was instructed to reply that the Council are in no way responsible for any opinions expressed or action taken by the Chairman of the Council, or any of its members in their individual capacity."

He (the Chairman) ventured to think the letter would be received by the meeting in the same spirit as it had already been by the Council of the Association—viz., that it was an evasive answer to the question put to the Sanitary Institute. They did not agree with the views expressed by Dr. Blythe; they differed with him absolutely, and, if he needed evidence, they were prepared to take him into their districts and introduce him to their systems of water-testing, and to show him that the drains were capable of resisting the water test many years after. However, the best answer that could be given to Dr. Blythe and to the Sanitary Institute, could be given by members turning up in large

numbers at the meeting on the following Wednesday. A large number of the members of that Association were also members of the Sanitary Institute, and they had now an opportunity of entering their protest.

Four new members were elected, viz., one from Scarborough, one from East Ham, one from Portland, and one from Middlesbrough.

Fogs and Smoke.

Business having been disposed of, Mr. Charles R. Darling, demonstrator and lecturer in the Electrical Department, City and Guilds Technical College, Finsbury, proceeded to discuss the subject of "Fogs and Smoke," illustrating his lecture by a series of experiments.

It was only in recent years, remarked the lecturer, that the exact nature of fogs and mists had been understood. By a series of beautiful experiments Aitken had shown that the presence of dust was essential to the formation of a fog or mist. Each little speck of dust acted as a centre or kernel round which water collected when the temperature was low enough to cause condensation. The combined effect of these myriad spheres of water, each containing a particle of dust or solid matter as its centre, was to produce the appearance which they described as fog or mist. A mist might be regarded as a mild variety of fog, not so intense as the latter, and easily dissipated. Mists were usually formed over cold ground during the night, and were soon dispersed when day dawned and the temperature rose. Fogs, however, did not depend upon cold ground for their formation, but upon a cooling effect in the atmosphere itself. They were also denser than mists, and more difficult to dissipate, and in the presence of smoke possessed a peculiar colour, with which they in London were, unhappily, too familiar. Both fogs and mists, however, possessed the common character of being due to the condensation of water round dust centres, and both were produced by the atmosphere being cooled down sufficiently to deposit the surplus moisture.

The lecturer observed that it would be an ideal state of affairs if we could live in an atmosphere free from dust, in which fogs and mists would be things unknown. It was an ideal, however, which would never be attained. So long as there were winds blowing, and dust on the surface of the earth, there would also be dust in the atmosphere; and, consequently, under proper conditions of temperature and aqueous vapour, mists and fogs would be produced. Thus at sea, far beyond the region of smoke, fogs were of frequent occurrence, although such fogs lacked the density of city fogs. They could not expect that fogs could be eradicated; but the duty which devolved upon sanitarians, and all others who had the welfare of the community at heart, was to endeavour to reduce the terrors of fogs to a minimum by preventing the needless generation of smoke. The Public Health Acts had placed a power in the hands of Sanitary Authorities, which, rightly used, might greatly diminish the intensity of city fogs, by the infliction of severe penalties upon the persons responsible for the generation of unnecessary smoke. This power, however, should be used with discretion. Sanitary experts would, Mr. Darling thought, gain more by co-operating with engineers with a view to smoke abatement than by creating absurd and impractical restrictions which caused engineers to regard them as faddists. It was a matter for regret that mutual action of this kind was seldom to be found, and a state of enmity existed frequently between the Sanitary Authority and the consumer.

It was to the interest of all concerned to prevent the production of smoke as far as possible; but of all the appliances in the market none, in his (the lecturer's) experience, had proved entirely successful, except in special cases. A good stoker, whether human or mechanical, was probably the most important factor in smoke prevention; and next to that came a judicious selection of coal. This latter consideration was far too frequently neglected, and by burning a cheap fuel a consumer often lost more in smoke than he saved by paying a low price for his fuel. The lecturer said the extension of the use of cheap gaseous fuels, such as Mond's, appeared to offer the best solution of the smoke problem. He submitted that the powers of Sanitary Authorities should be used in accordance with the idea that a certain amount of smoke appeared to be unavoidable in connexion with many industries,

and they should not unduly harass the consumer who honestly tried to keep the smoke down to a minimum. In the Woolwich district, where he (Mr. Darling) resided, one of the greatest smoke-producers was the County Council. He had frequently observed the free ferry steamers emit dense volumes of black smoke, not for one minute, but for twenty consecutive minutes; and this, he was informed, occurred daily. Indeed, it was curious that the chimneys in Woolwich which were sacred from the arm of the law emitted nearly all the smoke. The Arsenal chimneys, for example, if belonging to a private firm, would furnish a happy hunting ground for the "one minute" prosecuting authority; and to complete the trio, the next greatest smoke producer was the Borough Council's destructor. It was certain, in the case of the Arsenal chimneys, that the smoke was unavoidable consistent with the efficient working of the plant; and this might or might not obtain in the other two cases. But the private consumer was surely entitled to the same consideration, and he, therefore, entered a plea for "sweet reasonableness" in smoke prosecutions. He did so because there was a widespread tendency to estimate smoke prevention by the number of convictions secured, and not by the increased purity of the atmosphere and the diminished intensity of fogs. All things considered, he could see little immediate prospect of any vast improvement in respect to fogs and smoke in large cities and industrial centres. The smoke produced by domestic fires, and the unavoidable smoke connected with manufactures, would always furnish sufficient material for dense fogs until some ideal method of producing heat without smoke had been discovered. Fogs and smoke appeared to be the penalties of an age of commercialism, coupled, in the case of fogs, with a damp climate; yet any well-directed effort for the prevention of smoke could not fail to minimise, if only slightly, the terrors of the fog fiend.

A discussion followed, the various speakers concurring with the lecturer in his plea for "sweet reasonableness" in smoke prosecutions.

INSTITUTE OF SANITARY ENGINEERS, LTD.

The annual dinner of this Institute was held on Wednesday last at the Holborn Restaurant. Dr. J. C. Thresh, M.O.H. Essex County Council, presided, and those present included Professor W. J. Dibdin, Professor W. R. Smith, Lieut.-Colonel G. W. Dixon, Mr. Ernest Berrington, Mr. J. Farley, Mr. S. J. Adams, Mr. E. R. Palmer, and Mr. Arthur E. Ashley (the Secretary).

Following the usual loyal toasts, Professor W. R. Smith proposed "The Institute of Sanitary Engineers, Ltd." He said it was a matter of congratulation that they should be holding their dinner that evening, for the day had witnessed the inauguration of the greatest piece of sanitary engineering of ancient or modern times. He alluded to the inauguration of the dam at the Nile by the Duke and Duchess of Connaught. That gigantic engineering work would undoubtedly bring untold blessings to many millions of people. It would revolutionise the condition of things in Egypt, and would cause the development of towns on the Nile which would never have been thought of, and the inhabitants of those towns would be enabled to live under conditions which were never dreamed of a few years ago. The members of that Institute might not be engaged in the same gigantic undertakings, but every Fellow and every member of the Institute had some good work to do which, if it be well done, must result in happiness to some of their fellow-creatures. The Institute had for its object the association of men who were engaged in sanitary engineering work, and who by their association endeavoured to render themselves more perfect, and more able to deal with the various problems which came before them. During the past year he knew the Institute had made many strides. They had instituted, he believed for the first time, classes for the education of men who were desirous of obtaining the position of sanitary engineers. That, he thought, was a most desirable thing, and indicated on the part of any sanitary body a desire to take a very high place in promoting the welfare of people with whom they might be associated. Then they had examinations. He was not quite sure

whether those examinations were looked upon as consequential to their courses of instruction, but, as a somewhat old Parliamentary hand at that sort of work, he would suggest to the consideration of the Council whether that should not be so. Examinations were all very well in their way, but examinations without any position of responsibility were not of such great importance in his judgment as the previous training, and therefore, if they had examinations, he hoped they would see their way to insist upon a proper curriculum of study which should alone attend to their examinations. Also during the past year they had had for the first time a summer meeting, at Buxton. That meeting was eminently successful, and should encourage them to proceed with such gatherings in future years. He had to associate with the toast the names of two gentlemen who were well known to him, and who had been connected with the work of the Institute for some time—Dr. Thresh, the President, and Mr. Rayner, Chairman of the Council. So far as Mr. Rayner was concerned, they knew much more about him than he (the speaker) did, but he was quite sure he had devoted an amount of energy and ability to the Institute during the past year which had not a little contributed to the success which it had attained. Of Dr. Thresh he could say much more, as he had had the pleasure of knowing him for a great many years. They were extremely fortunate in securing such an able, distinguished, and well-known man as Dr. Thresh as President of their Institute, and the fact that he had been at the head of the Institute for the past year must have been of the greatest advantage to it.

Dr. Thresh, in replying to the toast, said he felt that an Institute of this kind should have a future before it. In the first place, it had got a name which was singularly taking, and its objects and aims were high and worthy of all encouragement. If an Association met a felt want, it would succeed; if it did not, it would speedily die of inanition; but it must be remembered that it was not always the lustiest baby that made the strongest man. That Association might be said to have emerged from its infancy and was reaching that period when it should grow with vigour; but that period was one which had its peculiar dangers of growth being subordinated to strength.

To be a real success such an Institute must grow not only in numbers, but in strength, and he believed that the lines which had been laid down by the Council would give both strength and increase in numbers to the Association. The work that had been done in connexion with revising the articles of association would, he believed, strengthen it and put it on a sound basis. He was also pleased with the summer meeting held during the past year, and he hoped and believed that that would be the first of an annual series of similar gatherings. Another important step was the inauguration of the lectures to which Professor Smith had referred. That was a most admirable idea, and if carried out ably, as he had no doubt it would be, he thought ultimately it must be a great success. Their lecturers should be gentlemen who had made a special study of the subjects upon which they had to speak. As to the giving of certificates, let it be remembered that, however valuable teaching might be in itself, there should be some certainty that a man had had a practical training before he was admitted to the final examination which entitled him to become a member or a Fellow of the Institute. Every care should be taken to see that the examination was sufficiently comprehensive to be a satisfactory test of a man's knowledge and ability, and then when he had obtained the certificate he would be proud of it and other people would emulate him and desire to possess it. One matter would sooner or later have to be considered by the Council, and that was whether they should have a special journal to embody the views and forward the interests of the Institute; but he would advise them to proceed very cautiously in such a matter. He would like to throw out the suggestion that it might be well if it were made compulsory upon all students who submitted themselves for examination to prepare a paper which could be read and discussed by the members at the meetings. In conclusion, he could add that it was a matter of gratification to him to be able to say that at the end of his year of office he left the Institute better than when he assumed the presidential chair. He felt quite sure that the interests of the Association would be perfectly

safe in the hands of his successor, Professor W. J. Dibdin, and he wished both him and the Institute every success.

Mr. Rayner, who was to have also responded, sent a telegram regretting his inability to be present.

The toast of "The Imperial Forces" was given by Mr. Geo. Reveis, and suitably acknowledged by Lieut.-Colonel G. W. Dixon.

Mr. W. H. Colcart, in proposing the toast of "The Visitors," remarked that Mr. Dibdin, who was to respond to the toast, would, he felt quite sure, fulfil the duties of the presidential chair in the coming year to the great advantage of the Institute of which he was such a distinguished member.

Mr. Dibdin, in replying to the toast, said that the position to which he had been elected was one of which any man might be proud. As to the Institute, it might with advantage have been born a little earlier; but still he felt that it had a most valuable and useful future before it. He rejoiced to think that it had emerged from the youthful stage, and they could rely upon him to do the very best he could to forward the interests of the Institute during the coming year.

The toast of "The Press" terminated the proceedings.

ARCHITECTURAL SOCIETIES.

ROYAL INSTITUTE OF ARCHITECTS OF IRELAND.—The annual meeting of the Royal Institute of the Architects of Ireland was held on the 4th inst. in the offices, 20, Lincoln-place, Dublin, Mr. George C. Ashlin, President of the Institute, in the chair. The President, in the course of his annual address, referred to the proposed revision of the recognised form of building contracts, and dealing with questions of education, qualification, and registration, said that a most laudable desire had lately sprung up amongst their junior members and aspirants in the profession to improve the system of architectural education, with a view of obtaining a distinctive qualification by a compulsory examination, as in other professions, and, he presumed, of paving the way ultimately to the statutory registration of all practising architects. He was sure the senior members sympathised with this desire thoroughly, and would be most willing to aid the movement in any way in their power. There was no use, however, disguising the fact that it was most difficult to determine the best means of obtaining even the first of these objects quickly under present conditions in Ireland. Still, he thought, if there was grit enough in the movement amongst the junior members, and if too much was not attempted at first, something might be accomplished in the near future, of a modest character at all events, towards the improvement of architectural education in Dublin. He thought the views expressed by the deputation of the Architectural Association of Ireland at the Council meeting that day were eminently practical, viz., that the facilities for study in the various branches of the profession should be provided here in Dublin to be of any avail, and that the examinations should be specially organised and conducted to suit the special circumstances that existed in Ireland. It might be well to provide also that the candidates should attend an approved class or school exclusively devoted to the education of practical architects. If such a scheme could be perfected, he threw out the suggestion that the Institute might, after some time, put forward a recognised form of apprenticeship containing a provision making it obligatory for the pupil to comply with this condition, and to pass the examination before completing his apprenticeship in the same way as it had put forward the required form of building contract.—The hon. secretary (Mr. Kaye Parry) submitted the annual report, which contained the following:—The statement made in the House of Commons last May by Mr. Austen Chamberlain respecting the proposed College of Science buildings in Upper Merriem-street naturally came as a surprise and disappointment to the profession. Your Council, having considered the matter, passed the following resolution, giving expression to their views on the extraordinary proposal of the Government, viz.:—"That the attention of the Council having been drawn to a statement of Mr. Austen Chamberlain in the House of Commons on May 28, thus reported, 'As to the architect, before the Bill left the House he would give the name of the architect selected,

No choice had yet been made, but he had been in communication with the Chief Secretary and the Department of Agriculture, who were entitled to a voice in the matter, and the claims of several architects, both British and Irish, had been considered. Personally, he should be most anxious to have an Irish architect; but in any case, whatever was done, hon. members might rest assured that the Government should associate an Irish architect with the work. The Council deprecate that only in mere concession to Irish sentiment an Irish architect should be associated with an English architect in designing and carrying out the proposed public offices (College of Science) in Dublin. It resents the imputation conveyed publicly that in the opinion of the authorities of his Majesty's Treasury there is not in Ireland an architect of sufficient reputation and capacity to design and carry out such a work as sole architect in the usual manner. Whatever the outcome of our action may be, it is very encouraging to find that we have the sympathy and support of our professional brethren in England.—Sir Thomas Drew, in proposing the adoption of the report, hoped that more attention would be given to the exhibition of architectural works. They had an opportunity of exhibiting their works at the Royal Hibernian Academy, and he trusted they would take advantage of it.—Mr. R. O'Brien Smyth seconded the adoption of the report, which, after discussion, was unanimously agreed to.

The following were elected as a Council of the Institute:—Messrs. C. J. MacCarthy, Sir Thomas Drew, R. C. O'Gorman, W. M. Mitchell, T. R. Carroll, A. E. Murray, G. P. Sheridan, E. Batchelor, and C. Geoghegan; F. G. Hicks, President, Architectural Association of Ireland, ex-officio member.—The annual dinner took place in the evening at the Shelbourne Hotel. Mr. Geo. C. Ashlin presided. The President gave the toasts of "The King," and "The other members of the Royal Family," which were duly honoured. Dr. Traill proposed "The Learned Professions," to which the Most Rev. Dr. Donnelly replied. Sir Christopher Nixon said the Institute of Architects had held its own among other professions. They had only to look at the magnificent buildings in Dublin to recognise what Irish architects had done.—Sir Thomas Drew, in proposing "Our Guests," said it was a remarkable fact that, though there were great architects in Dublin in the eighteenth century, yet following on the Act of Union, the long wars and the famine, there were in Dublin no buildings representing the first half of the nineteenth century. It was true the General Post Office was built in 1818, but it probably was designed in the eighteenth century. The terminus of the Great Southern and Western Railway was built by an English architect, and the Pro-Cathedral, Marlborough-street, was the work of a talented architect. But in the last half of the nineteenth century Dublin architects had again come to the front, and were now a united and strong body. The toast having been drunk, the President of Christ Church, Mr. J. H. Ryan, C.E., President of the Institution of Civil Engineers, Professor Thrift, F.T.C.D., and Colonel Plunkett replied. Mr. P. J. O'Neill, J.P., proposed "The Royal Institute of the Architects of Ireland," which was responded to by the President in suitable terms.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—The forty-eighth annual general meeting of the Society of Engineers was held on the 8th inst., at the Institution of Mechanical Engineers, Storey's Gate, Westminster, by permission of the President and Council of the Institution. The chair was occupied by Mr. Percy Griffith, President. The following gentlemen were duly elected by ballot as the Council and officers for 1903, viz.:—As President, Mr. J. Patten Barber; as Vice-Presidents, Messrs. D. Butler Butler, N. J. West, and Maurice Wilson; as ordinary members of Council, Messrs. J. Bernays, G. A. Pryce Cusson, G. A. Goodwin, W. H. Holtum, R. St. George Moore, H. Sherley-Price, J. V. Wilson, and E. J. Silcock; as hon. Secretary and Treasurer, Mr. George Bert; as hon. Auditor, Mr. Samuel Wood, F.C.A. During the scrutiny the President addressed the meeting, bringing before the members the salient points of the work of the past year. He referred to, and commented upon, the papers which had been read, and announced that the following premiums had been awarded by

the Council for papers read during the past session, viz.:—The President's gold medal to Mr. Thomas Andrews, F.R.S., for his paper on "The Effect of Segregation on the Strength of Steel Rails;" the Bessemer premium of books to Mr. Augustus R. Galbraith for his paper on "The Hennebique System of Ferro-Concrete Construction;" a Society's premium of books to Mr. Benjamin H. Thwaite for his paper on "British versus American Patent Law Practice and Engineering Invention;" and a Society's premium of books to Mr. Brerley D. Healey for his paper on "Recent Blast Furnace Practice." The President also alluded to the visits which had been made to works of professional interest during the year. A vote of thanks was accorded to the scrutineers, and the proceedings terminated by a vote of thanks to the President, Council, and Officers for 1902, which was duly acknowledged. After the meeting a reception was held by the President and Mrs. Percy Griffith, followed by a social reunion. During the evening a lecture illustrated by lantern views was given in the lecture hall by Mr. Frederick Lambert, F.R.G.S., entitled "The Crystal Caves of New South Wales, Stalactite Marvels of the Subterranean World."

COMPETITIONS.

MUNICIPAL BUILDINGS AND PUBLIC LIBRARY, BARRY.—The first premeditated design in this competition was sent in by Messrs. C. E. Hutchinson, A.R.I.B.A., and E. Harding Payne, A.R.I.B.A., joint architects, 11, St. John-street, Bedford-row, London. The second premeditated design was by Mr. William H. Ashford, A.R.I.B.A., 424, Stratford-road, Sparkhill, Birmingham; and the third by Mr. George Dickens Lewis, Talbot-chambers, Shrewsbury. Designs are to be exhibited at Hannah-street Board School, Barry, from December 29 to January 3, 1903.

LIBRARIES, SPRINGBURN, & C., NEAR GLASGOW.—The first design for a library at Springburn was that sent in by Mr. W. B. White, architect, 106, St. Vincent-street, Glasgow. The designs for (1) Woodside, (2) Govan Hill and Crosshill, and (3) Mary Hill were prepared by Mr. J. R. Rhind, architect, 28, High-street, Inverness.

HOUSING SCHEME, BERMUNDSLEY.—Mr. John Slater, F.R.I.B.A., the assessor appointed to adjudicate on the housing scheme competition on the Fulford-street area, in the Borough of Bermundsey, has issued his award, which is to the following effect:—First, Messrs. Brocklesby, Marchmont, & East, Pawnyn, Kingston-road, Merton; second, Messrs. Humphrey Davis & Co., 8, Lawrence Pountney Hill, E.C.; third, Messrs. Sills & Leeds, Donington House, Norfolk-street, Strand, W.C. The plans will be on view at Rotherhithe Town Hall, Lower-road, S.E., from Wednesday, the 17th inst., to Saturday, the 20th inst.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday at the County Hall, Spring-gardens, Sir J. McDougall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Stepney Borough Council 2,400*l.* for street improvements; St. Pancras Borough Council 920*l.* for paving works; Lambeth Guardians 6,400*l.* for extension of workhouse; and Stepney Borough Council 5,865*l.* for erection of working-class dwellings.

Telephones.—The Establishment Committee recommended as follows:—

(a) That the resolutions of the Council, dated July 29, 1902, authorising an expenditure of 210*l.* in fitting up a callroom off the hall, and adapting a building as an office exchange in the yard, and sanctioning the employment of a telephone attendant at the wages not exceeding 25*s.* a week, be rescinded.

(b) That an expenditure not exceeding 300*l.* be authorised for providing cabinets and screens and for other work connected with the removal of the switchboard, &c., and fitting up the entrance-hall and the room adjoining it.

(c) That the offer, dated October 23, 1902, of the National Telephone Company, amounting to 327*l.* 15*s.* for providing *inter alia* five additional 'exchange' lines, a new switchboard, and connecting the existing forty-two lines, and for providing 110 additional telephones and lines, and operating the whole of the lines during certain hours daily to the satisfaction of the Council's Engineer, and subject to a proportionate reduction in the amount of

the offer until the full number of the lines required are ordered by the Council and are provided and working, be accepted; that the arrangement be an annual one."

Mr. W. H. Dickinson moved "That the matter be referred back with instructions to the Committee to report fully as to the existing system of telephonic service used by the Council, and the charges therefor."

Mr. Benn seconded the amendment, which, after discussion, was defeated and the recommendations of the Committee adopted.

Holborn to Strand Improvement: Vaults at Carr's Restaurant.—A long discussion took place on some recommendations of the Improvements Committee, relating to the construction of the vaults at Carr's Restaurant. The restaurant is being reconstructed on the northern side of the new crescent road near the Law Courts, in connexion with the Holborn to the Strand new street. The vaults have been constructed under the direction of Mr. Emden, who is a member of the Council, and they project 16 ft. beyond the new frontage line of the building instead of 12 ft. as allowed in the case of other vaults along the new street. The Improvements Committee, reporting on the matter, said the owner had obtained the authority of the Westminster City Council, but not of the Council, and the Westminster Council refused to accept the contention that the County Council was the only authority having power to sanction the vaults. The committee recommended—

(a) That, in connection with the Holborn to the Strand improvement, the Solicitor be instructed to prepare and execute such deed or deeds as may be necessary to secure that Mr. Cox, his heirs and assigns, shall carry out their obligations in regard to the new vaults at Carr's Restaurant, on the northern side of the new crescent road near the Law Courts, as provided by Section 47 of the London County Council (Improvements) Act, 1891.

(b) That the Solicitor be further instructed to prepare and execute a deed, or deeds, preserving the rights of the Council in that portion of the vaults which is more than 12 ft. in advance of the new frontage line of Carr's Restaurant, and securing a payment to the Council of 1*s.* per annum in respect of the use and occupation of the portion of the vaults in question.

(c) That, subject to the owner of the vaults entering into the deed or deeds contemplated by the foregoing resolutions, an allowance of 20*l.* 7*s.* 6*d.* be made by the Council in consideration of being relieved from the obligation of constructing the new vaults contemplated by Section 47 of the Act of 1891 in question, and that the matter be referred to the Finance Committee with a view to the payment of the money to Mr. Walter Emden or to his client, Mr. George Cox, the owner of the restaurant.

Mr. Benn moved, as an amendment, to add the following words:—"And also requiring Mr. Cox to make proper application with plans for the land already taken by him, for vaults up to the frontage line of 12 ft., and to surrender to the Council that portion of the vaults which is more than 12 ft. in advance of the new frontage line, and to construct the necessary dividing wall."

Mr. Hubbard seconded the amendment.

Mr. Emden confessed he was not aware that the Westminster City Council was not the proper body to pass the plans; in fact, he still believed they were the authority. The Council's officials must have been aware of the construction of the vaults, for they had had bills of quantities which clearly showed that it was the intention to build them 16 ft. beyond the new frontage line.

Dr. Napier thought that a gentleman who was largely dealing with public bodies in a professional manner ought not to sit on those bodies, or otherwise he would get into all sorts of unnecessary situations.

Mr. R. A. Robinson asked Mr. Benn to withdraw his amendment. There was so much doubt as to who was the authority that any one was liable in good faith to make a mistake. As a matter of fact the Westminster Council contended they were the proper authority.

After further discussion, Mr. Benn withdrew his amendment, and, on the motion of Mr. McKinnon Wood, the whole matter was referred to the General Purposes Committee.

Drainage of West Ham.—The following recommendation was agreed to:—"That the Main Drainage Committee be authorised to take such steps as may be necessary to support the Council's claim in respect of the reception, treatment, and disposal of the sewage of the Borough of West Ham before the arbitrator to be appointed by the Local Government Board."

The Water Question.—A long discussion took place on the following recommendation of the Parliamentary Committee:—"That the Council is of opinion that the passing of the London Water Bill in its present form would be detrimental to the interests of London."

On a division, the recommendation was carried by 70 votes to 19.

Tramways: Tenders.—The following recommendations of the Highways Committee were agreed to:—

(a) That the tender of Messrs. Dick, Kerr, & Co. be accepted for the execution, for the sum of £2,000,000, 11d., of the roadwork and platelaying in connexion with the reconstruction, for electrical traction, of the portions of the London County Council tramways in Old Kent-road, eastward of the dividing line between the Boroughs of Bermondsey and Southwark, and along New Cross-road and Greenwich-road to East Greenwich.

(b) That Messrs. Dick, Kerr, & Co. be allowed to sublet to the Lorain Steel Co., of Ohio, U.S.A., the manufacture of the special work (namely, points and crossings), and also to sublet certain other portions of the work to the firms specified below (or to such other firms as may be approved by the Council's Chief Engineer), namely:—(a) to Messrs. Wilson, Pease, & Co., Ltd., the manufacture of the vias, and the insulator and clips; (b) to Messrs. Bayliss, Jones, & Bayliss that of the tie bars, bolts, &c.; (c) to Messrs. Doulton & Co. that of the insulator bushes.

(c) That the tender of Messrs. J. G. White & Co. be accepted for the execution, for the sum of £5,000,000, 18s. 6d., of the roadwork and platelaying in connexion with the reconstruction, for electrical traction, of the portions of the London County Council tramways in Old Kent-road westward of the dividing line between the Boroughs of Bermondsey and Southwark, along New Kent-road to the Elephant and Castle, and along Walworth-road, Camberwell Green, and Peckham-road, to New Cross Gate.

(d) That Messrs. J. G. White & Co. be allowed to sublet to the Hadfield Steel Foundry Co., Ltd., of Sheffield, the manufacture of the special work (namely, points and crossings); and also to sublet certain other portions of the work to the firms specified below (or to such other firms as may be approved by the Council's Chief Engineer), namely:—(a) to the Anderson Foundry Co., the manufacture of the cast-iron work; (b) to the Associated Manufacturers of Portland Cement, Messrs. Goldsmith & Co., or Mr. J. Robinson, that of the cement; and (c) to Messrs. Bullers & Co. that of the porcelain insulators.

The Council adjourned at 7.30 p.m.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Clapham.—A house on the south-east side of Deauville-road, Clapham, to abut upon Rodenhurst-road (Mr. H. Bignold, for Mr. Billham).—Consent.

Clapham.—A projecting porch in front of No. 1A, Rectory-grove, Clapham (Mr. S. J. Collins, for Mrs. R. Virgo).—Consent.

Fulham.—Projecting bay-windows, porches, and balconies to blocks Nos. 1 and 2, Hurlingham Court Mansions, on the north side of Hurlingham-road, Fulham, to abut upon Linver-road (Messrs. Palgrave & Co., for D'Eresby House, Ltd.).—Consent.

Clapham.—A one-story addition in front of No. 14, Hyde-thorpe-road, Balham (Mr. E. H. Dashwood).—Refused.

Whitechapel.—An extension of the shop front of No. 245, Whitechapel-road, Whitechapel (Mr. R. A. Hinds for the trustees of the late Mr. W. Ford).—Refused.

Width of Ways.

Finsbury, Central.—A block of water-closets in the playground of the Special School, Hugh Myddelton Sedcoles, Corporation-row, Clerkenwell (Mr. T. J. Bailey for the School Board for London).—Consent.

Hammersmith.—Retention of two sheds, used as mess-room and offices, on the north side of Duane-road, Wormwood Scrubbs, Hammersmith (Mr. T. Rowbotham).—Refused.

Formation of Streets.

Wandsworth.—That an order be issued to Mr. E. B. Anson sanctioning the formation or laying out of a new street for carriage traffic, to lead from Streatham High-road to Garrard's-road, Streatham (for Mr. C. Mortimer).—Consent.

Buildings for the Supply of Electricity.

Fulham.—An addition (to be used for fans for induced draught) on the south-east side of the electricity generating-station on the east side of

Townmead-road, Fulham (Mr. F. H. Medhurst for the Council of the Metropolitan Borough of Fulham).—Consent.

* * * The recommendation marked † is contrary to the views of the Local Authority.

BOOKS RECEIVED.

STEREOTOMY. By Arthur W. French, C.E., and Howard C. Ives, C.E. (Chapman & Hall.)
THE BUSINESS ENCYCLOPEDIA AND LEGAL ADVISER. By W. S. M. Knight. Vol. III. (The Caxton Publishing Co.)
WHITAKER'S ALMANACK, 1903.
WHITAKER'S FEERAGE, 1903.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

24.—CHEMICAL EXAMINATION OF SILICEOUS MATERIALS (CLAYS, BRICKS, SLATES, SANDS, AND SANDSTONES)—ANALYSIS OF ALLOYS.

MOISTURE.—Dry 5 grammes of finely-powdered sample in air-bath at 100 deg. C. until constant in weight.

Loss on Ignition (Combined Water).—Heat 5 grammes in platinum basin at bright red heat over blowpipe or in muffle furnace until constant in weight. From total loss in weight deduct moisture and CO₂, if any be present in the sample; the remainder of loss in weight will represent combined water and any organic matter which may be present.

Total Silica.—Fuse 2 grammes of the very finely-powdered sample in a platinum crucible with about 10 grammes of fusion mixture until no particles of unfused matter can be seen, and the entire mixture is free from bubbles and in a state of quiet fusion. The fusion mixture is made by mixing 10 parts of anhydrous sodium carbonate with 13 parts of anhydrous potassium carbonate. The result of the fusion is to convert all the silica, whether present as sand or in the form of a silicate, into sodium and potassium silicates. These alkaline silicates are soluble in water, while any aluminium or iron which may have been present as a silicate remains as insoluble oxide. The fused mass, when cold, is treated with hot water and a slight excess of hydrochloric acid. The solution is then evaporated to dryness, and the residue is gently heated over sand-bath until all free acid has been expelled. The silica which was present in the fused mass as soluble silicates of potassium and sodium is by this treatment obtained as silica alone, and is now insoluble in hydrochloric acid. The residue may, therefore, be boiled with dilute HCl to dissolve all the soluble salts while the silica remains insoluble and may be collected on filter, washed, strongly ignited, and weighed as total SiO₂.

Oxide of Iron, Alumina, Lime, Magnesia, and Sulphur.—Divide acid filtrate obtained during removal of total silica into two portions. In one portion, after boiling with a few drops of nitric acid, estimate the sulphur by precipitation by barium chloride as described in the preceding chapter, and in the other portion estimate the oxide of iron, alumina, lime, and magnesia also as directed in the preceding chapter.

Carbon Dioxide.—Estimate CO₂, if any, by means of Schrotter's carbon dioxide apparatus, as directed in preceding chapter.

Quartz Sand.—If it be desired to estimate the proportion of sand, as distinct from the proportion of silica in combination, the following process may be employed:—Heat 2 grammes in platinum dish with 50 c.c. of sulphuric acid prepared by adding 25 c.c. of strong acid to 25 c.c. of water. Heat gently for about eight hours, and then evaporate to dryness. Moisten residue with hydrochloric acid, then boil with hot water; filter off, and weigh insoluble matter, which consists of sand mixed with silica formerly present in combination—i.e., total silica. To separate the sand from the other form of silica, boil the weighed insoluble matter several times with successive portions of sodium carbonate solution in a platinum dish, then wash the insoluble matter, which consists only of sand, with dilute hydrochloric acid, and finally with pure water. Then dry, ignite, and weigh the sand. Difference in weight between that of the total silica and that of the sand alone represents the weight of the

combined silica in the quantity of the sample treated.

Marl, &c.—In the case of clays containing much carbonate of lime, or of other materials containing a considerable proportion of matter other than silica or metallic silicates, it is advisable to first dissolve all the matter soluble in hydrochloric acid, and to then analyse the insoluble matter by fusion with alkaline carbonates, or by treatment with sulphuric acid as described above. Boil 2 grammes of the dried sample with dilute hydrochloric acid, and collect insoluble matter on filter. Evaporate filtrate to dryness, treat with dilute HCl and hot water, and collect and weigh soluble silica. Divide filtrate into two equal portions, and estimate oxide of iron, alumina, lime, and magnesia in one portion, and the sulphur in the other portion, as directed in preceding chapter.

Analysis of Alloys.

The accurate estimation of minute proportions of foreign ingredients in commercial metals can only be accomplished by those possessing considerable manipulative skill and an intimate acquaintance with the chemical properties of the individual ingredients. The phosphorus in steel, for example, may not amount to 0.5 per cent., and yet be present in sufficient quantity to render the steel useless for many purposes; but the accurate determination of the quantity of phosphorus in steel can be made only by an experienced chemist, and no attempt will be made in these columns to describe the processes employed.

The approximate estimation of the proportions of tin and lead in solder, or copper and zinc in brass, is, however, a less difficult task, and may be accomplished by the average student. The processes selected for analysis must depend upon the composition of the alloy as found by qualitative analysis. For the analysis of alloys containing only the metals tin, lead, copper, zinc, and iron, the following scheme may be employed:—

Place 2 grammes of the metal in beaker and add excess of moderately strong nitric acid. When all the metal has been dissolved, or converted into an insoluble powder, transfer the contents of the beaker to a porcelain dish and evaporate to dryness. Moisten the residue with nitric acid, dilute with hot water, and allow to stand for an hour.

Tin.—The presence of a white sediment (tin oxide) proves the presence of tin; for lead, copper, zinc, or iron would be dissolved. Pure aluminium is practically insoluble in nitric acid, but is readily soluble in hydrochloric acid. The white precipitate, if present, must be collected on filter, washed free from acid, dried, ignited in porcelain crucible at high temperature, and weighed when cool. Calculate quantity of metallic tin in SnO₂ obtained by multiplying by the factor 0.7867.

Lead.—Add to the filtrate, or, if no tin be present, directly to the solution of the alloy, a few drops of dilute sulphuric acid. If lead be present a white precipitate will be formed, and more dilute sulphuric acid must be added until the whole of the lead has been precipitated as lead sulphate. Evaporate nearly to dryness, add sufficient water to dissolve any salt of copper, iron, or zinc which may have solidified, and, after allowing to stand for about an hour, collect the lead sulphate on a small filter paper. Wash the lead sulphate with water acidulated with sulphuric acid, until free from salts of other metals, and finally wash with alcohol. Dry the filter paper with contents; transfer the dried lead sulphate as completely as possible to a sheet of glazed paper. Burn the filter paper in a porcelain crucible, and to the ash and trace of lead sulphate left from the filter paper add the main bulk of lead sulphate, and heat at a low red heat. When cool, weigh the crucible and contents. From weight of PbSO₄ thus obtained, calculate the quantity of metallic lead in the 2 grammes of alloy dissolved, by multiplying by the factor 0.6832. The object of igniting the filter paper apart from the lead sulphate is to prevent the carbon of the paper from reducing a portion of the lead sulphate to metallic lead or lead sulphide.

For all quantitative determinations the filter paper should be ignited apart from the precipitate which is collected in it, and the ash of the filter paper should then be added to the main bulk of the heated precipitate.

Copper.—The filtrate, or, if lead and tin are both absent, the original solution, is evaporated to dryness with a small quantity of sulphuric acid in order to free it from nitric acid. The

residue is then dissolved in water, and a current of sulphuretted hydrogen is passed through the liquid until the whole of the copper, if copper be present, is precipitated as black copper sulphide. The copper sulphide is then collected on a filter (the filtrate being preserved for estimation of zinc and iron), washed with water saturated with sulphuretted hydrogen, and then transferred to a beaker, and dissolved by boiling with dilute nitric acid. When completely dissolved a slight excess of caustic soda solution is added to the boiling solution to precipitate the copper as copper hydrate. The precipitate is then allowed to settle. The clear liquid is decanted through a filter paper; the precipitate is washed several times with hot water, the hot water being subsequently passed through the filter; and finally the precipitate is transferred to the filter and washed with hot water until free from caustic soda. Dry, ignite at dull red heat, and weigh as usual. To find the weight of metallic copper in the CuO thus obtained multiply by the factor 0.7885.

Zinc.—The filtrate from the copper sulphide is boiled until all the sulphuretted hydrogen in solution has been expelled, and is then treated with a few crystals of potassium chlorate to ensure complete oxidation. A slight excess of sodium carbonate is then added to precipitate the zinc and iron together as basic carbonates. After boiling, the precipitate is allowed to settle, the clear liquid is filtered, the precipitate is washed several times with hot water, and is then transferred to the filter and washed until free from sodium carbonate. The precipitate is dried, ignited at bright red heat until constant in weight, and weighed when cool as a mixture of ZnO and Fe_2O_3 , if both metals are present. From weight of mixed oxides deduct weight of Fe_2O_3 when the latter has been ascertained by the process described below. To find weight of metallic zinc in the ZnO thus obtained multiply by the factor 0.8026.

Iron.—Dissolve the mixed oxides of zinc and iron in boiling concentrated hydrochloric acid, then dilute and add a few drops of nitric acid. The solution is then nearly neutralised with sodium carbonate, and the iron in this faintly acid solution is subsequently precipitated as subacetate by the addition of a slight excess of neutral acetate of soda. Boil until the precipitate readily settles down and leaves a clear solution. Decant clear solution through filter, repeatedly wash precipitate with hot water, then transfer precipitate to the filter and wash. Dry, ignite, and weigh the precipitate as Fe_2O_3 . To find weight of metallic iron in Fe_2O_3 obtained, multiply by the factor 0.700.

GENERAL BUILDING NEWS.

CONGREGATIONAL CHURCH, NORWICH.—The memorial-stones of the new Congregational church in Magdalen-street, Norwich, were laid on the 27th ult. The new church faces east and west, with its main elevation to Magdalen-street. The material will be brick with stone dressings. The roof is covered with glazed Bridgewater tiles. The seating accommodation on the ground floor is for 300, and in the galleries for 200. The organ-chamber is at the west end, where it is flanked on either side by deacons' and minister's vestries. In front of the organ is the pulpit and choir, and beneath it is a church room, on a level with which are heating-chambers and galleries. The main entrance leads into a porch, with a vestibule on each side. Messrs. E. Boardman & Son, of Norwich, are the architects, and Messrs. Scarles Bros. of Norwich, the builders.

CHURCH HALL, GATESHEAD.—The Bishop of Durham has just laid the foundation-stone of a new hall in Beech-street, Sunderland-road, Gateshead, for St. James's parish. In addition to the hall there are to be large classrooms, which will be used for guilds, committees, and the like. The hall will be capable of holding about 600 people, and will be arranged with platform and retiring-rooms, with a tearoom. Pelaw deep red bricks are being used for the exterior and interior facings, and the roof will be covered with red tiles, a high dado being arranged around the hall of rich brown majolica glazed bricks. The architect of the buildings is Mr. J. H. Morton, of South Shields, and the contractors are Messrs. John Ross & Son, of Gateshead.

CHURCH, STOKES DAMERL.—The foundation-stone of the new parish church of St. Andrew, Stoke Damerl, Devonport, was laid recently, as we stated last week, on a site in the Great Sanctuary Field, opposite Collingwood-villas. The designs have been prepared by Mr. W. D. Carie, who also planned the rectory. There will be a tower 108 ft. high, surrounded by four pinnacles. The site has a southern slope from 120 ft. above the sea-level at the north-west angle of the church to

118 ft. at the south-east corner. On account of this fact the vestries will be located at the east end, and the main entrance will be at the tower in the centre of the south side of the building. The nave will be 124 ft. long, 33 ft. wide, and 54 ft. high; the aisles 115 ft. long, 22 ft. wide, and 30 ft. high; and the choir 42 ft. long, 25 ft. wide, and 52 ft. high. From the entrance to the choir there will be a rise of seven steps to the holy table, and a rise of 21 in. from the same line to the west end, where there will be a vaulted baptistry under a west gallery. The morning chapel, 52 ft. long, 18 ft. wide, and 27 ft. high, will be over the choir vestry, immediately to the east of the tower. Round the east end of the choir there will be an ambulatory, and on each side of the nave a passage formed by lines of internal buttresses. On the north of the choir, corresponding to the organ chamber on the south side, will be a musicians' gallery for instruments. Cornish polyphane stone will be used throughout in the erection of the building. The accommodation will be as follows:—Nave, 1,057; choir, 40; choir aisles, 24; morning chapel, 114; western gallery, 67; occasional, 50; total, 1,358. The first section to be built will include the morning chapel and vestry, at a cost of about 4,000l., and the contract is being carried out by Mr. W. Dart, of Crediton.

EXTENSION OF CHURCH SCHOOLS, DARLINGTON.—On the 4th inst. at St. John's Schools, Darlington, additions to the building were dedicated. The new work consists of classrooms, corridor, cloakroom, &c., and will cost about 1,600l. Mr. Agutter was the architect.

THEATRE, SUNDERLAND.—The Sunderland Watch Committee have had before them plans from Messrs. W. & T. R. Milburn, for Mr. H. Rudland, for a new theatre, to seat over 2,000 persons, on ground once occupied by the old Star Theatre, and other properties in Upper Sans-street. The plans have been approved by the Committee. Plans have also been approved by the Building Committee for alterations and improvements to the People's Palace.

WESLEYAN CHAPEL, KIRTON, LINCOLNSHIRE.—A new Wesleyan chapel and school were opened at Kirton recently. The architect was Mr. L. W. Wills, of Derby, and Messrs. Sherwin & Son, of Boston, were the builders, their contract being 1,042l. The new chapel is 50 ft. long and 30 ft. wide, and will seat 250 people, and the schools at the rear will accommodate 200 scholars.

PROPOSED AQUACADE, SHELTER, AND PROMENADE, BRIGHTON AQUARIUM.—A Report has been submitted by the Aquarium Committee of Brighton Town Council as to the proposed improvements at that institution. Mr. A. H. Tiltman, of London, is the architect.

PETERBOROUGH CATHEDRAL.—Mr. G. F. Bodley, R.A., has reported to the Peterborough Cathedral Restoration Committee that he finds one bay in the south aisle of the choir is in a very unsatisfactory state. There has been a settlement, and cracks have occurred showing through the depth of some large stones. The transverse vaulting rib in this bay is quite out of its proper shape. It has been shaken and is twisted, and the rubble "filling in" around has been disturbed. The settlement has affected the adjacent window, and the eastward in the aisle wall, one of its Mullions is bent and cracked, and part of the stone arch has slipped. At the annual meeting of the Restoration Committee it was decided that the work necessary be proceeded with at once, and it will dispose entirely of the balance the Committee has in hand. The sum of 1,500l. is still required for the repair of the east and south transepts, which will complete the work of preservation commenced in 1883. The cost of the restoration of the west front has been 13,000l.

INFIRMARY, RICHMOND.—Mr. J. Grant Lawson, M.P., opened the new infirmary of the Richmond (Surrey) Union on Saturday last. These buildings, designed by Mr. E. J. Partridge, form only a part of a large scheme, the old workhouse, given to the town by George III., having proved inadequate to meet the demands of the towns and villages of the union—viz., Richmond, Kew, Barnes, Mortlake, North Sheen, and Petersham. The new infirmary stands on the highest point of Richmond Hill, and overlooks Richmond Park, and accommodation is afforded for 174 inmates and officials, each of the two main blocks consisting of three floors with twenty-four beds, and an extra story on which wards have been constructed for the open-air treatment of consumption. The total cost of the infirmary, including a home for nurses, is 40,000l.

SANITARY AND ENGINEERING NEWS.

CARDIFF WATER SUPPLY.—A meeting of the Cardiff Waterworks Committee was held recently, when the Water Engineer (Mr. C. H. Priestley) presented a report as to the proposed new works and extensions. The report showed (a) the works already executed; (b) what further works are necessary and the estimated cost; (c) modification of the sums enumerated in the Provisional Order, making up a total of 97,000l. The report showed that the amount expended was 17,422l. 2s. 11d., and the amount required to complete the works in accordance with the estimate was 73,577l. 17s. 1d., making the total 91,000l. It was resolved that an application be made to the Local Government Board for

sanction to the borrowing of the sum of 98,000l., the difference between the 97,000l. and the sum agreed upon being accounted for by the suggested duplication of mains for municipal supply, the water to be taken from the River Ely, thus saving filtered water from the Taff Vawr Valley.

THE PROPOSED GRIMSBY DOCK EXTENSION.—A meeting of the Grimsby Corporation Dock Company, to consider the Great Central Railway Company's Parliamentary Bill for the proposed deep-water dock at Stallingborough, was held on the 8th inst. The Committee unanimously agreed that the proposed site was the best possible in the circumstances, but decided that the Corporation's support of the Bill could only be accorded provided that the railway company agreed to the following condition:—Any extension of the new dock must be eastward and not westward; that a direct roadway 65 ft. wide must be made from Immingham to Grimsby; that this, together with the whole of the land to the north and for 300 ft. to the south, be incorporated in the borough of Grimsby; and for these purposes the railway company, Grimsby Corporation, Grimsby Rural District Council, and landowners affected consent to the necessary agreement. Failing acceptance of these conditions the Grimsby Corporation will take whatever steps may be deemed essential to oppose the Bill in Parliament. The Committee has appointed a deputation to wait upon Sir Alexander Henderson and the Great Central directors, together with Sir John Wolfe Barry, at a meeting to be held in London on the 18th inst.

MISCELLANEOUS.

NORTHAMPTON INSTITUTE, CLERKENWELL.—On the 3rd inst., the Lord Chancellor (Lord Halsbury) distributed the prizes gained during the past year by students of the Northampton Institute, Clerkenwell. The ceremony took place in the large hall of the Institute. Mr. L. B. Sebastian, Chairman of the Institute, presided, and there were present representatives of various educational institutions, City Companies, and other bodies more or less interested in technical instruction. The Principal of the Institute, Mr. R. Mullineux Walsley, having made his annual report as to its condition, which was described as one of continued progress, the Chairman gave a short address, in which he remarked, with reference to the work of the Institute, that Clerkenwell had taken the advice of the Prince of Wales and "wakened up." Lord Halsbury, being called upon by the Chairman before the giving away of awards to successful students, said it filled him with the greatest admiration to see the magnificent hall of the Institute so completely filled by a gathering interested in technical education. He had been an examiner himself, and had wished he could give prizes to all the candidates, because even those who had not won prizes had gained more than these in themselves were worth in the education which had fitted them for their work. In this country we did not always rely so much as we did in some other countries upon Governments, the genius of the people of this country being to rely upon themselves and not merely to be "officialised" into questions. While congratulating the Institute on the work it was doing in the matter of technical education, he must also offer his congratulations in regard to the social element in its programme. After distributing the numerous prizes and certificates to the successful students of the Institute, the Lord Chancellor was awarded a hearty vote of thanks.

TREES IN WHITEHALL AND PARLIAMENT-STREET.—At a meeting of the Westminster City Council, held at the City Hall on Thursday last week, the Works Committee, reporting upon a reference, on the motion of Sir J. Wolfe Barry, as to the planting of trees in Whitehall and Parliament-street, from Horse Guards-avenue to Bridge-street, on both sides of the roadway, stated that they had obtained tenders—(a) for supplying and planting trees, 30l. 5s.; and (b) for supplying grids, guards, and kerbs, 190l. The number of trees required was put down at twenty-seven, and on the lowest tenders the initial cost would be 220l. 5s. Although Sir J. Wolfe Barry had offered to present the trees to the Council, the Committee did not see its way to recommend the adoption of the proposal, having regard to the cost which would be incurred. Alderman Emden explained that the question which had weighed with the Committee was whether if trees were planted in this thoroughfare they would live, seeing that the street was honeycombed with electric, and water mains, which would have a deleterious effect upon the roots. After some discussion the matter was referred to the Finance Committee.

BOARD ROOM, ELECTRA HOUSE.—Messrs. A. T. Arowsmith & Co. first mentioned that the furniture and fittings in this room, illustrated in our last issue, were made by them from the architect's designs.

NEW CLOCK AND CHIMES, SELBY ABBEY.—The Urban District Council, Selby, have given orders to Messrs. Wm. Potts & Sons, clock manufacturers, to send to Selby and make and fix a large size Cambridge quarter-chime clock, the tower of Selby Abbey, with four large external dials.

BUILDING BY-LAWS.—A meeting was held at 29, Bloomsbury-square, on Monday, on the question of

oppressive building by-laws. Sir William Chance presided, and after an address, in which he referred to cases of hardship in various parts of the country, he moved the following resolution:—That, in consequence of the general complaints about the oppressive nature of the model by-laws (drawn up originally to meet the needs of Urban Districts only) in Rural Districts or rural portions of Urban Districts, it is thought that the time has come for the formation of an association for the purpose of drawing public attention to the matter, and it is hereby resolved that an organisation be now formed, to be called the Building By-law Reform Association, to promote amendments of building by-laws, so as to limit official control of private buildings to what only the public health and safety demand, and thus remove encroachments on individual liberty." The resolution was seconded by Mr. E. D. Tilt, and supported by Messrs. A. H. Clough, W. M. Acworth, Anderson, Graham, Christopher Turner, Mark Judge, E. L. Lutyens, Thackeray Turner, A. H. Vowell, Lacy Ridge, and R. W. Schultz. The resolution was carried unanimously, and a provisional council was elected, Mr. R. A. Read, of 45, Parliament-street, being appointed secretary, *pro tem*.

THE "RED HOUSE," BEXLEY HEATH.—The home of the late William Morris, the "Red House," at Bexley Heath, was sold by auction at Tokenhouse-yard on the 8th inst. The poet's house stands in an acre and a half of ground, a large portion of which was converted by him into an old English garden. The walls of the house have been painted by Sir Edward Burne-Jones. The house was sold at 2,850*l*.

APPOINTMENT OF SANITARY OFFICER.—The Local Government Board has sanctioned the appointment of Mr. H. R. Hardy as a Sanitary Inspector in Wandsworth.

LEGAL.

ACTION BY A BUILDER AGAINST BREWERS.

The hearing of the case of Holloway v. Truman, Hanbury, Buxton, & Co., concluded before Mr. Justice Lawrence and a special jury in the King's Bench Division on the 5th inst.

The action was brought by the plaintiff, Mr. H. L. Holloway, a builder carrying on business at the Union Works, Deptford, against the defendants, the well-known London brewers, to recover the sum of 5,444*l*, being the balance alleged to be due to the plaintiff from the defendants on the architect's final certificate in respect of work done in rebuilding the Elephant and Castle, in Newington Butts, S.E. The amount in the case was not in dispute, the only question being who employed the plaintiff to do the work—Mr. Meetings, the licensees, or Messrs. Truman, Hanbury, Buxton, & Co., and whether the latter had represented to the plaintiff that if he entered into the contract they would see that the funds were provided for him. It appeared that the brewers on April 30, 1901, after the work had been completed, served Mr. Meetings with a notice to pay them some 70,000*l*, which they had advanced, and on his failure to do so they took possession of the house and are in it now.

The jury, after hearing the evidence, found that the plaintiff had no authority from the defendants to carry out the alterations.

Judgment was accordingly entered for the defendants.

Mr. Macaskie, K.C., and Mr. Acland appeared for the plaintiff; and Sir Edward Clarke, K.C., Mr. R. M. McCall, K.C., Mr. Cleave, and Mr. Buxton for the defendants.

IMPORTANT ACTION AGAINST THE HUDDERSFIELD CORPORATION.

In the Court of Appeal, composed of the Master of the Rolls and Lords Justices Romer and Mathew on the 6th inst., the hearing was concluded of the case of Beaumont and others v. the Mayor, &c., of Huddersfield, on the application of the defendants for judgment or new trial on appeal from verdict and judgment entered at the trial before Mr. Justice Grantham and a special jury at the Leeds Assizes.

In this case, Messrs. Samuel Beaumont, Quarby & Sykes, A. T. Woodhead & Sons, G. W. Oldham, and G. T. Oldham (trading as G. W. Oldham), Taylor Bros., Henry Oldham, W. Halstead & Sons, Goddard Beaumont & Co., Ltd., eight mill occupiers having mills on the banks of the Brow Grains Dike, at Meltham, near Huddersfield, brought the action (the actions being consolidated) against the Huddersfield Corporation for compensation or penalties for neglecting to send down a certain quantity of water per day which by law they were entitled to send down from the reservoir at Blackmoor Foot.

It appeared that under their Waterworks Act of 1860 the Huddersfield Corporation, as the water authority, were empowered to impound considerable quantities of the water which used to flow into two or three streams, one of them being the Brow Grains Dike at Meltham, upon the banks of which the mills of the present plaintiffs were built. To compensate the millowners for the water so taken

by the Corporation, the Act required the Corporation to return to the stream 951 gallons per minute from the reservoir, failing which the Corporation should be penalised to the extent of 5*l*. per day on every working day on which a shortage occurred. The plaintiffs' case was that during forty-three days between September 23 and November 11, 1901, the statutory amount of compensation water was not sent down by the Corporation, and each of the eight plaintiffs claimed 215*l*, representing the penalty or compensation payable by the Corporation at the rate of 5*l*. per day. Section 28 of the Act provided that the Corporation should cause to flow from the reservoir to be constructed at or near Blackmoor Foot down a pipe or aqueduct into the Brow Grains Dike, at a point near to and above New Bridge Mill, 951 gallons per minute during the following hours of every lawful working day, viz., from 9 a.m. to 6 p.m. Section 32 of the Act provided that if there should be any neglect of the Corporation to maintain any such gauge in a state of efficiency, and in case of any other neglect by or in consequence of which any of the several quantities of water from the reservoir should not so flow, the Corporation should, every day on which such neglect occurred, forfeit and pay to the occupiers of each of the mills and works affected thereby the sum of 5*l*, and should in addition make compensation for any loss or damage sustained by the occupiers or any of them in respect of which such penalties were an insufficient compensation. The plaintiffs alleged that in consequence of the negligence of the Corporation, the statutory quantity of compensation water did not so flow during the days mentioned and they claimed each 215*l*, being the aggregate amount of penalties of 5*l*. per day for forty-three days.

The defendants pleaded several defences to the action. They denied that they had been guilty of any negligence; and alleged that the quantity of water required for the Act did, in fact, flow into the dike on the days in question. They further said that if it did not so flow, the deficiency was due to the act of God in causing a drought of exceptional character which prevented such water flowing as required by the Act. They further denied that the plaintiffs had suffered any damage and pleaded the Statute of Limitations. Defendants alternatively pleaded that on the true construction of Sections 28 and 32 of the Act of 1860 they were not liable for more than one penalty in respect of each of the days upon which their alleged neglect caused the deficiency of the statutory amount of compensation water to flow into Brow Grains Dike, and that such penalty was payable either to all the plaintiffs jointly or to the plaintiff or plaintiffs who first sued them, and defendants brought 215*l*. into Court as being sufficient to satisfy the claims of all the plaintiffs in the consolidated actions. At the trial the jury returned a verdict for the plaintiffs for the full amount of each plaintiff's claim, and judgment was entered accordingly. From this judgment the defendants now appealed on the ground that there was no evidence of negligence on their part, that the learned judge had misdirected the jury, and that on the true construction of the sections of the Act they were not liable for a larger sum than they had paid into Court.

Mr. Tindal Atkinson, K.C., Mr. W. H. Upjohn, K.C., and Mr. R. W. Harper appeared for the plaintiffs, and Mr. F. C. Fox, K.C., and Mr. W. J. Waugh for the respondents.

At the conclusion of the arguments of counsel, the Master of the Rolls, in giving judgment, said it was clear that a duty was imposed on the defendants, and the question was whether the plaintiffs had made out that there had been a breach of it. The plaintiffs' complaint was that the pipe through which the water flowed from the reservoir was of such a character that, though, if there had been a head of water of more than 11 ft., it would have been adequate for bringing all the water that they were entitled to, yet when the head of water was less than 11 ft., it was inadequate for doing so. The reservoir was well constructed and of ample size, and the pipe theoretically of proper or sufficient dimensions. The plaintiffs, however, proved that they did not get their proper supply of water and that the pipe did not do what, if efficient, it should have done. This established a *prima facie* case against defendants, which called for an explanation on their part. The plaintiffs also proved that during the period of insufficient supply defendants were selling water, and thereby diminished the amount of water which would have been otherwise available for their supply. The plaintiffs had called expert evidence at the trial, suggesting that the possible cause of the failure was that the pipe had become obstructed by corrosion or some kind of deposit, and that iron pipes required reasonable inspection and diligence. Defendants called no expert evidence to deny this, and they admitted that no inspection of the pipe had taken place for the thirty years it had been in existence. In these circumstances he thought that the appeal must be dismissed. He saw no misdirection by the learned judge. It was clear, from the express words of Section 32, that the penalties were payable to the occupiers of each of the mills affected by the neglect.

The Lords Justices concurred, and the appeal was accordingly dismissed with costs.

ACTION FOR ALLEGED BREACH OF COVENANT.

INTERESTING POINT OF LAW.

THE case of *Bicmore v. Dimmer* came before the Court of Appeal, composed of Lords Justices Vaughan Williams, Stirling, and Cozens-Hardy on the 4th inst., on the defendant's appeal from a mandatory order made by Mr. Justice Farwell in the Chancery Division on March 11 last, requiring defendant to remove a clock from the premises occupied by him as a jeweller, in Church-street, Liverpool.

Mr. C. E. Jenkins, K.C., who appeared with Mr. Rutherford for the appellant, said that the question was mainly one of law. The appellant held a lease of the premises in question for the purpose of carrying on a jeweller's business, and had put up a clock outside as a trade sign. Mr. Justice Farwell had held that that was an alteration within the meaning of a covenant against alterations. The clock in question was a hollow iron drum of light construction affixed to the premises at about 30 ft. from the ground, and it was attached to the wall by four stays and half-a-dozen iron bolts. A surveyor called by the plaintiff estimated that the removal of the clock would cost 15*l*. or 20*l*. if new blocks of stone were substituted for those into which the bolts had been driven, and when it was suggested that the bolts might be cut off flush, the witness said that that would be sufficient. The premises were leased to a Mr. Heath for a term of twenty-one years from January 1, 1890, and the lease contained a covenant that the lessee would not make or suffer to be made any alteration of the premises without the consent of the lessors. In December, 1900, Heath assigned the lease to the appellant without the consent of the lessors, and they brought an action to compel forfeiture, but the action was compromised by an agreement of March 7, 1901, under which the appellant paid the lessors 10*l*. on account of costs and covenanted not to carry on the business of a jeweller on a particular part of the premises. That covenant the appellant had strictly observed, and the clock was on the unrestricted part. In some reported cases a covenant not to alter premises was contrasted with a covenant not to put up trade signs, and the learned counsel's submission was that this clock was nothing more than a trade sign. It was not clear whether a trade sign was in the nature of a fixture, or remained a mere chattel like a mirror, but there was the case of a sign of an oak painted by David Cox for the landlord of a public-house at Bettws-y-Coed, which was authority for saying that a public-house sign was in the nature of a trade fixture. The law recognised that when a house was let for the purposes of trade the tenant was allowed to put up such fixtures as were necessary or usual in connexion with his trade. He put it that the covenant was meant to apply to structural alterations, and that the affixing of the iron stays to the wall did not make a structural or substantial alteration of any kind.

Mr. Butcher, K.C. (with him Mr. Cochrane), on behalf of the respondents (plaintiffs), said that in February, 1901, the appellant wrote to the lessors' solicitors asking for leave to put up the clock, for which he had obtained the consent of the Corporation, but leave was refused, and nothing further was done till November, when the clock was fixed without the respondents' leave. What they objected to was not the clock itself, but the actual physical alteration in the structure of the premises by boring bolt-holes 6 in. deep into the stonework.

At the conclusion of the arguments of counsel, Lord Justice Vaughan Williams, in giving judgment, said he was unable to hold that every addition to the premises, whether it altered the form or construction of the premises or not, was within the meaning of the word "alteration," and in his opinion the clock fixed to the outside did not come within the prohibition. They ought so to draw the line defining the meaning of the covenant as that it should not operate to prevent a lessee who was intending to carry on business on the premises from doing those acts which were convenient and useful to his business.

Lord Justice Stirling agreed, and added that in his opinion the erection of the clock was a reasonable and proper mode of drawing the attention of the public to the business the appellant was carrying on.

Lord Justice Cozens-Hardy also concurred. The appeal was accordingly allowed, and the action dismissed with costs.

SEWAGE DISPUTE AT AYLESBURY.

THE hearing of the case of *Lee v. Aylesbury Urban District Council* was concluded before Mr. Justice Buckley in the Chancery Division on the 8th inst. The case came before his lordship on an application by the plaintiff that a writ of sequestration might issue against defendants on the ground that defendants had wilfully disobeyed an injunction granted by his lordship on July 20, 1901. It appeared that on this date his lordship granted a perpetual injunction restraining defendants from allowing sewage to pass from their sewers or works into the Haydon Millstream so as to be a nuisance to the plaintiff or his tenants. The plaintiff, in July, 1902, applied by motion for

liberty to issue a writ in order to sequestrate the goods and chattels of the personal estate and the rents and profits of the real estate belonging to the defendants, on the ground that defendants had been guilty of a contempt of Court in disobeying the injunction. When the motion was heard a Mr. George Chatterton, M.Inst.C.E., was directed by his lordship to report to the court what, if anything, ought to be done to increase the capacity of the defendants' works in order that they might be sufficient to efficiently deal with the sewage which required treatment in the defendants' works. That gentleman made his report last month, and the plaintiff's case now was that this report showed that the defendants had been guilty of contempt in disobeying the injunction.

Mr. Ingpen, K.C. (with him Mr. Howard Wright), for the plaintiff, asked his lordship to make a similar order to that made by the late Lord Justice Chitty in the case of the Attorney-General v. The Walthamstow Urban District Council, who ordered the writ to go, that is to the effect for a certain period to enable the Urban District Council to apply for an extension of time.

Mr. Astbury, K.C. (with him Mr. R. C. Glen), for the defendants, asked that only costs as between party and party might be ordered, or that, at any rate, if the writ should issue that it should be directed to go to the office for a considerable length of time to enable the defendants to consider what could be done by them to abate the nuisance.

His Lordship, in the result, made an order for sequestration, but directed that the writ should lie in the office for six months on the defendants undertaking to carry out Mr. Chatterton's recommendations as comprised in his report, such work to be done under Mr. Chatterton's supervision with such modifications as the defendants might suggest and Mr. Chatterton approve; but no modification was to be made without the plaintiff being first heard by Mr. Chatterton. His lordship also directed that defendants should clean out and remove the mud from the stream from the outfalls to the Haydon Mill within a month after Mr. Chatterton had certified the works to have been completed. The defendants were also ordered to pay all the costs of and incidental to the motion, including all Mr. Chatterton's fees and the fees of the plaintiff's experts. Liberty to apply was given to the defendants at the expiration of the six months.

MEETINGS.

FRIDAY, DECEMBER 12.

Institution of Junior Engineers (Westminster Palace Hotel).—Mr. A. T. Swaine on "A New Automatic Railway Coupling, Compared with the Existing System on British Railways." 8 p.m.

MONDAY, DECEMBER 15.

Royal Institute of British Architects.—Mr. Arthur J. Evans F.R.S., LL.D., on "The Palace of Knossos, Crete." 8 p.m.

Philosophical Society of Glasgow (Architectural Section).—Mr. E. C. Morgan on "The Construction of Spires, with special reference to that of St. Mary's Cathedral, Edinburgh." 8 p.m.

Liverpool Architectural Society (Incorporated).—Mr. David Beveridge on "Sir John Vanbrugh and his Work." 8 p.m.

Society of Arts (Cantor Lectures).—Professor Vivian B. Lewes on "The Future of Coal Gas and Allied Illuminants." 8 p.m.

TUESDAY, DECEMBER 16.

Glasgow Architectural Association.—Mr. J. M'Kissock on "Architectural Photography." 8 p.m.

Institution of Civil Engineers.—Mr. Stephen Martin-Leake on "The Rupnarayan Bridge, Bengal-Nagpur Railway." 8 p.m.

WEDNESDAY, DECEMBER 17.

Architectural Association (Joint Meeting of Camera and Cycling Club and Discussion Section).—Mr. Francis Bond, M.A., on "English Medieval Capitals," illustrated by lantern-slides. 7.30 p.m.

Builders' Foremen and Clerks of Works' Institution.—Annual meeting of the Directors. Mr. T. Aldwinckle on "The Erection of Isolation Hospitals in Times of Emergency. A Description of the Hospitals Erected this Year in connection with the recent Outbreak of Small-pox in London." Illustrated. 8 p.m.

Society of Arts.—Mr. Archibald P. Head, Mem.Inst.C.E., on "The South Russian Iron Industry." 8 p.m.

THURSDAY, DECEMBER 18.

Leeds and Yorkshire Architectural Society (Craft Evening).—(1) Mr. E. C. Spruce on "Modeling." (2) Mr. A. Willmott on "Door Furniture." 6.30 p.m.

Institution of Electrical Engineers.—Mr. W. B. Esson on "Recent Electric Designs." 8 p.m.

FRIDAY, DECEMBER 19.

Architectural Association.—Mr. W. D. Bidlake on "The Study and Delineation of Old Buildings." 7.30 p.m.

Institution of Mechanical Engineers.—Mr. J. N. S. Williams on "Recent Practice in the Design, Construction, and Operation of Raw Cane Sugar Factories in the Hawaiian Islands." If time permits, there will be presented to the meeting a brief report from the Committee appointed by the Council April last to consider and analyse the written communications received in continuation of the discussion on the standardisation of flanges and flanged fittings. 8 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. P. R. Way on "Electricity Supply from Double-Current Generators." 8 p.m.

SATURDAY, DECEMBER 20.

The Craft School (Globe-road, Bethnal Green, E.).—Mr. G. Laurence Gomme on "Old Christmas Customs." 8.30 p.m.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

November 25.—By W. SALISBURY & HAMER (at Manchester).
Bredbury, Cheshire.—Hyde's Imperial Rubber Works, area 3 a. 0 r. 34 p. f. (as a going concern). £15,550

November 28.—By Messrs. SPELMAN (at Norwich).
Norwich.—St. Andrew's-st., corner business premises, area 10 rods, f. y. r. 30l. 650
9 and 10, Rodwell-st. (offices), f. y. r. 35l. 550
10, Briggs-st. (S), f. y. r. 65l. 1,000

November 29.—By STRETHORN & ALEXANDER (at Cardiff).
Llandfodwy, Glamorgan.—Glyn Llan Mountain, area 86 a. 3 r. 24 p. (including minerals), f. 4,000
Runney, Glamorgan.—Two cophold pasture fields, 4 a. 0 r. 17 p. 400

December 1.—By DYER, SON, & HILTON.
Lee.—Burnt Ash-rd., lg. r. 3 64l., u.t. 57 yrs., g. r. 1,180
Tainton-rd., lg. r. 5 34l., u.t. 57 yrs., g. r. 550

By ALFRED RICHARDS.
Ponders End.—1 to 4, Mould-cottages, f. w. r. 72l. 16s. 770
Edmonton.—19 to 22, Beale-st., u.t. 73 yrs., g. r. 720, w. r. 78l. 720

By WRIFFORD & DIXONS.
Regent's Park.—25, Gloucester-rd., u.t. 414 yrs., g. r. 13l. 11s. e.t. 80l. 610
By Messrs. TROLOPE & WOLMAR.
Kensington.—Pembroke-rd., &c., &c., a freehold estate, comprising f. g. r. 12, 27l. 16s. 9d., area 82 acres, reversions varying from 30 to 90 yrs. (in one lot). 565,000

December 2.—By DEBENHAM, TEWSON, & CO.
Clapham.—36 and 38, Clapham-rd. (S), f. p. 1,980
By C. GERRETT & CO.
Norwood.—35, Albert-rd., u.t. 62 yrs., g. r. 57l. 230
82, Colden-rd., u.t. 50 yrs., g. r. 9l. e.t. 34l. 135

By HILNERY & CO.
Hoxton.—76, Buckland-st., u.t. 32 yrs., g. r. 57l. 340
13, Alma-st., u.t. 32 yrs., g. r. 57l. 340

By G. FRANK & SONS.
Walthamstow.—81, Somerset-st. (S), u.t. 94 yrs., g. r. 10l. y. r. 40l. 330
Leyton.—5, Shortland-st., u.t. 79 yrs., g. r. 3l. 10s. e.t. 34l. 270

By FREDERICK WARMAN.
Barnsbury.—71, Roman-rd., u.t. 56 yrs., g. r. 6l. y. r. 40l. 350
17, 19, and 21, Crossley-st., u.t. 79 yrs., g. r. 22l. 15s. y. r. 120l. 7,913

By HUBERT & FLINT (at Watford).
Abbots Langley, Herts.—Breakspear-rd., three freehold cottages, w. r. 37l. 4s. 495
By J. J. HILL & WEAVER (at Masons' Hall Tavern).
Hammersmith.—Blythe-rd., the Freemasons' Arms p-h., u.t. 534 yrs., y. r. 100l., with goodwill. 9,000

By Wm. ROLFE (at Masons' Hall Tavern).
Barnes.—Castellau, the Red Lion p-h., u.t. 989 yrs., y. r. 120l., with goodwill. 74,330
December 3.—By BURLEY & BRACKENBURY.
Ealing.—25, Hanger-lane, u.t. 754 yrs., g. r. 17l. e.t. 110l. 1,200

By FOSTER & CRANFIELD.
Putney.—41, Oakhill-rd., u.t. 82 yrs., g. r. 10l. 13s. y. r. 55l. 610
By E. GIBBS & CO.
Kennington.—26, St. Paul's-rd., u.t. 47 yrs., g. r. 4l. y. r. 28l. 3,025

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Ealing.—25, Hanger-lane, u.t. 754 yrs., g. r. 17l. e.t. 110l. 1,200

By HIGGINS & SON.
St. John's Wood.—18, Finchley-rd. (S), u.t. 17 yrs., g. r. nil, y. r. 50l. 75
32, Queen's-bt., u.t. 17 yrs., g. r. 5l. y. r. 45l. 75

By INMAN & CRIER.
Chancery-lane.—13, Took's-court, f. y. r. 70l. 1,800
By MARK LIEBL & SON.
Stratford.—4, 6, and 8, Frederick-st., u.t. 55 yrs., g. r. 3l. 3s. w. r. 28l. 440

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32, Queen's-bt., u.t. 17 yrs., g. r. 5l. y. r. 45l. 75

By INMAN & CRIER.
Chancery-lane.—13, Took's-court, f. y. r. 70l. 1,800
By MARK LIEBL & SON.
Stratford.—4, 6, and 8, Frederick-st., u.t. 55 yrs., g. r. 3l. 3s. w. r. 28l. 440

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32, Queen's-bt., u.t. 17 yrs., g. r. 5l. y. r. 45l. 75

By BOULTON & COOPER (at Malton).
Norton, &c., Yorks.—The Norton Parks Farm, 145 a. 3 r. 20 p., f. p. 45,100
Three closes of grass land, 8 a. 3 r. 37 p., f. y. r. 30l. 920

Huttons Ambo, Yorks.—Seven closes of land, 35 a. 3 r. 7 p., f. y. r. 90l. 3,425
By W. D. SHADRAKE (at Leyton).
Leyton.—105, Maffing-st., f. w. r. 174l. 12s. 1,630
253, High-rd., u.t. 78 yrs., g. r. 54s. y. r. 28l. 315

7, St. Mary's-rd., f. w. r. 35l. 2s. 360
40 and 48, Creswell-rd., f. w. r. 57l. 4s. 350
Walthamstow.—2 and 11, Pearl-rd., u.t. 93 yrs., g. r. 10l., w. r. 59l. 16s. 380

By G. A. WILKINSON & SON (at Leicester).
Streton-en-le-Field, Leicester.—The Streton Hall Estate, 885 a. 2 r. 7 p., f. (including the Lordship of the Manor). 30,000

December 4.—By C. RAWLEY CROSS & CO.
Shepherd's Bush.—37, Shepherd's Bush-rd., u.t. 814 yrs., g. r. 10l. 10s. e.t. 65l. 650
43, Uxbridge-rd., u.t. 986 yrs., g. r. 3l. e.t. 75l. 9-5

Chiswick, Chiswick-la., Fernside and Hazelmere, u.t. 83 yrs., g. r. 19l. y. r. 125l. 1,500
9 and 11, Dacre-rd., u.t. 88 yrs., g. r. 16l. y. r. 80l. 900

By FISHER, STANHOPE, & DRAKE.
Stoke Newington.—14, Osbaldeston-rd., u.t. 78 yrs., g. r. 74l. e.t. 50l. 1-0
Clapton.—19, Richmond-st., u.t. 78 yrs., g. r. 6l. y. r. 30l. 125

Hackney.—222, Amhurst-rd., u.t. 441 yrs., g. r. nil, p. 110
By CURTIS & COLLINS.
Hyde Park.—30, Park-la., u.t. 48 yrs., g. r. 180l. 1-20

Islington.—Popham-st., f. g. r. 13l. 10s., reversion 10 yrs. 10
Hornsey Rise.—Hornsey-rd., u.t. 47 yrs., g. r. 75l. 1,350
Islington.—Grosvenor-st., f. g. r. 25l., reversion 45 yrs. 690

By DODD & CO.
Commercial-rd.—East-End, 785a and 785b (S), y. r. 120l., also f. g. r. 140l., reversions in 49 and 90 yrs. 6,100
Hampstead.—3, Eton-rd., u.t. 53 yrs., g. r. 3l. e.t. 60l. 600

By NEWBORN, EDWARDS, & SHEPHERD.
Caledonian-rd.—No. 429 (S), u.t. 484 yrs., g. r. 12l. y. r. 50l. 510
67, Blundell-rd., u.t. 40 yrs., g. r. 44l. 10s. y. r. 16l. 110

Kentish Town.—51, Carlton-rd., u.t. 54 and 47 yrs., g. r. 3l. 3s. 300
Highbury.—3, Beresford-rd., u.t. 47 yrs., g. r. 8l. 8s. y. r. 50l. 450
Islington.—High-st., Peppercorn f. g. r., reversion in 24 yrs. 600

Barnsbury.—43, Cloudeley-rd. (S), u.t. 144 yrs., g. r. 4l. w. r. 45s. 10s. 150
Stoke Newington.—75, Bouvier-rd., u.t. 684 yrs., g. r. 5l. 10s. y. r. 24l. 390

4, King-rd., u.t. 57 yrs., g. r. 81s. e.t. 50l. 450
Dalston.—Lenthall-rd., f. g. r. 77l. 10s., u.t. 35 yrs., g. r. 6l., with reversion. 1,380
Hackney.—23, Breckley-rd., u.t. 44 yrs., g. r. 14l. y. r. 40l. 410

Leyton.—88, Warren-rd., u.t. 95 yrs., g. r. 4l. e.t. 37l. 310
Leytonstone.—263 to 285 (odd), Odessa-rd., u.t. 82 yrs., g. r. 4l. w. r. 280l. 16s. 1,550

Tottenham.—44 to 50 (even), Cornwall-rd., u.t. 514 yrs., g. r. 27l. w. r. 114l. 8s. 515
By NOTY, CARTWRIGHT, & FICHES.
Pimlico.—7, Johnson's-pl., u.t. 22 yrs., g. r. 5l. w. r. 54l. 12s. 205

By STUBBS & SONS.
Stroud Green-rd., Womsey-rd., f. y. r. 50l. 10s. 850
Pimlico.—12, Churton-st., u.t. 261 yrs., g. r. 6l. 10s. y. r. 50l. 415

41, Westminster-rd., u.t. 814 yrs., g. r. 50l. 400
173, Vauxhall Bridge-rd., u.t. 214 yrs., g. r. 7l. y. r. 65l. 410

Southern-rd., Emerson-rd., f. w. r. 33l. 16s. 425
Bermondsey.—47, Abbey-st. (S), f. w. r. 34l. 4s. 445
37, 38, and 39, East-lane, f. w. r. 8l. 10s. 850

228, Fretted-rd., u.t. 32 yrs., g. r. 54l. w. r. 33l. 16s. 250
39, Beatrice-rd., u.t. 354 yrs., g. r. 54l. w. r. 33l. 16s. 255

Camberwell.—23, 24, and 26, Caspian-st., f. w. r. 100l. 48s. 1,250
Brookley Vestry-rd., f. g. r. 64l. w. r. 74l. 78s. g. r. 58s. 105

Brixton.—36, Chantry-rd., u.t. 694 yrs., g. r. 6l. 10s. g. r. 37l. 400
By DOUGLAS YOUNG & CO.
Tottenham.—Ferry-lane, a corner block of building land, f. 1,100

Ferry-lane, a corner building site, u.t. 100 yrs., g. r. 15s. w. r. 57l. 425
Fawley-rd., a freehold building site. 200

December 5.—By WM. CLARKE.
Poplar.—81, Culodest-st., and 81, Dec-st., u.t. 205 yrs., g. r. 15s. w. r. 57l. 425
1 and 2, Rook-st., u.t. 70 yrs., g. r. 9l. 430

39l. 430
By A. HARRIS & CO.
Pentonville.—1, Percy-rd., u.t. 293 yrs., g. r. 6l. e.t. 30l. 550

By WILTSHIRE & THURGOOD.
Brookley.—68 and 100, Adelaide-rd., u.t. 94 yrs., g. r. 134s. y. r. 71l. 815
15, Montague-av., u.t. 914 yrs., g. r. 10l. y. r. 40l. 550

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PRICES CURRENT OF MATERIALS.

*Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	s. d.	
Hard Stocks	1 13	0 per 1,000 alongside, in river.
Rough Stocks	2 10	0 " " " "
Crizes	2 12	0 " " " "
Facing Bricks	8 5	0 " " " "
Shippers	8 5	0 " " " "
Flemons	1 7	6 " at railway depôt
Red Wire Cuts	1 12	0 " " " "
Best Fareham Red	3 12	0 " " " "
Best Red Pressed		
Ruabon Facing	5 0	0 " " " "
Best Blue Pressed	4 5	0 " " " "
Staffordshire	4 11	0 " " " "
Do, Ballnose	4 11	0 " " " "
Best, Stourbridge	4 8	0 " " " "
Fire Bricks	4 8	0 " " " "

GLAZED BRICKS.

Best White and Ivory Glazed	13 0	0 " " "
Stretchers	13 0	0 " " "
Headers	13 0	0 " " "
Quoins, Bullnose, and	17 0	0 " " "
Double Stretchers	16 0	0 " " "
Double Headers	16 0	0 " " "
One Side and two Ends	19 0	0 " " "
Two Sides and one End	20 0	0 " " "
Splays, Chamfered, Squints	20 0	0 " " "
Best Dipped Salt Glazed Stretchers and Headers	12 0	0 " " "
Quoins, Bullnose, and Flats	14 0	0 " " "
Double Stretchers	15 0	0 " " "
Double Headers	14 0	0 " " "
One Side and two Ends	15 0	0 " " "
Splays, Chamfered, Squints	14 0	0 " " "
Seconds Quality White and Dipped Salt Glazed	8 0	0 " less than best.
Thames and Pit Sand	7 0	0 per yard, delivered
Best Portland Cement	30 0	0 per ton, delivered.

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime..... 10s. 6d. per yard, delivered

Stourbridge Fire-clay in sacks, 27s. 0d. per ton at rly. dep.

STONE.

	s. d.	
Ancaster in blocks	1 11	per ft. cube, deld. rly. depôt
Bath	1 7	0 " " "
Leigh Down Bath	1 8	0 " " "
Beer	1 6	0 " " "
Grinshill	1 10	0 " " "
Brown Portland in blocks	2 4	0 " " "
Darley Dale in blocks	2 4	0 " " "
Red Corshill	2 4	0 " " "
Cloisburn Red Freestone	2 4	0 " " "
Red Mansfield	2 4	0 " " "
York Strong-ribbed Food Quality	2 10	0 " " "
Scrapped random blocks	3 0	0 per ft. cube
6 in. sawn two sides landings to sizes (under 40 ft. sup.)	2 8	0 per foot super.
6 in. Rubbed two sides	2 6	0 " " "
6 in. sawn two sides slabs (random sizes)	0 11	0 " " "
6 in. to 2 1/2 in. Sawed one side slabs (random sizes)	0 7 1/2	0 " " "
6 in. to 2 1/2 in. ditto, ditto	0 6	0 " " "
BEST HARD YORK—Scrapped random blocks	3 0	0 per ft. cube
6 in. sawn two sides landings to sizes (under 40 ft. sup.)	2 8	0 per ft. super.
6 in. Rubbed two sides	2 6	0 " " "
6 in. sawn two sides slabs (random sizes)	0 11	0 " " "
6 in. self-faced random	0 5	0 " " "
6 in. to 2 1/2 in. (Hard Bed) in blocks	2 3	0 per ft. cube, deld. rly. depôt
6 in. to 2 1/2 in. sawn both sides landings	2 7	0 per ft. super. deld. rly. depôt
6 in. to 2 1/2 in. 3 in. do.	2 11	0 " " "

SLATES.

	s. d.	
Best blue Bangor	13 6	per 1000 of 2200 sq. ft. dep.
Best blue second	13 7	0 " " "
Best blue third	12 15	0 " " "
Best blue fourth	13 10	0 " " "
Best blue fifth	7 0	0 " " "
Best blue sixth	12 5	0 " " "
Best blue seventh	10 10	0 " " "
Best blue eighth	11 10	0 " " "
Best blue ninth	8 7	0 " " "
Best blue tenth	9 0	0 " " "
Best blue eleventh	6 5	0 " " "

PRICES CURRENT (Continued).

TILES.

	s. d.	
Best plain red roof tiles	42	0 per 1,000, at ly. depôt.
Hip and valley tiles	3	7 per doz.
Best Brosey tiles	0	0 per 1,000
Do. Ornamental tiles	52	0 " " "
Hip and valley tiles	4	0 per doz.
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6 per 1,000
Do. Ornamental Do.	60	0 " " "
Hip tiles	4	0 per doz.
Valley tiles	3	0 " " "
Best Red or Mottled Staffordshire Do. (Penkes)	51	0 per 1,000
Do. Ornamental Do.	54	6 " " "
Hip tiles	4	0 per doz.
Valley tiles	3	0 " " "
Best "Rosemary" brand plain tiles	48	0 per 1,000
Do. Ornamental Do.	50	0 " " "
Hip tiles	4	0 per doz.
Valley tiles	3	0 " " "

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard.	
Deals: best 3 in. by 11 in. and 4 in. by 11 in.	15 10	0 10 0
Deals: best 3 in. by 11 in. and 4 in. by 11 in.	14 10	0 10 0
Battens: best 2 1/2 in. by 7 in. and 8 in. by 7 in.	11 10	0 10 0
Battens: best 2 1/2 in. by 6 in. and 3 in. by 6 in.	10 10	0 10 0
Deals: seconds	10 10	0 10 0
Battens: seconds	10 10	0 10 0
2 in. by 4 in. and 2 in. by 6 in.	9 10	0 10 0
2 in. by 4 in. and 2 in. by 6 in.	8 10	0 10 0
Foreign Sawed Boards	10 10	0 10 0
1 in. and 1 1/2 in. by 7 in.	10 10	0 10 0
3 in. by 11 in.	10 10	0 10 0
Four timber: Best middling Danzig or Memel (average specification)	4 10	0 5 0
Seconds	4 5	0 4 10
Small timber (8 in. to 10 in.)	3 12	0 3 10
Small timber (6 in. to 8 in.)	3 0	0 3 10
Swedish balks	15 10	0 3 10
Pitch-rimber (30 ft. average)	3 5	0 3 10

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.	23 0	0 24 0
3 in. by 9 in.	21 0	0 21 0
Battens, 2 1/2 in. and 3 in. by 7 in.	17 0	0 18 0
Second yellow deals, 3 in. by 11 in.	18 10	0 20 0
3 in. by 9 in.	13 10	0 14 0
Battens, 2 1/2 in. and 3 in. by 7 in.	15 10	0 16 0
2 1/2 in. by 7 in.	12 10	0 13 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 0	0 21 0
3 in. by 9 in.	18 0	0 19 0
Battens, 2 1/2 in. and 3 in. by 7 in.	13 10	0 14 0
Second yellow deals, 3 in. by 11 in.	16 0	0 17 0
3 in. by 9 in.	14 10	0 15 0
Battens, 2 1/2 in. and 3 in. by 7 in.	11 10	0 12 0
Third yellow deals, 3 in. by 11 in.	13 10	0 14 0
3 in. by 9 in.	10 10	0 11 0
Battens, 2 1/2 in. and 3 in. by 7 in.	10 10	0 11 0
White Sea and Petersburg: First white deals, 3 in. by 11 in.	14 10	0 15 0
3 in. by 9 in.	12 10	0 13 0
Battens, 2 1/2 in. and 3 in. by 7 in.	13 10	0 14 0
Second white deals, 3 in. by 11 in.	12 10	0 13 0
3 in. by 9 in.	9 10	0 10 0
Battens, 2 1/2 in. and 3 in. by 7 in.	10 10	0 11 0
Pitch-pine: deals	16 0	0 17 0
Under 2 in. thick extra	10 0	0 10 0
Yellow Pine—First, regular sizes	33 0	0 upwards.
Oddments	22 0	0 24 0
Second, regular sizes	24 0	0 26 0
Yellow Pine Oddments	20 0	0 22 0
Kauri Pine—Planks, per ft. cube	0 3	0 6 0
Danzig and Stettin Oak Logs—Large, per ft. cube	0 2	0 3 0
Small	0 3	0 3 0
Waincoat Oak Logs, per ft. cube	0 5	0 5 0
Dry Waincoat Oak, per ft. cube	0 0	0 7 0
2 in. do.	0 0	0 7 0
3 in. do.	0 0	0 7 0
Dry Mahogany—Honduras, Tabasco, per ft. sup.	0 9	0 0 11
Selected, Figury, per ft. sup.	0 1	0 6 0
Dry Walnut, American, per ft. sup.	0 10	0 10 0
Teak, per inch	16 10	0 20 0
American Whitewood Planks, per ft. cube	0 4	0 4 0

	Per square.	
Prepared Flooring—1 in. by 7 in. yellow, planed and matched	0 13	6 0 17 6
1 in. by 7 in. yellow, planed and matched	0 14	0 18 0
1 1/2 in. by 7 in. yellow, planed and matched	0 16	0 18 0
1 in. by 7 in. white, planed and matched	0 11	6 0 13 6
1 1/2 in. by 7 in. white, planed and matched	0 12	6 0 14 6
1 in. by 7 in. yellow yellow matched and beaded or V-jointed boards	0 11	0 13 6
1 in. by 7 in. do. do.	0 14	0 18 0
1 1/2 in. by 7 in. white do. do.	0 10	0 12 6
1 in. by 7 in. do. do.	0 11	6 0 13 6
6 in. at 6d. to 9d. per square less than 7 in.		

PRICES CURRENT (Continued).

JOISTS, GIRDERS, &c.

	In London, or delivered	
Roller Steel Joists, ordinary sections	6 5	0 2 s. d.
Compound Girders	8 2	6 0 7 5 0
Angles, Tees and Channels, ordinary sections	7 12	6 8 12 6
Flat Plates	8 5	0 8 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 2	6 8 5 0

METALS.

	Per ton, in London.	
IRON—Common Bars	7 15	0 8 s. d.
Staffordshire Crown Bars, good merchant quality	8 5	0 8 15 0
Staffordshire "Marked Bars"	10 10	0 10 0
Mild Steel Bars	9 0	0 9 10 0
Hoop Iron, basis price	9 5	0 9 10 0
" galvanised	10 0	0 10 0
(* And upwards, according to size and gauge.)		
Sheet Iron, Black—Ordinary sizes to 30 g.	10 0	0 10 0
" " to 24 g.	11 0	0 11 0
" " to 20 g.	12 10	0 12 0
Sheet Iron, Galvanised, flat, ordinary quality—Ordinary sizes 6 ft. by 2 ft. to 3 ft. to 20 g.	12 15	0 12 15 0
" " 22 g. and 24 g.	13 5	0 13 5 0
" " 26 g.	14 5	0 14 5 0
Sheet Iron, Galvanised, flat, best quality—Ordinary sizes to 30 g.	16 0	0 16 0
" " 22 g. and 24 g.	16 10	0 16 10 0
" " 26 g.	18 0	0 18 0
Galvanised Corrugated Sheets—Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 15	0 12 15 0
" " 22 g. and 24 g.	13 5	0 13 5 0
" " 26 g.	14 5	0 14 5 0
Best Soft Steel Sheets, 6 ft. by 2 ft. to 10 ft. by 20 g.	12 0	0 12 0
" " and thicker	12 0	0 12 0
" " 22 g. and 24 g.	13 0	0 13 0
" " 26 g.	14 0	0 14 0
Cut nails, 3 in. to 6 in.	9 5	0 9 15 0
(Under 3 in. usual trade extras.)		

LEAD, &c.

	Per ton, in London.	
LEAD—Sheet, English, 3 lbs. & up.	13 5	0 13 5 0
Pipe in coils	13 15	0 13 15 0
Soil Pipe	16 5	0 16 5 0
Compo Pipe	16 5	0 16 5 0
ZINC—Sheet—Vielite Montagne	25 0	0 25 0
Silesian	24 10	0 24 10 0
COPPER—Strong Sheet	0 0	10 0
Thin	0 0	11 0
Copper nails	0 0	11 0
BRASS—Strong Sheet	0 0	10 0
Thin	0 0	10 0
Tin—English Ingots	0 0	11 0
SOLDER—Plumbers	0 0	11 0
Timmen's	0 0	11 0
Wirepipe	0 0	11 0

ENGLISH SHEET GLASS IN CRATES.

	24d. per ft. delivered.	
15 oz. thick	14d.	11
" fourths	14d.	11
21 oz. thirds	14d.	11
" fourths	14d.	11
26 oz. thirds	14d.	11
" fourths	14d.	11
32 oz. thirds	14d.	11
" fourths	14d.	11
Fluted sheet, 15 oz.	14d.	11
" 21	14d.	11
1 Hartley's Rolled Plate	14d.	11
" 16	14d.	11
" 18	14d.	11
" 24	14d.	11

OILS, &c.

	£ s. d.	
Raw Linseed Oil in pipes or barrels	0 2	2 5
Boiled " in pipes or barrels	0 2	2 5
" " in drums	0 2	7 5
Turpentine, in barrels	0 3	3 5
" in drums	0 3	3 5
Genuine Ground English White Lead	21	0 21 0
Red Lead, Dry	20	0 20 0
Best Linseed Oil Putty	16	0 16 0
Stockholm Tar	12	0 12 0

VARNISHES, &c.

	Per gallon.	
Fine Pale Oak Varnish	0 10	6
Pale Copal Oak	0 10	6
Superfine Pale Elastic Oak	0 12	6
Fine Extra Hard Church Oil	0 10	6
Superfine Hard-drying Oil, for Churches	0 14	0
Fine Elastic Carriage	0 12	6
Superfine Pale Elastic Carriage	0 16	0
Fine Pale Maple	0 16	0
Finest Pale Durable Copal	0 18	0
Extra Pale French Oil	1	0 18 0
Eggshell Flattening Varnish	1	0 18 0
White Copal Enamel	1	0 18 0
Extra Pale Paper	1	0 18 0
Best Japan Gold Size	0 10	6
Best Black Japan	0 10	6
Oak and Mahogany Stain	0 10	6
Brunswick Black	0 8	6
Berlin Black	0 10	6
Knottling	0 10	6
French and Brush Polish	0 10	6

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENT

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Designs for University Buildings, Cape of Good Hope	Arch. Gen. for Cape of Good Hope	400l., 200l., 100l.	Jan. 31
Designs for Town Hall	Sutton Coldfield Corporation	50l., 30l., and 20l.	Feb. 20
New Public Offices	Pontypridd U.D.C.	Not stated.	No date

CONTRACTS.

Nature of Work or Materials	By whom Advertised.	Forms of Tender, &c., supplied by	Tenders to be delivered
Additions to Electricity Station, West Strand	Whitehaven Corporation	T. Brown, Town Hall, Whitehaven	Dec. 16
*4,100 ft. Norwegian Granite Kerb, &c.	Bromley U.D.C.	Clerk to the Council, District Council Offices, Bromley, Kent	do.
New Matings	J. & A. Telford, Tullamore	Beckett & Medall, Leinster-street, Dublin	do.
Street Works, Cartwright-street	Wolverhampton Corporation	G. Green, Borough Engineer, Wolverhampton	do.
Electricity	Bangor (Ireland) U.D.C.	E. L. Woods, Civil Engineer, Town Hall, Bangor	do.
Bridge over Railway, Nelson, Lancs	L. & V. Railway Company	R. C. Irwin, Hunt's Bank, Manchester	do.
Road Works, Denton-road	Shepton U.D.C.	Surveyors, Public Offices, Charlton, Kent	do.
Kerling, High-street	Shoburness U.D.C.	F. Gregson, Town Hall, Southend	do.
Vicarage, Nenthead, near Alston		Hicks & Charleswood, Architects, 67, Westgate-road, Newcastle	Dec. 17
Wesleyan Chapel, Longwood, Huddersfield		J. Berry, Architect, 3, Market-place, Huddersfield	do.
Additions to Destructor, Hammerston-street		F. Stevens, Town Hall, Bradford	do.
Additions to Premises, Manchester-road	Bradford Corporation		do.
Granite and Limestone (2,000 tons)		F. Hall, Council Offices, Tisbury	do.
Enclosure Works at Infirmary, Shirley	Ilkley U.D.C.	Mitchell & Co., Architects, Portland-street, Southampton	do.
School Buildings	Southampton Guardians		do.
Sewerage Works, &c., Scalby-road	Swansea (U.D.) School Board	Morley (York) Corporation	do.
Additions to Brewery, Dock-road, Newport, Mon.	Scarborough Town Council	Messrs. Phillips & Sons, Ltd.	do.
Pavilion, Bandstand, &c., East Cliff	Herne Bay T.D.C.	H. W. Smith, Civil Engineer, Town Hall, Scarborough	do.
Business Premises, Alexandra-road, Aberystwith	Messrs. D. Roberts & Sons	F. Phillips, Dock-road Chambers, Newport	do.
Additions to Commercial Hotel, Aberystwith		Surveyor to the Council, Town Hall, Herne Bay	Dec. 18
*Making-up Denleigh-road, Hillcroft-crescent, &c.		T. E. Morgan, Architect, Aberystwith	do.
Police Station, Hawes Side	Borough of Ealing		do.
Buildings at Sewage Works	Blackpool Corporation	Borough Engineer, Town Hall, Ealing, W.	do.
Sewers, &c.	Morley (York) Corporation	J. S. Brodie, Borough Engineer, Town Hall, Blackpool	do.
Surveyor's Materials	Leicester Corporation	W. E. Putman, Civil Engineer, Town Hall, Morley	do.
Villa, Llanwit-Fardre		E. G. Morley, Civil Engineer, Town Hall, Leicester	do.
Additions to Basin, South Dock	Mr. S. Y. Knight		do.
Sewers, Eldon-road	Swansea Harbour Trustees	Thomas & Cule, Architects, Pontypridd	do.
Roofing at Avonide Wharf, Bristol	Caversham U.D.C.	A. O. Schenk, Civil Engineer, Harbour Offices, Swansea	do.
*Counter Cabinet	Midland Railway	S. P. Andrews, Surveyor, 23, Prospect-street, Caversham	do.
Additions to Parish Church, Tyrie	Central Finsbury Radical Club	Company's Architect, Cavendish House, Derby	do.
Underground Conveyance, Stour-road, Dovercourt		Secretary, Central Finsbury Radical Club, 326, City-road, E.C.	Dec. 19
Two Cottages, Rainworth		W. Reid, Architect, Saloon-square, Fraserburgh, N.B.	do.
Kerbing, &c., the Esplanade	Mansfield Corporation	H. Ditcham, Borough Surveyor, 7, West-street, Harwich	do.
Additions to sanatorium, Hedon-road	Frinton-on-Sea (Essex) U.D.C.	J. H. White, Town Hall, Mansfield	do.
Removal of House Refuse, &c.	Fife County Council	W. D. Sang, Civil Engineer, Kirkcaldy, N.B.	do.
House, &c., at Schools	Hull Corporation	J. H. Hirst, Architect, Town Hall, Hull	do.
Sewer, Station-road	Metro. Borough of Marylebone	Medical Officer of Health, 3, Upper Gloucester-place, N.W.	do.
Steam Piping	Rhadyr School Board	A. O. Evans, Architect, Pontypridd	do.
Sewerage Works, Holmwood	Elgin Town Council	Borough Engineer, Greyfriars-street, Elgin, N.B.	do.
Granite and Slag (20,000 tons)	Burnley Corporation	G. H. Pickles, Civil Engineer, Town Hall, Burnley	Dec. 21
Cut Iron Pipes and Laying (1,200 yards)	Dorking R.D.C.	W. Rapley, junr., Tower Hill, Dorking	do.
Street Works, Bamber-street, &c.	Sheaford R.D.C.	E. Clements, 74, Southgate, Sheaford	Dec. 22
Precipitation Tanks	Fife County Council	W. D. Sang, Civil Engineer, Kirkcaldy, N.B.	do.
Granite, &c.	Hindley (Lancs.) U.D.C.	A. Holden, Civil Engineer, Council Offices, Hindley	do.
1st yards Stoneware Pipe Sewer, &c.	St. Helena (Lancs.) Corporation	G. J. C. Broom, Civil Engineer, Town Hall, St. Helena	do.
Twenty-five Cottages, Ebbi-street	Meriden R.D.C.	A. Seymour, 11, Priory-street, Coventry	Dec. 23
Superstructure of a bank Electricity Works	Walthamstow U.D.C.	W. J. Morley & Son, Architects, 263, Swan-arCADE, Bedford	Dec. 24
Ninety-five Cottages, Aber, near Caerphilly, Wales	Wigan Corporation	H. Jevens, Municipal Offices, Wigan	do.
Sewers, &c., Watlington	Cleethorpes (Lincs.) U.D.C.	E. Rushton, Engineer, Poplar-road, Cleethorpes	Dec. 25
*1,200 ft. of Brick Outfall Sewer, &c.	City and County of Bristol	City Electrical Engineer, Temple Back, Bristol	do.
*Norrington-road Schools	Windsor Building Club	G. D. Stevenson, 13 and 14, King-street, Champside, E.C.	Jan. 5
Dormitories, Maternity Wards, &c.	Henley R.D.C.	Taylor & Co., Civil Engineer, 27, Great George-street, S.W.	do.
*Annual Contracts	Horsley U.D.C.	Engineer to the Council, Southwood-lane, Highgate, N.	do.
Gasworks Extension	Leyton School Board	W. Jacques, 2, Fen-court, Finchchurch-street, E.C.	Jan. 6
Foundations of Chief Fire Station, Police Station &c.	Bethnal Green Guardians	W. A. Finch, 76, Finchbury-pavement, E.C.	do.
Tar-paving Footways, &c., at Newington Workhouse	Borough of Camberwell	Borough Engineer, Town Hall, Camberwell, S.E.	do.
Modern Cooking Appliances	Teignmouth U.D.C.	J. R. Gray, Engineer, Teignmouth	Jan. 7
Asylum, Water Fulford, York	Manchester Corporation	City Treasurer, Town Hall, Manchester	Jan. 8
Water supply Works at National Schools, Olneyworth	Southwark Union	G. D. Stevenson, 13 and 14, King-street, Champside, E.C.	Jan. 10
Alterations to Shop, &c., Park-lane, Leeds	Down District Lunatic Asylums	Graeme, Watt & Tulloch, 77, Victoria-street, Belfast	Jan. 10
Sewerage Works	Committee	A. Creer, Architect, Guildhall, York	Jan. 10
Two Houses, Taunton-road, Ashton, Kent	Fermoy (Ireland) R.D.C.	P. O'Neill, Council Offices, Fermoy	No date
Schools, Beverley		Messrs. Morley & Wormald-road, Leeds	do.
Warehouse, Butte Docks, Cardiff		W. B. Woodhead & Sons, Civil Engineers, 18, Exchange, Bradford	do.
Cottage and Coachhouse, Clitheroe, Lancs.		T. George & Son, Architects, Old Square, Ashton	do.
House, Melonsley-road, Consett	Messrs. J. Rose & Co.	W. J. Morley & Son, Architects, 263, Swan-arCADE, Bedford	do.
Nineteen Houses, High-road, Wall, Halifax	Colonel R. J. Aspinall	E. G. C. Down, Civil Engineer, 31, High-street, Cardiff	do.
Alterations to House, Holbeck, Leeds		E. L. Clare, 30, King-street, Clitheroe	do.
		W. Ward, 47, Sherburn-terrace, Consett	do.
		M. Hall, Architect, 29, Northgate, Halifax	do.
		Buttery & Birds, Architects, 1, Basinghall-square, Leeds	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Applications to be delivered
Clerk of Works	Erith School Board	3l. 3s. per week	Dec. 10
Two Draughtsmen	Metropolitan Asylums Board	2l. 10s. per week each	Dec. 18
Surveyor	Swadlow U.D.C.	150l. per annum	Dec. 31
Clerk of Works	Manchester Corporation	4l. 4s. per week	Jan. 7

Those marked with an asterisk (*) are advertised in this Number. Competitions, iv. Contracts, pp. iv, vi, viii, x, & xix. Public Appointments, xvi, & xvii.

TO CORRESPONDENTS.

J. W. W.-C. & W. (Amounts should have been stated.)

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

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We are compelled to decline pointing out books and giving addresses.

Any communication to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR, to whom relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursday, N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is underlined, unless in some exceptional cases and for special reasons.]

* Denotes accepted. † Denotes provisionally accepted.

ALBERDEEN.—For additions to school, Albyn-place (new gymnasium, laboratories, cookery-room, and laundry), for the School Board. Mr. J. A. O. Allan, Architect, School Board Offices, 25, Union-terrace, Aberdeen. Quantities by Messrs. Henry & Addie, architectural surveyors, 120, Union-street, Aberdeen:—

Masonry.—James Gauld, Gilcomston Park.
Carpentry.—Henry & Keith, Gilcomston Park.
Slating.—George Farquhar, Union-street.
Fluencing.—Alex. Fiddes, Albert-street.
Painting.—J. W. Forrest, Union-street.
[All of Aberdeen.]

ALRESFORD.—For the erection of houses on Town Estate, Alresford, Hants, for Messrs. Hollingworth & Gibbs, Mr. H. Volland Boreham, architect, 75, Finsbury-pavement, London:—
F. J. Edmonds, Alresford..... £1,150

BRISTOL.—For the erection of a carpet-beating warehouse, office, &c., in Station-road, Montpelier, for Mr. George Pearce, upholsterer, &c. Mr. Thomas Scammell & Co., architect and surveyor, 1, St. Stephen-street, Bristol:—
J. E. Jones..... £790
J. E. Jones..... 800
W. Hatherly..... 727
H. Edmunds..... 690
[All of Bristol.]

COALVILLE.—For Coalville Waterworks (Contract No. 2). Mr. J. B. Everard, M.Inst.C.E., Leicester:—
Hayward-Tyler & Co., Ltd..... £6,073 15 3
Thornhill & Warham..... 8,174 0 0
Craig & Co., Ltd..... 7,999 0 0
Stewart & Co. (1902), Ltd..... 7,573 0 0
Fairbairn, Lawson, Combe, Barbour, Ltd..... 7,439 0 0
Grant, Ritchie, & Co., Ltd..... 7,160 0 0
Fawcett, Preston, & Co., Ltd..... 7,039 0 0
Glenfield & Co., Ltd..... 6,848 18 0
Gimson & Co., Ltd..... 6,769 8 6
Robinson, Cooke, & Co..... 6,616 19 8
Summers & Scott, Ltd..... 6,376 0 0
Victor Coates & Co., Ltd..... 6,355 8 0
Harvey & Co., Ltd..... 6,538 0 0
The Central Marine Engine Works
Acheson, Frost, & Co., Ltd..... 5,614 0 0
Watt & Co, Smethwick, Birmingham..... 4,927 17 0

CROYDON.—For the erection of a pair of houses at Eden-road, Croydon, for Mr. Frank Widdow, architect and surveyor, Bank Buildings, 1, High-street, Croydon:—
Bulled & Co., Ltd..... £1,637
F. Knight, Junr..... 1,300
Smith & Sons..... 1,138
Huntley Bros..... 1,130
C. J. Saunders..... 1,300
W. Potter..... 1,390

DERBY.—For additions, &c., to Abbey-street school, for the School Board. Mr. F. S. Antill, architect, Draycott, Derby. Quantities by architect:—
T. H. Beeson..... £202 13 7
E. Morley..... 81 0 0
A. Brown..... 788 16 0
H. Vernon..... 774 10 0
Fisher..... 772 0 0
J. & J. Warner..... 769 5 6
A. Smith..... 769 0 0
Pegg & Bailey..... 717 0 0

FRINTON-ON-SEA.—For the erection of a detached house, for Dr. G. C. Bell, Messrs. Harrington, Ley, & Tomkins, architects, Frinton-on-Sea, and 658, Bishopsgate-street Without, E.C., and Romford:—
D. Collins..... £740

FRINTON-ON-SEA.—For alterations and additions to Iwainville, for Mr. J. V. Vesey Fitzgerald, K.C. Wharfedale, Messrs. Harrington, Ley, & Tomkins, architects, Frinton-on-Sea, Essex:—
D. Collins..... £250

FRINTON-ON-SEA.—For the erection of a detached house, for Mr. A. West, Messrs. Harrington, Ley, & Tomkins, architects, Frinton-on-Sea, Essex:—
Borough Engineer..... £660
M. Mone..... 680
E. West..... 615
C. Mills..... 575

GRIMSBY.—For supplying and erecting 135 sewer ventilating shafts in the Humber Ward. Mr. H. Gilbert Wharfedale, A.M.Inst.C.E., Borough Engineer:—
A. Cooke..... £539 11 8
J. R. Cole..... 495 16 8
D. Collins..... £585
M. Pearson..... £320
T. L. Green..... 317

GRIMSBY.—For erection of weigh office, foreman's room, stores, and other out-buildings in connexion with destructor, Mr. H. Gilbert Wharfedale, A.M.Inst.C.E., Borough Engineer:—
T. R. Waterman..... £679 10 0
C. W. Dixon..... 555 13 5
C. Cooke..... 558 0 0
K. Swallow..... 540 10 8
Hewins & Good..... £527 0 0
Gilbert & Kirtson..... 524 14 0
[All of Grimsby.]

GRIMSBY.—For supplying and erecting a trolley bridge in connexion with destructor, Mr. H. Gilbert Wharfedale, A.M.Inst.C.E., Borough Engineer:—
W. & C. Avery..... £681
H. Pooley..... 651
S. Denison..... 631
Hodgson & Stead..... £561
C. Ross..... 58
J. Greenwood, Salford..... 58

WALLINGTON.—For the erection of a pair of villas, Grosvenor-avenue, Wallington, Surrey, for Mr. J. H. R. Cutler, and under the supervision of Mr. Arthur L. Dartnell, architect and surveyor, 69, High-street, Croydon:—
W. Gowman..... £1,113 19 0
W. C. & A. E. Cheshire..... 1,000 0 0
Smart & Son..... 975 0 0
Sedwick Bros..... £945 0 0
W. Martin..... 848 10 0
W. Roberts..... 849 0 0

WHITSTABLE.—For tar paving, new latrines, sanitary work, and new drainage at the Oxford-street Board Schools, Whitstable. Mr. A. A. Kemp, architect and surveyor:—
F. G. Browning..... £518 0 0
Thos. Collier..... 605 18 0
Gann & Co..... 500 0 0
W. Camburn..... £570 0 0
T. W. Porter..... 566 12 0
Amos & Foad..... 544 12 0
[All of Whitstable.]

† Accepted subject to the approval of the Board of Education.

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following lists of tenders. Mr. T. J. Bailey is the Board's Architect:—

* Recommended for acceptance.

ARISTOTLE-ROAD (Boys' and Girls' Departments).—Providing and fixing complete low-pressure hot-water apparatus to two halls, ten class-rooms, cloak-rooms, corridors, and lavatories:—
I. & F. May..... £515 0 0
Oldroyd & Co., Ltd..... £467 5 0
J. Elson..... 510 0 0
W. Downes..... 505 0 0
Cannon & Sons..... 470 0 0
Rice & Son..... 1,741 0 0
Wenham & Waters, Ltd..... £467 5 0
J. Elson..... 435 0 0
Duffield & Sons..... 445 0 0
Defies & Sons, Ltd..... 1,612 0 0

BROCKLEY-ROAD.—Manual training centre for twenty children, with room for practical science over:—
J. Appleby..... £1,824
Garrett & Son..... 1,308
Johnson & Co., Ltd..... 1,793
F. & H. F. Higgs..... 1,731
W. Downes..... 1,776
Bulled & Co..... 1,772
Rice & Son..... 1,741
Mitchell & Son..... £1,726
T. D. Leng..... 1,702
Smith & Sons, Ltd..... 1,693
J. & C. Bowyer..... 1,669
E. Triggs..... 1,665
General Builders, Ltd..... 1,612

ELTRINGHAM-STREET (Infants' Department).—Altering position of existing partition and providing an additional glazed partition in order to redivide classrooms E and F into three rooms; also reversing stepped-flooring in the middle room for left light and providing open fire portable stove for warming the room, including brick flue and stack in connexion with same; also partitioning off portion of hall to provide an additional classroom for forty-eight children:—
R. S. Rosdall..... £420 0 0
London School..... £420 0 0
Furniture Co..... 361 7 9
Hooper & Son..... 328 0 0
E. Triggs..... 312 0 0
Rice & Son..... £310 0 0
Green & Twilley..... 308 0 0
Whitehead & Co., Ltd..... 295 0 0
Garrett & Son..... 293 0 0

ENFIELD-ROAD (Special School).—Forming new entrance and building separate offices for boys; constructing a bathroom inside building; also providing oak fencing in order to form separate playgrounds, &c.:—
Williams & Son..... £530
Sheffield Bros..... 575
Green & Son..... 570
J. Stewart..... 536
Lawrence & Sons..... £530
Dearing & Son..... 519
Barrett & Power..... 487
John & Co..... 304

GREENING-STREET SITE.—Providing and fixing flooring, &c.:—
G. Bush..... £193 10 0
W. Harbrow..... 154 0 0
Smith & Co..... £140 0 0
E. Proctor..... 110 0 0

HIGH-STREET, TOWER HAMLETS (Infants').—Providing glazed partition to divide classroom B, and reversing the stepped flooring in the two rooms thus formed for left light, including brickwork fireplace and providing two open fire portable stoves for warming the rooms:—
A. E. Symes..... £394 0 0
F. & F. J. Wood..... 268 0 0
J. T. Robey..... 262 0 0
A. W. Derby..... £241 18 6
A. J. Sheffield..... 230 0 0
G. Barker..... 215 0 0

MEDBURN-STREET (Infants' Department).—Altering position of existing partition and providing an additional glazed partition to redivide classrooms F and G into three rooms; including reversing stepped flooring in two of these rooms for left light, with the consequential alterations to fireplaces, doorway, &c.:—
M. Pearson..... £320
T. L. Green..... 317
Barrett & Power..... £287

ROSEBERY-AVENUE.—Altering and refitting offices all departments; providing new soil drains, re-using present surface water drains where practicable; and refitting lavatories all departments:—
J. & M. Patrick..... £3,248 0 0
Maxwell Bros, Ltd..... 2,180 0 0
Lawrence & Sons..... 1,994 0 0
Falkner & Sons..... 1,973 0 0
Williams & Son..... 1,920 0 0
Stevens Bros..... 1,874 0 0
Johnson & Co..... £1,350 0 0
J. Peattie..... 1,778 0 0
Durtin & Kates..... 1,740 0 0
R. P. Beattie..... 1,748 7 0
Willmott & Sons..... 1,705 0 0

UPPER KENNINGTON-LANE.—Providing manual training centre for forty children:—
Martin, Wells, & Co., Ltd..... £1,329
Mitchell & Son..... 1,239
Johnson & Co, Ltd..... 1,224
Rice & Son..... 1,226
Smith & Son..... 1,191
T. D. Leng..... 1,194
F. Triggs..... 1,173
Bulled & Co..... 1,157
Garrett & Son..... £1,149
J. & C. Bowyer..... 1,127
General Builders, Ltd..... 1,114
Lathey Bros..... 1,097
J. & M. Patrick..... 1,091
London and Rochester..... 1,093

WHITFIELD-STREET (Girls' Department).—Altering position of partition between classrooms A and C and reversing the stepped flooring in latter room in order to obtain side lighting; also altering positions of two windows in the former room (A) for the same purpose. (Infants' Department).—Forming new passage and steps in order to obtain direct access to classrooms B and C, and providing new doorway, stove, &c. in connexion with same; also altering positions of two windows in classroom A to obtain side light:—
Marchant & Hirst..... £549 0 0
M. Pearson..... 538 0 0
Densham & Sons..... 498 0 0
Stevens Bros..... 498 10 0
R. S. Buckeridge..... 498 0 0
London School Fur-niture Co..... £497 0 0
Thompson & Be-ridge..... 482 0 0

WINDSOR-ROAD (Special School).—Providing offices for boys and girls, and oak fencing to form separate playgrounds, including altering position of the normal boys' entrance gateway in connexion with same; also forming new entrance gateways for the special boys and girls:—
Lawrence & Sons..... £690
Belcher & Co, Ltd..... £359
J. Stewart..... 341

The interiors of the following schools will be cleaned between December 13, 1902, and January 3, 1903, and the exteriors of the schools marked † will be painted between April 4 and May 2, 1903:—

ARLOMFIELD-ROAD (clean interiors Boys' and Girls' and paint interiors of Junior Mixed and Infants schools):—
Hayter & Son..... £635 0 0
H. Groves..... 593 0 0
W. Banks..... 495 15 6
G. Kemp..... £450 0 0
E. Proctor..... 435 0 0

BRACKENBURY-ROAD:—
G. H. Sealy..... £314 0 0
G. Neal..... 295 0 0
S. Polden..... 101 15 0
Chinchen & Co..... 885 15 0
W. R. & A. Hide..... £271 0 0
F. Chidley..... 256 6 1
Bristow & Eat- well..... 219 0 0

CHEQUER-STREET (old portion):—
Johnson & Co..... £600 0 0
W. Chappell..... 95 0 0
Stevens Bros..... 78 0 0
Belcher & Co, Ltd..... £72 0 0
Gavin Bros..... 70 18 0

DALMAIN-ROAD:—
H. & G. Mallett..... £551 17 0
J. & M. Patrick..... 498 0 0
J. & C. Bowyer..... 418 0 0
C. Kemp..... £381 0 0
C. G. Jones..... 328 11 0

DROOP-STREET:—
G. H. Sealy..... £261 10 0
H. C. Clifton..... 236 0 0
W. Chappell..... 175 0 0
F. Chidley..... £165 0 0
Chinchen & Co..... 149 5 0
Bristow & Eatwell..... 137 17 0

ELLERSLIE-ROAD:—
G. H. Sealy..... £254 10 0
G. Neal..... 225 0 0
S. Polden..... 195 10 0
W. R. & A. Hide..... £188 10 0
F. Chidley..... 180 3 0
Bristow & Eatwell..... 153 0 0

[See also next page.]

ENFIELD-ROAD:-
 Grover & Son £397
 McCormick & Sons .. 346
 Viney & Stone 450
 G. Barker £224

GAINSBOROUGH-ROAD:-
 Gibb & Co. £489
 Chessum & Sons 450
 G. Barker 440
 Corfield & Co. 436

GRAFTON-ROAD:-
 Bate Bros. £500
 Dearing & Son 458
 McCormick & Sons 454

HINDLE-STREET:-
 C. & W. Han- £372
 Grover & Son 242
 Corfield & Co. 230

HITHER GREEN:-
 W. Hornett £241
 J. & C. Bowyer 225
 T. D. Leng 218
 H. Groves 194

HOMERTON-ROW (clean interior of old portion and paint interior of enlargement):-
 Corfield & Co. £431
 Collis Willmott & Son 411
 Shurmer & Sons, Ltd. 410
 A. W. Derby 396
 Grover & Son 378

HUGH MYDDELTON:-
 Smith & Sons, Ltd. £390
 Leney & Son 333
 McCormick & Sons 602
 Marchant & Hirst 646
 Johnson & Co. 619

HUGON-ROAD:
 Green & Swilley .. £354
 Laiden & Son 333
 W. Hammond 295

MANTLE-ROAD:-
 Leney & Son £290
 T. D. Leng 229
 J. & C. Bowyer 225
 C. G. Jones 213

MILLFIELDS-ROAD (clean interior of main building and paint interior of new centres):-
 J. Stewart £374
 Silk & Son 365
 McCormick & Sons 365

MULGRAVE-PLACE:-
 E. Proctor £208
 W. Banks 170
 Hayter & Son 170

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 W. Hammond £312
 Holloway Bros. 229
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PENROSE-STREET (old portion):-
 W. V. Goad £226
 Sayer & Son 212
 Johnson & Co. 206

PLASSY-ROAD:-
 Black & Son £262
 J. & C. Bowyer 259
 Hayter & Son 259
 J. & M. Patrick 234

PLUM-LANE (iron buildings):-
 Hayter & Son £275
 Smith & Sons, Ltd. 53

ROMAN-ROAD:
 Viney & Stone £477
 A. W. Derby 425
 A. J. Sheffield 409

ST. CLEMENT'S (Boys', Girls', Infants', and Special):-
 G. H. Sealy £585
 General Builders, 496
 S. Foulden 356

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VOL. LXXXIII.—No. 3224.

DECEMBER 20, 1902.

ILLUSTRATIONS.

Design for a Royal Memorial Chapel (Submitted in Competition for R.I.B.A. Soane Medallion, 1902)	By Mr. J. Swarbrick.
Competition Plans for Royal Sanatorium for Tuberculosis	By Mr. Arnold Mitchell, F.R.I.B.A.
Electric Station, &c., on the Severn	Mr. G. Hornblower, F.R.I.B.A., Architect.
A New Bank at Chatham	Mr. W. Campbell Jones, A.R.I.B.A., Architect.
House, Berkeley-square	Mr. R. G. Hammond, Architect.

Block in Text.

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Collected Essays of William Morris.



FROM the appearance of a new edition of William Morris's various lectures and essays on artistic subjects,* issued by a firm which is not in the habit of publish-

ing what there is no demand for, it is to be argued that there is still a market in the world of books for this gospel of pessimism; that there are still an appreciable number of people who enjoy reading, and like to have on their shelves, a volume of denunciations of everything in their own country and in their own age as incurably sordid, mean, and hopeless. It is not, to our thinking, either a wise or a pleasant kind of literature; and it has the additional drawback of being somewhat monotonous. For in spite of the various titles to the eleven essays contained in this book, the subject is always the same: the wickedness of competition, the baneful influence of machinery on art and on life, the general ugliness of all modern life, and the impossibility of any true or healthful art except that which springs from the working craftsman. Not only the same arguments but very often the same expressions are repeated; and in fact all that Morris had to say in these eleven essays might very well have been compressed into one of them.

Morris's influence for good on the taste and the workmanship of his generation, in regard to what is called industrial art, we should be the last to under-rate. Since the Early Victorian era there has been almost a revolution in English taste in such matters, which is now on the whole superior to that of any other country; certainly superior to that of either Germany or France; and if Morris did not actually bring about this revolution, he was at all events one of the largest factors in it. His almost instinctive insight into the technique of different manufactures, and its governing influence on design, enabled him to impart new life and truthfulness into industrial art; and as far as his actions and his practical influence are concerned we ought to feel nothing but gratitude to him. But in his philosophy of art and life he was a man possessed by an *idée fixe*, and a very narrow one. Men who are strongly possessed by one idea, and are never tired of asserting it, are the men who bring about changes; their pertinacity is useful or even necessary for the moment; but one objects to see their exaggerated and over-stated postulates collected into a book for permanent reading.

The one idea in these essays which is really a sound and a valuable one, and which has borne much fruit, is that things should be made because they are worth making, not merely because they can be sold, and that there can be no artistic value in any production the making of which has not been a pleasure and an interest to the maker. That is a great and wholesome truth, and we may thank Morris for having hammered it well home. This principle carries with it, of course, the recognition of the individual artisan, and would put an end to that wretched system of the production of so-called works of art by commercial firms, who pay anonymous craftsmen to execute work for which the credit (or discredit) goes to the paymasters and not to the craftsmen; a system which some of the best firms in the country are now giving up, and which a gradually improving public opinion will in time compel others to give up. This gospel of the joy of art is the golden thread which runs through Morris's lengthy and often extravagantly-worded vaticinations.

What Morris said over and over again as to the baneful influence of machinery upon art—handicraft art especially, is also perfectly true. The man who is employed in a factory making over and over again one portion only of an object of which the other portions are to be supplied by hands in other departments—or overlooking a machine which makes it—is not likely to take pleasure in his work for its own sake, or to

produce anything that is beautiful in itself. But Morris does not seem to have at all realised the difficulties in the way of getting rid of this state of things. The world is much fuller than it was in the old handicraft days; life moves much faster; people want things more quickly and in greater quantities. Much is lost by this, but much also is gained. Labour is saved by machinery, prices are lessened, more work is found for those who are in need of work. Morris seems still to have been under the old economic delusion of the first opposers of machinery, that it was taking the bread out of the mouths of the labouring classes; though it is almost a truism to say that where ten men were employed before machinery a hundred are employed now. Morris had the idea, which finds expression more than once in these essays, that every man in the world has, by the fact of his existence, some mysterious "right" to have paying labour found for him; an idea which has captivated a good many other muddle-headed philanthropists, Ruskin among them. Argument would be thrown away on people who are capable of reasoning thus—if reasoning it can be called; the point to be noted is that Morris, with this idea in his head, was fighting against and vilifying the very means which provides work for numbers who would not otherwise have it. Could he have stopped machinery, as he professed that he would like to do—perhaps he would have wavered if it had come to the actual point and possibility of doing so—the first result would have been that he would have filled the workhouses. A certain minority of good craftsmen would have been made happier; the rank and file would have had to starve. As we observed the other day in speaking of the new venture of the Guild of Handicraft in setting up their workshops in a remote village, the steam which they despise is what alone, by means of the railway, could make their scheme a commercial success; and that any such scheme *must* be, to be carried on at all. Many manufacturers may be too greedy of gain; but a project must at all events pay, with whatever artistic motives it may be started.

* "Architecture, Industry, and Wealth." Collected Papers by William Morris. London: Longmans, Green, & Co. 1902.

or it must soon go to the wall. And indeed it is whispered that those who had dealings with the decorative and furniture establishment founded by Morris, did not find them any less keen upon money than firms of more prosaic ideas; they aimed at producing good work, no doubt, but they certainly wanted to be well paid for it. And as to the meanness of everything connected with machinery, we should be prepared to maintain that a locomotive engine is a finer and more inspiring piece of metalwork than anything that any Mediæval smith ever produced.

"Lord, send a man like Robbie Burns to sing the Song o' Steam!"

as Mr. Rudyard Kipling's Scotch engine-driver said. "M'Andrew's Hymn" was not published till after Morris's death; one would have been curious to know what he would have said to it!

Machinery cannot produce art, however: that we devoutly believe; art must be the work of the individual hand. The way out of the puzzle may, after all, be a pretty simple one; let people give up trying to produce art by machinery, and content themselves with trying to produce good practical useful work. This has a beauty of its own, after all. In making a locomotive, to return to our former illustration, there is no attempt to treat it artistically; any such deliberate attempt would probably be a failure; yet it turns out as an exceedingly fine and impressive object. Nor do we believe that good workmen, employed in a first-class engine factory, are without interest or pride in the results of their work. Less important kinds of piecemeal work—pin-making and needle-making for instance—must be dull enough; so is sweeping a room; yet, as gentle George Herbert said

"Who sweeps a room, as to Thy laws,
Makes that, and the action, fine."

And it is impossible in these days to do without this division of labour; it is not merely, as Morris seems to have thought, a question of competition; it is a question of supplying the public demand in the quickest and most economical manner. It is for the general good in the long run. How would poor persons who have to use pins like to have to pay—say 3d. a dozen for them?

Morris was never tired of girding at the evils of "civilisation"; one wonders whether he ever attempted to realise what daily life was really like in the Middle Ages: life in the midst of wars of the most savage character; of violence and frequent murder; insanitary and filthy houses; bad roads and almost an impossibility often of communication. The Mediæval Ages produced the cathedrals, and we can produce no buildings equal to them, or have not done so; but people forget that we have only the remains of the architectural greatness of the time, not of its meaner aspects. Suppose we could see all the realities of life in a back street of a mediæval town reproduced; would they not be even worse than those of a back street in London, over which at all events some degree of sanitary legislation has control? Morris laments, as a sign of the vulgarity of the times, that now there are two languages talked in England, gentleman's English and workman's English; that there are a great many people in the land "who are doomed by the accident of birth to misplace their H's" (Morris writes "aitches,"

a word which dictionaries do not recognise); this, he thinks, "is barbarous," and this also, in some wonderful manner, is chargeable on the modern spirit of competitive commerce; he does not explain how. We may remark however, that the misplacing of the aspirate is not the special privilege of the artisan class whom Morris championed; it is prevalent throughout the trading class, and—must it be confessed?—one could sometimes sweep up a good many dropped after a meeting of architects. It is not the accident of birth, it is a matter of education; and if it were a class difference, would that, after all be peculiar to modern life? Did Morris really suppose that, in the Middle Ages, the "seigneur" and the "knave" spoke the same tongue? Was not the class division far more marked, even by costume, than it is now? And do we not read in Mallory's "Morte d'Arthur," when a knight deigned to ask a question of two labourers working in a field, the historian's naive comment—"Then were they afraid, when they saw a knight." A pretty idea that gives one of the courtesies of the great to the lowly in the Middle Ages.

The idea of the dignity of hand-labour is a favourite one with Morris and his followers, and is a wholesome one in itself, but it is pushed too far and in a one-sided spirit. That carpentry or masonry are nobler and more interesting occupations than ordinary clerk's book-keeping we quite agree. But when Morris says, after mentioning a discussion as to whether her son could take to cabinet-making (decided in the negative), "Why in the name of patience should a carpenter be a worse gentleman than a lawyer?" he only envisages one half the question. An educated gentleman may be a carpenter, but a carpenter need not be an educated gentleman; a lawyer, to acquire any position, must be. That is where the *crux* of the question comes. Being a good lawyer does presuppose a liberal education and a certain amount of mental culture and of refinement of manners; being a good carpenter does not necessarily presuppose that. Building craftsmanship is an admirable thing in itself, but it does not necessitate a high degree of mental culture, and therefore it is not to be expected that it will generally be regarded as a suitable profession for the best educated class of men.

Morris's opinions about architecture, of course, amounted merely to a general condemnation of everything done in the present day (except the work of one or two of his own friends), and of all architecture of the past except Gothic and Byzantine. In Greek architecture even he could see nothing, and as to Roman and Renaissance no words were bad enough for them. "The new Church of St. Peter still curses the mightiest city of the world;" the whole extraordinary, almost romantic, history of the slow evolution of that famous building being totally without interest for Morris. St. Peter's has great faults; partly due to a mistaken system of scale in dealing with Classic materials, partly to the work of Maderno in adding to the original plan; but when all is said, that dome with its lantern—

"Michaelangelo's dome, that had hung the Pantheon in Heaven"—

is one of the great things of the world, and we should be sorry for any architectural purist who did not feel that the first sight of

that famous cupola, familiar in how many a picture, with all its train of associations, was a kind of epoch in his life.

In Morris's complaints about the average house of the day, especially in a picturesque site, we feel a good deal of sympathy. Bournemouth, he observes, "is a district of rich men's houses."

"There was every inducement there to make them decent, for the place, with its sandy hills and pine trees, gave really a remarkable site. It would not have taken so very much to have made it romantic. Well, there stand these rich men's houses among the pine-trees and gardens, and not even the pine-trees and gardens can make them tolerable."

As far as we remember, the Bournemouth houses are sadly commonplace, though there may be exceptions. But the question is, would any houses of any kind, built by modern architects, have pleased Morris any better?

Morris's Essays are the expression of enthusiasm, of dogged personal conviction, and of a philanthropic passion for what he believed to be for the good of mankind. But they are not the words of wisdom, and were hardly worth collection in a permanent form.

THE LONDON BUILDING ACT AMENDMENTS.



WE have already referred to the proposed amendments of the Building Act which were foreshadowed at an earlier meeting of the London County Council, the proposals having been made in consultation with the Home Office. It is now to be presumed that the proposed amendments will have the support, not only of the London County Council and the Home Office, but also of the City Corporation, for, in a Report issued last week by the County Purposes Committee of the City, that body reports that it concurs with the views expressed by the British Fire Prevention Committee, as already published in our columns, and hence similarly recommends retrospective legislation where the safety of human life is concerned. The able Report, by the County Purposes Committee, we should add, claims the attention of all interested in fire protection; and we are glad to see that the communication of the Fire Prevention Committee referred to has had the favourable consideration of the representatives of the City.

We have now before us a summary indicating the general lines of the proposed amendments of the Act as approved by the London County Council, and we find that the proposals may be divided into six groups.

The first group deals with the provision of an adequate means of escape from any new building of which the level of the upper surface of any floor is of a greater height than 50 ft. above the road. This is practically a revision of Section No. 63 of the present Building Act, in which the level of 60 ft. is the requirement.

In the second group we find the important question of principle, *i.e.*, the requirement of giving facilities for escape to any *existing* building other than a dwelling-house occupied by not more than one family which exceeds the 50-ft. limit of height just mentioned. Such alterations as are necessary for providing means of escape are to be completed before January 31, 1908—*i.e.*,

within four years of what we would assume to be the passing of the Act. No one can contend that the principle is not a sound one, but the practical execution of this requirement for old buildings will be very difficult, and we are not sure whether the Council have allowed sufficient time for the alterations necessary. We think that, for such a far-reaching requirement, affecting practically all business property and all tenement houses, at least ten years should be allowed from the date of the passing of the Act.

The third group relates to a provision of adequate means of escape from fire in buildings which are not dwelling-houses, and are not occupied by more than one family, but in which sleeping accommodation is provided for more than forty persons. (This figure, by an amendment, was altered to "thirty" at the County Council meeting on Tuesday.) This, again, is a requirement of a most far-reaching character.

The fourth group deals with amendments to Clause 74 of the Building Act which relates to the separation of one building from another, and sets of rooms or tenements from one another; and we quite agree that amendments in this part of the existing Act are much called for.

The fifth group deals with the materials to be used on the roofs of projecting shops in front of dwellings, and the passages so often provided through these shops from the dwelling-houses to the street. Here, again, we can only commend what the County Council advises, for the shops in front of dwelling-houses make the latter veritable fire-traps.

Lastly, in the sixth group, there are to be various provisions as to the construction of lift-shafts in buildings that are not dwelling-houses. This group deals with the principle of the prevention of the spread of fire rather than with any question of the safety of life, although both these questions have to be considered together. There is no doubt that the lift-shaft of the modern business premises is the weak point of even the best construction and planning, and it is on account of such lift-shafts that well-constructed buildings are frequently gutted.

As seen above, with the exception of the question of lifts, all the proposed provisions are solely for the safety of life. The important subject of better construction is really not touched upon; but the amendments, as far as they go, if carefully drafted and wisely applied, should be a great benefit to the Metropolis and the public; and we would only warn the legislators against making any part of the proposed Amendment Act have the appearance of panic legislation.

Panic legislation has frequently been brought about after a catastrophe such as the Queen Victoria-street fire, which may be taken as the direct cause of the new proposals. It is not panic legislation that we require, but an improvement on the existing rules and regulations to accord with modern demands, without affecting too seriously the vested interests or, perhaps, making certain classes of business impossible in the Metropolis.

On a future occasion we may deal with the proposed Amendment Act in detail, but the outlines we have presented will give those primarily interested an idea of the important character of the new suggestions.

NOTES.

THE Report on Trades Unions in 1901, just published as a Parliamentary Paper, contains

some interesting figures. The increase in the numerical strength is only 12,166, taking the Trades Unions as a whole. The increase, moreover, has been confined to the mining and quarrying industries, an increase of 9,480; employees of Public Authorities, 5,490; and the food and tobacco trades, each 2,000. But this increase of 18,970 has been reduced as shown above, by 2,804, owing to the diminution of the number of members in the building and metal trades. The income, however, of the 100 principal Trades Unions shows an increase of 100,000*l.*, but their expenditure also has increased by 181,000*l.*; but their accumulated funds now stands at 4,161,916*l.*, about 400,000*l.* more than at the end of 1900. The total membership seems now to stand at the figure 1,922,780, of which 120,078 are women and girls. It would be interesting to ascertain the reason of the decrease in the number of members connected with the building industries.

Liabilities of Water Companies.

At a time when public attention is being much directed to the question of water and Water Authorities, the case of Beaumont *v.* Mayor, &c., of Huddersfield (see our last issue, page 563), has some points of interest. The Corporation, which was the Water Authority, endeavoured to excuse itself from complying with the provisions of its Act of Parliament (under which, in consideration of the Corporation having the right to the water from a certain stream, it was compelled to supply the owners of mills abutting on it with a certain minimum supply), by pleading the act of God—viz., a drought. Apart from the facts proved in the case, and on which the decision of the Court against the Corporation turns—viz., that they had not taken sufficient care in insuring the regular flow of water down their aqueduct—it is certainly difficult to see how they could successfully set up this defence as long as they were selling water elsewhere. Whilst touching on the question of water supplies we must draw attention to the effect the extended creation of Water Authorities is having on the value of landed property. Where the company or authority becomes entitled to water which flows in known and defined watercourses, as in this case, the Act of Parliament under which they derive their powers always secures compensation to the landowner, either in the shape of a free water supply or pecuniary compensation; but the law does not recognise any rights to percolating water, and hence, if the establishment of waterworks drains the wells of the district, the landowners, although they suffer a substantial depreciation of their property, have no remedy. Where the water is taken from the country to supply the needs of a distant town this hardship is accentuated. In many parts of Kent the wells have run dry on the establishment of waterworks' pumping-stations, and the landowners are compelled to buy back their own water from the companies at high rates and often only obtain a water of inferior quality owing to hard and soft water having been blended in the companies' reservoirs. If the Metropolis is to stretch its arms some thirty miles into the country, some change in the law seems

necessary to afford the landowners compensation for the abstraction of the water which has been used by them from time immemorial.

Workmen's Compensation Cases.

THE Court of Appeal have at present under their consideration some seventeen appeals under the Workmen's Compensation Act, and, as usual, when this measure comes before the superior Courts, the manner in which it is drafted draws down judicial censure, and during the hearing of one of the cases Lord Justice Mathew described the Act as calculated "not to give any guidance to anybody." The case of Wagstaffe *v.* Perks & Son is of interest to builders. A builder having had to pay a claim made upon him for the death of a workman in the employ of his sub-contractor was claiming over against his sub-contractor to be indemnified for the sums so paid. It will be remembered that the House of Lords recently decided in the case of Cooper *v.* Davenport & Winstanley that such a claim could be made under Section 4 of the Act in cases where the sub-contractor was an "undertaker," that is, where he was undertaking the construction, alteration, or repair of a building. Many decisions have had to be given of what is to be deemed "construction and repair" for the purposes of this definition. Thus in Hoddinott *v.* Newton Chambers the House of Lords decided the addition of certain stays with the object of strengthening the building to amount to construction, and in Dredge *v.* Conway, Jones, & Co., whitewashing and painting were held to be repair. The present decision is an authority to the effect that where a sub-contractor undertakes some substantial part of the work on a building (in this case the work being the plastering), he is an undertaker, although the material is not supplied by him. The case of Smithers *v.* Wallis, to the effect that a groom-gardener is within the Act if injured whilst driving his master's carriage three and a half miles from where he was employed, is the first case to be decided in the Court of Appeal on the Amending Act of 1890 applying workmen's compensation to agricultural operations. In these columns we need only shortly draw the attention of employers generally to the fact that the terms of this Act widely extend their liability. Thus when any servant is employed mainly in agriculture, by which we presume the Legislature meant rather more in agriculture than in any other employment, his employer becomes liable for any injury that may happen to him when "partly or occasionally" employed in other work anywhere, and as agriculture includes "horticulture, forestry, the use of land for any purpose of husbandry, the keeping and breeding of live stock, poultry, or bees, and the growing of fruit or vegetables," it will be seen what a vast extension of the principle this involves, including even in certain circumstances domestic or menial servants.

Tenants in Flats.

By that very large class or persons, the dwellers in flats, the case of Jaeger *v.* Mansions Consolidated, Limited, will be studied with the greatest interest. The case has at present only been argued on a preliminary objection that the facts as stated by the plaintiff disclosed no case in law, but, shorn of its technicalities, the principal point in

the case is the rights, if any, which tenants of flats have against the landlord when other tenants are guilty of immoral conduct on the premises. The action was brought on the ordinary covenant in the lease "for quiet enjoyment," and each tenant was also bound by a clause in the lease "not to permit" the premises to be used for "any unlawful or immoral purpose," and it was argued that even if the covenant for quiet enjoyment was not sufficient, the tenants were in any case entitled to the benefit of the tenants' agreements in relation to the general scheme for the user of the premises. The learned judge, Mr. Justice Buckley, has held that the covenant for "quiet enjoyment" only relates to some physical interference with the use of the premises by the landlord or by some person claiming under him, and not to its comfortable enjoyment. The Court, however, decided that the case could proceed, as there was an allegation that there was some physical interference with such things as the lights on the stairs, and that possibly the landlords could be effected with liability for this action on the part of other tenants, either as directly authorising them by receiving the rents, or that by so receiving the rents the landlords were waiving a breach of covenants to the benefit of which, as part of the general scheme, each of the tenants was entitled. The final decision of the case will be watched with interest; but in face of the decision that the covenant for "quiet enjoyment" does not extend to disagreeable noises, sights, or sounds, tenants who realise the terrible inconveniences which attend such a user of the premises will do well to see that their lease contains an express covenant rendering the landlord directly responsible.

American Mountain Railways. To people who live in a comparatively level country like England, the enterprising methods of American railway engineers seem particularly remarkable. The elevation attained by the Pacific Railway in the United States is completely outclassed by the Oroya Railway in Peru, which was built by a well-known firm of American contractors. This unique line starts at the seaport town of Callao, and after passing the city of Lima, it traverses the low hills at the foot of the Andes and reaches Chosica, 2,800 ft. above sea level. At San Bartolomé, forty-seven miles from the sea, the elevation of 4,959 ft. is reached, and then begins the famous switch system introduced by Henry Meiggs. The method here followed is to run the train up one arm of a "V" and then to back it up the other arm. A succession of such switch lines carries the train up to the wonderful Agua de Verrugas Bridge at an altitude of 5,839 ft. Proceeding thence to Matucana, 7,708 ft., and by another zig-zag V-switch system through tunnels, over steel viaducts, and along the sides of precipitous mountains, Aruri is reached at a distance of 76 miles from Callao, and 10,094 ft. above the sea. Then comes a succession of "V" tunnels, leading up to the Infernillo Bridge, hanging between the mouths of two tunnels, while the turbulent waters of the Remac rage in the depths below. The next points are Chicla, 12,697 ft.; Casapalca, 13,606 ft.; and then the tunnel of Galera is entered at a height of 15,665 ft., the highest point on the line, and the highest hitherto reached

by any railway. The middle of this tunnel is the true water-parting between the Atlantic and the Pacific, drainage water from one mouth running to the former and from the other to the latter of these oceans. Beyond the tunnel the line runs on a down gradient to Oroya, which is only 12,178 ft. above sea level, and is 138 miles from Callao. A concession has been granted for an extension of the line to the mining town of Cerro de Pasco, some eighty miles beyond the present terminus. Another high mountain railway is now being projected in the northern part of Peru, to commence at Piura, a few miles from the coast, and to proceed through a recently-discovered pass situated north-west of Iquitos, to the extreme head of navigation on the Amazon. Through the pass in question it is believed that a railway can be carried at a height of not more than 7,170 ft. above sea level.

A STRIKING example of a cantilever arch bridge has lately been completed for the Pacific Railway of Costa Rica. The structure crosses a cañon with almost vertical banks, at a level of not less than 340 ft. above the water, and has a total length of about 685 ft. Although surpassed in magnitude by the Garabit Viaduct, the Mungsten Bridge, and the new bridge over the Viar, the Rio Grande Bridge is of interest as the greatest span in Central America, as well as on account of the peculiar engineering problems attending its construction. In some details the design of the bridge differs from that usually adopted in similar structures, but its general form is similar to that illustrated in fig. 15, p. 386 *ante*. The skewback shoes are made entirely of riveted steel, and the pin bearings are thoroughly braced by solid ribs which serve to distribute the load over a base plate of considerable area, made in two planes, one being normal to the pressure from the completed arch and the other horizontal, so as to add to the stability of the shoe on the masonry seat. The pins are of 15 in. diameter, and, owing to the setting of the shoes, they are at right angles to the plane of the trusses. Theoretically the structure comprises a pair of spandrel braced arch trusses continued beyond the skewback piers to form cantilever arms 47 ft. 6 in. long supporting the river ends of the two approach spans, but, in fact, the top chord is a continuous riveted member. This constructional detail was carried out to permit the erection of the centre arch from each abutment with merely vertical anchorage. The bridge contains over 932 tons of steelwork, which was built in the shops within one month, and was erected by fifty men in three months—a remarkable engineering achievement that ought to be attentively considered by bridge-building firms in Great Britain.

Electric Lamp Photometry.

DR. J. A. FLEMING read an interesting and exhaustive paper on "The Photometry of Electric Lamps" to a crowded meeting of the Institution of Electrical Engineers last week. He began by pointing out the discrepancies between tests made by standardising laboratories and those made by manufacturers, and suggested that it was due mainly to the want of a definite standard of light. He classed as primary standards

the Violle platinum incandescent standard and the Vernon-Harcourt Pentane 1-candle flame standard, and as secondary standards the Hefner lamp, the 10-candle pentane lamp, and the Fleming glow lamp. As the Violle standard is non-existent, it seems that we are left with the pentane lamp as our only standard. If manufacturers agree with Dr. Fleming, this would be a partial explanation of the discrepancies in tests. We have not yet come across any one who can give us the formulæ for correcting the candle-power of the pentane lamp for variations in the height of the barometer, the amount of carbon dioxide in the atmosphere, and the humidity of the atmosphere. Yet accurate formulæ for the Hefner lamp are well known and are given by Dr. Fleming in his paper. When we have had occasion to make photometric tests we send a few standard glow lamps to be calibrated to the German Imperial Standardising Laboratory at Charlottenburg, which we keep as primary standards. Lamps calibrated there eight years ago agree within half a per cent. with lamps calibrated recently. It is true they calibrate them in hefners, but if we take the Post Office value of the English candle—namely, that it is 1.14 hefners—it will be seen that any one can for a few shillings get an accurate primary standard. Dr. Glazebrook spoke hopefully of being able to set up a photometric department at Bushy House shortly, and so there will soon be no excuse for those manufacturers and professors whose English candle is less than the Continental hefner or the American "English Standard Candle." In the latter part of his paper Dr. Fleming gave some very interesting methods of comparing lights of different colours by means of "flicker" photometers. Sir W. Abney, however, threw doubts on this method of photometry, pointing out that when there was no flickering it did not mean that the intensities of the two illuminations were equal. He also pointed out that the principle of the "discrimination" photometer described was wrong, as "acuteness of vision" varies most decidedly with colour.

The Churches of All Hallows and St. Edmund about the King, Lombard street. THE Bishop of London is about to issue a commission to the King, Lombard street, to enquire into and report upon the expediency of uniting into one benefice the rectory of All Hallows and that of St. Edmund the King and Martyr with St. Nicholas Acons, Lombard-street. Wren rebuilt the two churches, the former in 1694 at a cost of 8,058*l.* 15*s.* 6*d.*, the latter in 1690 at a cost of 5,207*l.* 11*s.* The tower and spire of St. Edmund's form, in the opinion of many, one of the most pleasing of Wren's compositions. The fabric was restored in 1865 by Butterfield, and again in 1880. The figures of Moses and Aaron in the altar-piece are by Etty (1833). The two fine stained glass windows representing St. Peter and St. Paul, by Nixon & Ward, of Soho, were removed from the north to the south side about twenty-two years ago. Mr. C. Hardgrave's design for the east window was exhibited in the Royal Academy rooms in 1886. Messrs. Arthur Lee & Bros., of Bristol, carried out improvements of the chancel in 1887. The organ is by J. C. Bishop, 1833. The register records the marriage on August 9, 1716, of Addison and the Countess Dowager of Warwick and Holland. In the old

church was buried, 1563, John Shute, architect and paper-stainer, whom the Duke of Northumberland sent to Italy in 1550, and who wrote a folio volume entitled "The First and Chief Groundes of Architecture." The design of All Hallows, which has always been hidden by houses, evokes no particular comment, but the interior, in its practical qualities, is eminently adapted for congregational worship, and contains a beautiful font with cover in white marble (a relic from St. Bene't Gracechurch) and some fine carving; the pulpit, sounding-board, and the lower part of the reredos are ascribed to Grinling Gibbons. The ten windows were designed by Mr. Alexander Gibbs; and at the restoration of the fabric in 1870, under the superintendence of Messrs. Francis the organ (by Harris, 1695) was re-built by Messrs. Gray & Davison; ten years later the interior was re-decorated and lighted from the roof. In 1865 the curiously-carved stone gateway was removed from the street into a vestibule beneath the tower. The tower, 21 ft. square on plan and about 85 ft. high, has a porch with two Corinthian columns and an entablature on its south side; it is finished with a simple cornice and a high parapet, whereof the upper half has an arcade of well-designed plate-tracery work. Sir John Vanbrugh, the architect, was baptized in the church of St. Nicholas Acons, and the registers contain many entries relating to his family. St. Edmund's, having formerly belonged to Holy Trinity Priory, by Aldgate, was bestowed at the Suppression upon the Archbishops of Canterbury, who, alternately with the Crown, present to its rich living. Its demolition was contemplated a few years since, and now All Hallows is marked for the same fate.

A CORRESPONDENT has sent us a letter protesting against our condemnation of *all* flueless gas stoves in dwelling-rooms, and informing us that he has a flueless gas stove of a certain brand in use in his bedroom, "with closed windows all night," which is giving him complete satisfaction. We do not doubt the good faith of our correspondent, but we cannot recommend the use of any flueless stove in a bedroom. Flueless gas stoves of the best description are permissible in halls and passages, because the atmosphere in such places is constantly changing, foul air going out and fresh air coming in; but, as we have repeatedly pointed out, they should not be used in dwelling-rooms. We cannot state the case against flueless stoves more clearly than by quoting the following paragraph from the lecture delivered last week by Professor Lewes:—

"A cubic foot of coal gas on its complete combustion yields 0.52 cubic foot of carbon dioxide and 1.3 cubic feet of water-vapour. If you do not mind breathing hot, polluted air, highly charged with water-vapour, and getting chilled with cold walls, a Bunsen burner stood on the floor is the most effective method of getting the whole of the heat of combustion into the air of the room, and no flueless stove can do more than this. In order to get something to sell, stoves are constructed in which some of the water is condensed, and the public are gravely informed that this removes all deleterious products. But it is impossible to get away from the fact that if healthful heating is to be obtained it is the solid objects and walls of the room that must be heated, and not the air; and although some of the heat is lost thereby, a flue to take off all the products is an absolute essential."

THE Mayor of Chichester appeals for subscriptions to the repair of the interesting market cross of Chichester, dating from 1500. Monuments of this kind are of more than local interest; and as we are assured that it is not proposed to "restore" the cross but only to keep it in repair, we may recommend the subject to the consideration of those who are interested in the preservation of old English monuments of this kind, of which not very many are left.

The Modern Sketch Club.

THE exhibition of this Club at the Modern Gallery in Bond-street shows a good deal of variation of opinion as to what constitutes a sketch, some of the exhibits being really finished drawings. If an exhibition is to illustrate sketches, which constitute a special form of art with special limitations, it is better to keep to what are really sketches—broad studies of effect and composition without finish. There are, however, a good many works which come properly under the head of sketches. Among the best of these are Mr. A. K. Brown's "Moorland" and "Upper Clydesdale" (11 and 23); Mr. H. Bennett's "A Lincolnshire Dyke" (7); Mr. Muirhead's two sketches in oil, "The Mill Pool" and "The Green Lane" (32 and 37), and Mr. Champion Jones's "The Beach, Aldeburgh" (43). Several figure sketches by Mr. E. Slocombe are interesting studies of attitude, character, and costume; so also is Mr. Hal Hurst's "Vanity Fair" (77), a girl before a looking-glass. Mr. Fraser's "Moonrise" (48), a good work in general, shows a portentously large moon; but this is the way with painters; the real scale of the moon in the landscape seldom satisfies them.

Workington Public Library Competition.

WE are sorry to find—or perhaps we ought rather to say we are glad to find—that we did an injustice to those concerned in the management of the above-mentioned competition by giving circulation to the statement of an intending competitor, who seems to have made a complaint without even properly reading the advertisement of the competition, where it was stated that the deposit fee would be returned if a design was sent in, and where the name of the assessor was given. The architect who wrote to us actually complained that he had to expend a guinea in order to find out if there was an assessor. Unfortunately this is so frequently the case that we saw nothing improbable in the statement; but in this case it is not so; everything is being done quite fairly. We are always ready to support architects against any exactions by competition committees, but we must at least ask that they will be sure of their facts before complaining.

PATENT OFFICE EXTENSION.—The Commissioners of H.M. Works and Public Buildings notify their intention of introducing a Bill in the course of next Session of Parliament in respect of a proposed further enlargement of the Patent Office in Southampton-buildings. They seek for powers to acquire certain lands, houses, and premises bounded upon the north by No. 6, Furnival-street and a portion of Staple Inn, upon the south by No. 13 in that street and Nos. 1 and 2, Took's-court, upon the east by Furnival-street, and upon the west by the existing Patent Office and the garden of Staple Inn (south court). Some of the area thus scheduled is now garden ground at the rear of Furnival-street, and the projected new buildings will form an addition on the east side to the Patent Office buildings which face the terrace and garden of Staple Inn.

COMPETITION FOR HOUSING SCHEME, BERMONDSEY.

MR. JOHN SLATER, F.R.I.B.A., the assessor appointed by the Metropolitan Borough of Bermondsey to report on the designs submitted in this competition, has now issued his award. The first place is given to the design by Messrs. Brocklesby, Marchmont, & East, of Merton, Surrey; the second to Messrs. Humphrey Davis & Co., 8, Lawrence Pountney-hill, E.C.; and the third to Messrs. Sills & Leeds, Norfolk-street, Strand. These and other designs are on view this week at the Rotherhithe Town Hall, and may be seen on Friday from 10 a.m. to 8 p.m., and on Saturday from 10 a.m. to 5 p.m.

The site, known as the Fulford-street area, is a slightly irregular oblong, about 180 ft. by 270 ft., the ends facing nearly due north and south, and the sides nearly east and west. It is bounded on the north by Rotherhithe-street, on the east by Seven Step-alley, on the south by Paradise-street, and on the west by Fulford-street. In a scheme of this kind the arrangement of the buildings on the site is of prime importance, and it is surprising that so many competitors have failed in this preliminary part of their work. There are many designs which are clearly out of court for this reason. Much valuable time would have been saved if competitors had bestowed a little more attention to this point, and had borne in mind the simple truth that no amount of ingenious detail can compensate for a bad block plan.

The authors of the first premiated design (No. 23) have utilised the site in a very simple manner. Four blocks are placed across it from east to west, and are arranged in two pairs, separated by a central garden varying in width from 45 to 70 ft. There is a yard or street 40 ft. wide between the two blocks in each pair. Nothing could well be simpler, but the arrangement has one radical defect—one side of each block faces almost due north, and consequently the rooms on these sides, including many living-rooms and bedrooms, will be sunless throughout the year. The central garden will also suffer from this arrangement, as the sunshine will be largely intercepted by the block to the south of it, which is 46 ft. high to the curb of the Mansard roof. On the other hand, there are no small courts or narrow passages, but ample room for air to circulate around every block.

Each building is five stories high, the uppermost story being formed in the Mansard roof. In each building there are three staircases, leading to as many balconies on each upper floor. In three blocks, each balcony gives access to four tenements. In the fourth block, adjoining Paradise-street, the three balconies serve five three-room tenements, five two-room, and one one-room on each floor. As tenants of single rooms are often of a lower class than tenants who can afford two or three rooms, it is not a good plan to allow the different kinds of tenements to be approached by the same stairs, as in this design.

The tenements themselves are cleverly planned without waste space. The balconies overhang the sculleries, water-closets, and entrances, and do not interfere with the lighting of the living rooms and bedrooms. Each tenement has windows on both sides of the blocks, so that through ventilation is obtained. The elevations are simple and suitable, a certain amount of character being given to the four principal fronts by three projecting bays with gables, following the lines of the Mansard roof.

In the design placed second (No. 16) there are also four blocks, one running from east to west adjoining Rotherhithe-street, and three at right angles to it extending from the rear of the first block to Paradise-street. The three longer blocks come too near the other, two of them within 17 ft.; this is 13 ft. too little. The tenements are arranged in five stories, those on the upper floors being entered from recessed balconies as in the first premiated design. With the exception of the end portions, the three main blocks are alike, each having three staircases. The one-room tenements are mixed up with the others. The details are carefully considered, although the planning is not quite as compact as in the successful design. The elevations bear a general resemblance to those of Messrs. Brocklesby, Marchmont, & East's design, but the projections are hipped instead of being gabled.

The design placed third (No. 14) is less satisfactory. There are four blocks placed across

the site as in the first premiated design, but return wings are projected in the rear of each block, so that each pair forms an almost complete quadrangle; in three out of the four cases the spaces between the wings are only 20 ft. wide. This is a serious defect. Seven sketches of drawings are shown, but three of these are not coloured, and one is not even fully inked-in. The buildings, according to the plans, section, and front elevation, are intended to be five stories in height, but the back elevation is drawn with six stories. Some of the fire-places are not well placed, but the elevations are both simple and effective.

The authors of Design No. 1 (shown on nine stretchers) have produced a good block plan. Five blocks are shown, one along each end, and three between and nearly at right angles to them. But the tenements are entered from the staircase landings in the middle of the buildings, and are placed back to back, so that there is no through ventilation. There are other defects, but the back-to-back arrangement is enough to condemn the design.

Design No. 2 has also five blocks, arranged in No. 1, but with one of the side blocks produced to Rotherhithe-street. The ends of the four external blocks are too close to each other, the spaces ranging from about 14 ft. to 25 ft.; the circulation of air around the central block is, therefore, seriously impeded. The balconies are carried over the windows of many of the living-rooms, and would render these rooms dark and dreary. We did not notice any elevations or sections.

The seven stretchers of Design No. 3 tell of a good deal of wasted labour. The planning shows little knowledge even of the elements of tenement design. There are four blocks—two wide and two narrow—all with long central corridors. Design No. 4 is rather better. Four blocks are shown, parallel respectively to the four streets, and as this did not give the required accommodation, nine projections are built out into the central court; each projection contains a tenement on each floor and part of the staircase. The rooms between the projections would be deficient both in light and air. There are no balconies, the tenements being entered from the landings of the stairs.

The author of Design No. 5 has economised time and paper, for he has attempted to explain his scheme on two stretchers. The block plan is good, consisting of three parallel blocks running from north to south, and at least 40 ft. apart. There are no balconies, and this omission has led the author to provide a greater number of staircases than would otherwise have been necessary. It is a point in favour of this design that tenements of different classes are kept separate. Some of the sculleries are approached only through the living-rooms. The elevations are lacking in variety. Design No. 6 shows seven blocks placed on the site in an unsatisfactory manner. No. 8 is conspicuous for its huge and ugly gables. No. 9 has four blocks parallel respectively to the four streets, and rather too near each other at the ends, but better in this respect than some of the other designs; the staircases as well as the tenements have through ventilation. No. 10 has four blocks arranged as in the preceding design, but in the central quadrangle two smaller blocks are placed, one end of each being within about 10 ft. of one of the external blocks; the details of the planning are better, and the elevations are pleasing, but rough-cast is scarcely appropriate for Rotherhithe. No. 11 is a monument of wasted labour; it consists of eleven stretchers, and the block plan is a notable example of misapplied ingenuity. On the ground floor there are twenty blocks, but these blocks are connected on the upper floors into two groups, each shaped like a double H, thus II.

The block plan of No. 12 is good—three blocks running north and south—but the planning generally is not of equal merit. Nearly all the sculleries are entered only from the living rooms; the external balconies block the light of many of the bedrooms. The most conspicuous features of the elevations are the chimney stacks, which form an almost continuous line along the ridge; the main stacks are about 50 ft. long! No. 13 has seven blocks, too close at the ends; the tenements are back to back and are entered from the staircase landings and not from balconies; some of the larger tenements have dark passages leading from the living-rooms to the bedrooms.

No. 17 is one of the few good designs submitted. There are five blocks arranged as in No. 1, but not as well spaced. The general planning is, however, much better. There are only two staircases to each block, and these might with advantage have been a little wider. The tenements are entered from balconies. Those on the fifth floor run up into an ordinary span roof, and are furnished with dormers; this reduces the height and cost of the buildings, but also reduces the value of the tenements. The block plan of No. 18 is remarkably like that of the first premiated design, but in other respects the planning is inferior; there is a good deal of waste space in the through stairs. No. 20 has a similar block plan, but the balconies extending nearly the whole length of each front elevation are a serious defect. No. 19 has three parallel north and south blocks and no balconies; many of the tenements are back to back, and the water-closets are not well placed. No. 21 has four blocks arranged on the site, as in the second premiated design; in nearly every case the scullery of the larger tenements forms the entrance lobby and the only approach to the living room and bedroom; the one-roomed tenements are grouped in the middle of the block facing Rotherhithe-street, and are approached by a separate staircase; there are four of these tenements on each floor, each group having a joint scullery; both the plans and the elevations are above the average.

On the whole, it cannot be said that the designs reach a high level of excellence, but we agree with the assessor that the best has been placed first.

THE MANUFACTURE OF "STOCK" BRICKS.

It is said that the method of manufacturing stock bricks is to undergo a complete revolution; that the manner of moulding is to be entirely different to that which now obtains in all but one yard, where this different process is being adopted; that the method of drying the raw bricks is, by artificial means, to be enormously accelerated, a day being occupied in that part of the manufacture instead of some weeks or months; that the raw bricks are to be burnt in closed kilns instead of "clamps"; and that the finished brick is a better "stock" than bricks of similar kind hitherto used.

Such an announcement will, naturally, attract the attention of almost all London architects, as well as those practising in the South-East of England generally. Before venturing an opinion on this suggested revolution and its effects, it may be well to remark that we have seen the whole process in operation, and it has not yet passed beyond the experimental stage. The experiments are on a large scale, and the installation is turning out 20,000 bricks per day; so it is possible to pass judgment on the results as far as they have been obtained.

It is desirable, however, to first of all define what a stock brick is. Every architect thinks he knows one when he sees it; but different localities produce different kinds of stocks, and there is the question as to whether the revolutionary method we are about to describe will apply universally to those districts. In legal disputes, judges have had considerable difficulty in defining what a stock brick is, and until the decision of Judge Martineau, in 1868, it is doubtful whether any real guidance could be relied upon. In that case a firm of builders in Hove, near Brighton, maintained that whilst they ordered "stock" bricks from a brick-maker in East Grinstead, they only received what they considered to be "place" bricks. They pleaded that "stock" bricks are not taken up at random from the clamp, as are "place" bricks, but that they should be selected. The brickmaker, on the other hand, contended that "stock" bricks meant bricks burnt in a clamp and taken at random. The judge, after hearing the arguments, decided that "stock" bricks meant selected bricks from the clamp.

We shall not attempt to traverse that judgment. At the same time, there are many points which it does not cover, and we may consider some of them. If there is any predominating feature the architect and builder is of opinion that a "stock" brick should possess, it is its colour. No one who is familiar with "stocks" will claim that there is much uniformity about

their tint, but what is aimed at is a deep yellow (called golden) when the wall made of them is looked at from a distance. But the colours from almost any clamp are as diverse as can well be, and a rough classification based on this peculiarity, together with certain physical properties, has been generally accepted. Discarding "bats" and "shufis," we have left in an ordinary clamp "place stocks," "grizzle stocks," "stocks," "picked stocks," and "red picked stocks." As these different varieties are largely determined by picking, human nature comes in, and great latitude must be allowed. The law has not yet defined all the varieties of stock bricks, and it, probably, never will. There is abundant food for litigants here.

The fact is that, given fine weather, the hand-made, slop-moulded brick which is to be burnt in a clamp will, on the whole, turn out satisfactorily enough, except for some on the outside of the pile. But, if wet weather sets in just after the clamp is set and the fires are alight, there is abundant risk of a large proportion of the bricks being distorted, and for several tiers from the top they will, as a rule, be rendered so rotten that they are worthless. Hundreds of them may be broken by simply letting them fall one by one from the hand to the ground.

This, of course, is a very great waste of carefully-prepared raw material, and affects both the profit on and the price of the better bricks in the clamp. But makers have not seen their way to improve matters until lately, and it may be that the keen competition of Peterborough makers has spurred them on to an appreciation of a more scientific treatment of the mode of manufacture. It might have done very well fifty or a hundred years ago to have made slop-moulded bricks by hand, and then to dry them in hacks, finally burning them in clamps—and this is the method commonly adopted now at Sittingbourne and district—but it is too slow, the bricks are not remarkable for their good shape, and an enormous amount of ground is required for the hacking and stocking. By the last-mentioned method, many months in the year must lay fallow, and no brickmaking can be done. It is only with difficulty that the bricks can be dried out-of-doors in the winter, and frost is a perpetual enemy to anything like continuous work all the year round. Unless a very favourable season crops up, the bricks cannot be made more than about seven months in the year.

Confining our attention to the Sittingbourne district, which is, of course, the most important centre of the stock brick manufacturing industry, we may say that it has always been held that "stocks" can only be made by hand—that machinery is incapable of turning out the genuine article. After what we have seen in the large experimental installation alluded to, however, we rather doubt this dictum, though it has the sanction of antiquity. We shall make some qualifications, nevertheless.

The experimental works, the property of Messrs. Eastwood & Co., Limited, are at the Conyer brickyard, Teynham, Sittingbourne. The raw material consists of loam mixed with "breeze" (the refuse of London dust-bins), and a small proportion of chalk. This material is placed in a pug, after having been suitably prepared, and is then delivered to a machine of American pattern. The bricks are pressed into a mould, the latter having been well sanded, and are turned out, frogged, on to the delivery table. By manual labour the prepared bricks are turned out of the moulds on to steel-framed trolleys, and are arranged in tiers on the latter, as is usual in hundreds of brickyards throughout the country. A trolley being full, it is wheeled along steel rails to the drying shed hard by. The drier is a most important part of the process. It is arranged in three tunnels. When the raw bricks are first introduced to it, the temperature within the drier is but a little above that of the outside atmosphere at the time. By a semi-automatic process the trolleys are pushed further in the drier as new trolleys are introduced, and as they go farther in the temperature becomes higher, until when they arrive at the end of the tunnels the bricks are being dried in a temperature of 250 deg. Fahr. As this temperature is considerably above the boiling point of water, it will be seen that practically all moisture must be driven out of the raw brick. The bricks come out of the tunnel extremely hot, and, in spite of the fact that they are brought into immediate contact with cold air, do not crack. Perhaps the most remarkable thing in the process is that the

complete drying is effected in twenty-two hours. Seeing the process is so rapid, we thought it desirable to test the shrinkage. When the raw bricks go in the drier they measure $9\frac{1}{2}$ in. by $2\frac{1}{2}$ in. by $4\frac{1}{2}$ in., and when they come out they are $9\frac{1}{4}$ in. by $2\frac{1}{4}$ in. by $4\frac{1}{4}$ in. The drier is of German origin, and is by Messrs. Müller & Pfeifer, of Berlin.

After leaving the drier, the bricks are raised by a lift to the kiln—the drier and the kiln being in one long building—and a similar gradual process is adopted in the burning. That is to say, the bricks on being introduced into the kiln are not suddenly thrust into a great heat, but insensibly approach the highest temperature by automatic action. They are burnt at a maximum temperature of from 1,800 deg. to 2,000 deg. Fahr., and are in the kiln sixty-eight hours. In regard to fuel, one hundredweight of nuts coal will burn 10,750 bricks, though it must be borne in mind that there is already a considerable quantity of fuel in each brick in the shape of "breeze."

The whole process is extremely simple, and appears to be very effective. After coming from the kiln the bricks have much sharper angles than have the hand-made "stock." They are of a better shape, and, having been well sanded in the mould, may be said to be sand-faced. The proportion of unsound bricks is very small as compared with the clamp-produced bricks. At the same time, the colour of many, as we saw them stacked in the yard, bearing in mind that they were intended to be "stock-coloured," did not strike us as being too much like the "clamp" stock. A very large proportion were excellent bricks in every way, and they should command a ready sale, but they looked too much finished off for "stocks"—too good, in fact. In regard to colour, we were reminded that the installation, although producing 20,000 bricks per day, was only experimental, and it is believed that, with experience, many improvements will be effected.

At any rate, it is proved that Sittingbourne "stock" bricks may be made by machinery, dried by artificial means, and burnt in closed kilns—and the experiment is, thus far, entirely successful.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE usual fortnightly meeting of the Royal Institute of British Architects was held at the rooms of the Institute, Conduit-street, on Monday, the President (Mr. Aston Webb) in the chair.

A Bird's Eye View of the Minōan Palace of Knossos, Crete.

The minutes of the last ordinary meeting were taken as read.

Dr. Evans read a paper on "The Minōan Palace of Knossos, Crete." He said that, after three campaigns of excavation, begun in 1900, it was now possible to speak with some confidence of the main lines of the great prehistoric palace that it had been his lot to bring to light on the site of Knossos. The magnitude of the work could be judged from the fact that between four and five acres of the building had now been uncovered, and in some parts the area had been practically doubled, so far as architectural results were concerned, by the recovery of extensive remains of upper stories. Great assistance had been given to him through the Cretan Exploration Fund, and he gladly seized the occasion of heartily thanking the Institute for its liberal contribution; but the annual amount to be covered, over and above the assistance given, had still been necessarily large. In carrying out the work he had been specially fortunate in securing the services of Dr. Duncan Mackenzie and of Mr. Theodore Fyfe, as to the excellence of whose architectural plans and drawings the Institute would have that evening an opportunity of judging.

Reviewing the construction of the palace and its general design and distribution, Dr. Evans stated that, in outline, the palace very nearly approached a square form with an oblong central court, and apparently four main entrances, roughly answering to the points of the compass. To the west were the remains of a paved court with altar bases and raised causeways. Along the base of the palace wall was a raised plinth, which seemed also to have been used as a seat, and there was every indication that this was the principal gathering place of the people—the Agora—where king

and citizens would most naturally have met. Here was the state entrance, a lofty porch flanked by fresco paintings of which bulls formed a principal feature, and giving access to two imposing entrances. One of these opened into a magnificent corridor, the other to a chamber at whose portal one might well believe the king sat in judgment before the assembled people in the Agora beyond.

The entrance corridor contained remains of a great processional fresco—men in long robes, priests or princes, youths carrying vases, apparently tribute-bearers, the lower borders of the robes of a brilliantly-apparelled lady, perhaps a Queen. Evidence was forthcoming of the continuation of this "Corridor of the Procession" along the upper terrace of the southern face of the palace. By this means a covered line of passage was secured between the state entrance on the west and the eastern quarter of the palace, passing the southern entrance, and looking out on the south end of the central court.

The more immediate objective of the entrance corridor from the west was to be found in the remains of a propylæum overlooking the southern terrace. This propylæum was originally entered by three doorways, giving access to a kind of fore-hall containing two column bases.

The same system of processional figures that characterised the walls of the entrance corridor from the west was continued on those of the columnar hall. The elegant pose of the youth bending back to support the weight of the tall painted silver vase that he bears with both hands, the brilliantly decorated belt and embroidered loin-clothing, but above all his finely-cut features, of a dark South European type not yet extinct in Crete, combine to stamp this as the finest example of figure-painting that had survived from prehistoric Greece. Two remarkable fragments show a part of a head with a fleur-de-lis crown, and a male torso, naturalistically moulded, wearing a fleur-de-lis collar.

This southern propylæum gives access to a small court with an altar-base, beyond which, in the present state of the remains, was visible a somewhat complicated block of small rooms. Many of them seemed to have served as the offices of palace functionaries, and contained deposits of their clay archives, accounts, inventories and other documents, in a highly developed system of writing about a thousand years earlier than the first written records of historic Greece. Other small chambers were used as stores for fine stone vases, or as cellars containing vats and tall jars, once filled with oil or wine. This block of ground-floor or basement rooms flanked the west side of the central court, the floor level being four steps down from it. On its inner or western side the block was flanked by a fine paved corridor, upon which opened a succession of eighteen magazines, many of them with their rows of huge oil jars—large enough to have accommodated the forty thieves!—still ranged in order against their walls. Beneath the paved floor on which rested the jars were double tiers of stone chests, lined with lead, which may have been constructed with a view to securing treasure.

The existing remains of upper blocks show that the whole of this region was originally surmounted by a more important upper story. The distribution of these upper blocks, as well as the inner lines of the lower walls and supporting pillars in the central part of this area, show that an important hall ran down it, the general outline of which can, to a great extent, be recovered. It almost exactly corresponds in arrangement with the great Megaron of the contemporary palace excavated by the Italian Mission at Phœstos, on the southern side of Crete. The face of this hall rose opposite the propylæum, and it was approached either by a ramp or, as at Phœstos, by a flight of steps that has since disappeared—this particular portion of the site having been much denuded.

A most interesting room in this part of the Palace was the room of the throne, discovered—though at but a small depth from the surface of the ground—in a surprising state of preservation. The remains of the frescoes, wingless griffins with peacock plumes against a landscape background of somewhat Nilotic aspect, were still clinging to the wall. Gypsum benches were ranged on three sides round the well-paved floor, which still showed traces of its central square of red painted plaster. In the centre of the north wall, between two lower benches, rose the gypsum

throne with its high leaf-shaped back—it was once covered with coloured designs—its shapely seat, its lower arches and crocketed moulding, so strangely anticipative of Gothic architecture. Opposite, giving light to the whole, was an impluvium, except for the inverted lines of its supporting columns, almost Pompeian in character, with steps descending to an oblong basin beneath the light well, which may have served as a shallow bath. The wooden columns were found in their sockets in a carbonised condition, but, together with the upper part of the walls and the roof, they had now, in accordance with Dr. Evans's directions, been restored by Mr. Fyfe after a wall-painting of a small shrine found in the palace, so that this little gem of Knossian architecture has been definitely rescued from destruction.

Of the importance of the great Megaron, and its magnificent decoration, the contents of the basement spaces bear ample witness. Here were found not only pieces of bull reliefs analogous to those from the northern entrance, but remains of painted human figures, both male and female, moulded in high relief in *gesso duro*, and showing in their reproduction, not only of the general contour, but of the individual muscles, sinews, and veins, an extraordinary fidelity to nature. Fragmentary as they are, they represent the highest achievement of stucco relief by the Minōan artists, and found their fitting place in the largest palace hall.

Having given a description of the "Hall of the Colonnades," one of the finest features of the building, and the staircase—flights of stairs, in one case flanked by a balustrade, leading from one story to another—a discovery, Dr. Evans considered, probably unparalleled in the history of excavation, the author next treated of what was obviously the domestic quarter. The centre of interest here was a very original chamber, called by the author the "Queen's Megaron," which was approached through double doorways by a crooked passage from the "Hall of the Double Axes." It was divided into two parts by a stylobate, with pillars at intervals on a central ledge, leaving ample openings for light, and which showed on each side of it remains of a shapely bench of wood and plaster.

A small private staircase leads up by two flights of stone steps from the Queen's Megaron to the chambers, still partly traceable above this room, and the adjoining hall of the double axes. There are indications that this staircase was continued to a still higher story. On the west an upper and lower passage leads to a complicated series of rooms originally provided on one side with a wooden staircase which seem to have been used as sleeping-rooms and for other domestic purposes. There is here a small court suggestively marked with the distaff sign; an inner room where valuables seem to have been stored, of which various traces, including a gold heart and parts of a crystal bowl were found, and other rooms which may have served as bedrooms, including one off which opens the nearest approach to a modern water-closet yet found in any ancient site. There is here, besides the passage to the main drain, an actual flush-pipe, and there are traces of a wooden seat.

Nothing, indeed, is more extraordinary than the remains of an elaborate drainage system existing throughout all this section. The limestone slabs of sections of the pavement, the pillar bases and door jambs, walls with painted stucco still adhering to them—in one case, even a stone bench in position—are here preserved on the upper story level. From these floors a succession of stone shafts—one apparently connected with another latrine—descend to a network of stone ducts, large enough for a man to make his way along them, beneath the floor level below. It may be added that near the olive press area were found fine terra-cotta drain-pipes fitted into each other with stop-ridges and internal collars to grip the cement, which in some respects seem to equal the most modern forms, though following out a different principle.

Very animated paintings representing scenes from the bull-ring, in some of which female toradors took part, formed a favourite subject of the palace wall-paintings. The room above the "Queen's Megaron" seems to have been adorned with miniature designs of this class.

* One of the largest existing halls of the palace, and named from the signs repeated on its limestone blocks.

Dealing with the general design and construction of the building, Dr. Evans brought out some remarkable contrasts presented by the palace of Knossos when compared with the palaces of Tiryns and Mycenæ, showing that in the former, unlike the Mycænean palaces, everything was arranged according to the most elaborate planning, the whole outline being laid down in definite lines without regard to the site—or, rather, a site seemed to have been chosen which allowed free scope of action to architect and engineer.

Another point dwelt on was the striking resemblance in plan between the Knossos building and the palace of Phæstos—among known buildings the only real parallel. Summing up, Dr. Evans said that it was impossible, in view of the fundamental arrangement revealed by those buildings—pointing in both cases to a more or less square building with central court crossed at right angles by two main lines of approach—not to recall the familiar features of the Roman camp, and its still more remote prototype as traced by Chierici and Pigorini in the prehistoric pile-settlement, the "Perroniere" of the Po Valley. The quadrilateral form, the Orientation, the existence of *Cardo* and *Decumanus* and their parallel lines, and the inner court itself, were points of comparison of a very suggestive kind, and seemed to point to an ancient European system of arrangement, sister forms of which were preserved by prehistoric Crete as well as Italy.

The palaces of Knossos and of Phæstos belonged in their existing shape approximately to the same period. That period, as shown by the earliest remains of vases and other relics found above the floor levels in each case, was somewhat more remote than that to which Mycæne has given a name, though in both cases modifications of the building were carried out during the Mycænean period proper. The best positive chronological data is supplied by the lid of an Egyptian alabastron found with remains of indigenous stone vases belonging to the Early Palace period on a floor-level near the northern hall. The lid has a beautifully cut cartouche of King Khyan, of the Fifteenth Dynasty, who was the principal ruler of the foreign or Hyksos Conquerors in the Nile Valley. He seems to have reigned about the eighteenth century B.C., and, considering the rarity of his monuments in Egypt itself, it is difficult to suppose that objects with the name of this Pharaoh could have reached Crete at a later date.

The high level of civilisation reached in Minōan Knossos by the date of the foundation of the existing palace, so conspicuous alike in its architecture and decoration, points itself to long centuries of earlier development. It is not surprising, therefore to find beneath the later foundations the remains of a still earlier palace, the lines of which seem partly to have been followed in the later work. The thirteenth dynasty monuments—not later than 2100 B.C.—found beneath the pavement of the central court, seem to belong to this earlier building, and a series of exquisite painted vases of eggshell fabric, in design and colouring never certainly surpassed, point, together with other relics, to an intimate acquaintance with Twelfth Dynasty designs, going back therefore to about 2800 B.C. But beyond this, again, we have evidence of still earlier princely occupation, and fragments of imported Egyptian vases of diorite and obsidian that take us well back into the Fourth Millennium before our era. And still before this, underlying the whole hill-top on which the palace stands, is a vast Neolithic settlement, replete with stone weapons and implements of primitive pottery, and idols, as were later supplied by ancient intercourse with Egypt, which carries back the antiquity of the site beyond the limits of such records.

Mr. G. A. Macmillan, in moving a hearty vote of thanks to Dr. Evans, said he could hardly believe it would be possible to listen to a paper more interesting than that given. The President reminded him in the course of a conversation he had with him that evening that the Institute concerned itself with architecture more than archaeology, but all who had listened to Dr. Evans's paper that night and had seen the admirable illustrations, and the drawings by Mr. Fyfe, with which it was illuminated, would agree that the problems concerned were largely architectural, and he could not help feeling that in the material which Dr. Evans had placed before them there was a good deal left for architects as well as archaeologists

to do. He could not help thinking that many architects might be disposed to try their hand at reconstructing some parts of, or perhaps the whole of, the palace, and it was perhaps not vain to imagine that if architects of the present day were called upon to build a palace for a South African or some other millionaire, some hints might be taken from this magnificent building which had been outlined to them that night. Before he sat down he might be allowed, as one who had been largely concerned in the Cretan Exploration Fund, by whose aid Dr. Evans had carried out his work, to remind them that there was yet another season's work before them, and that the exchequer at the present moment was empty.

Mr. R. Phene Spiers, in seconding the motion, said that he had the pleasure of listening to Dr. Evans last year, when he read a paper on the first portion of his exploration before the Architectural Association. What struck him most that night, was that the art was like that of the Egyptians—the further back they went, the purer and finer seemed the examples. It was well known that in the earlier Egyptian tombs the sculptures were of a far finer character than those in the later; and that night they had seen representations of paintings and sculpture which were certainly finer than any except those in the great Greek buildings. The same tendency was observed in the decoration. There was another point he would like to refer to. He thought that if the plan of this Palace of Knossos had been thrown on the screen without any intimation whatever as to where it came from or what its date was, one might fairly have guessed that it was another of those buildings of Rome, and it might well pass for a palace belonging to the Cæsars. That became all the more noticeable when the way it was set out was noticed, with the line of axis north, south, east, and west. The regularity of the planning was altogether different from what one would imagine the earlier buildings to be. There was another point on which he would like a little more information, and it was a matter which Dr. Evans mentioned casually in the commencement of his paper. In the photographs the walls, with one exception, were shown with level surfaces all the way through. In one of the first photographs, however, it would have been noticed that there was some material on the top of the stone wall. Dr. Evans said that the upper portions of the palace were built with rubble clay, and that the outer surface of this was covered with some kind of plaster of gypsum. Of late, of course, there had been a good many discoveries in Egypt and elsewhere, and the walls were found to have been built of clay. What he would like to ask was whether the fact of the upper portion of the upper stories of this building having been built in clay, these walls had fallen down into the lower portions of the Palace, and so, to a certain extent, preserved the frescoes which had been found, and which had been shown that evening.

Dr. Evans said it was quite true that a great deal of rubble and clay of the upper stories got into the premises below and preserved the frescoes. He might say that the President and Council of the Royal Academy had kindly consented to allow an exhibition of the drawings and plans and photographs, &c., as part of the winter exhibition of the Academy, so that those interested would have the opportunity of looking at the details at their leisure.

A number of photographs of drawings of fragments found in the palace were shown on the screen, and briefly explained by Mr. Fyfe.

Mr. D. G. Hogarth said he did not think there was much he need add to what had been stated. Of course, Dr. Evans had not told one tithe of what had been found in the Palace. He had said nothing about his inscriptions, his clay tablets, his crystals, or anything about his jewels; but he gathered that the object of the meeting was to keep more or less strictly to architectural details, and therefore he would only say with regard to the question raised about the rubble of which the upper part of the walls of Knossos was made, that one would rather have expected mud bricks. It was a fact that on three of the sites, more or less of the same period, in Eastern Crete, there were remains of mud bricks of a very fine kind, well made and durable, and these bricks were so well preserved that it was inconceivable that some of them should not have

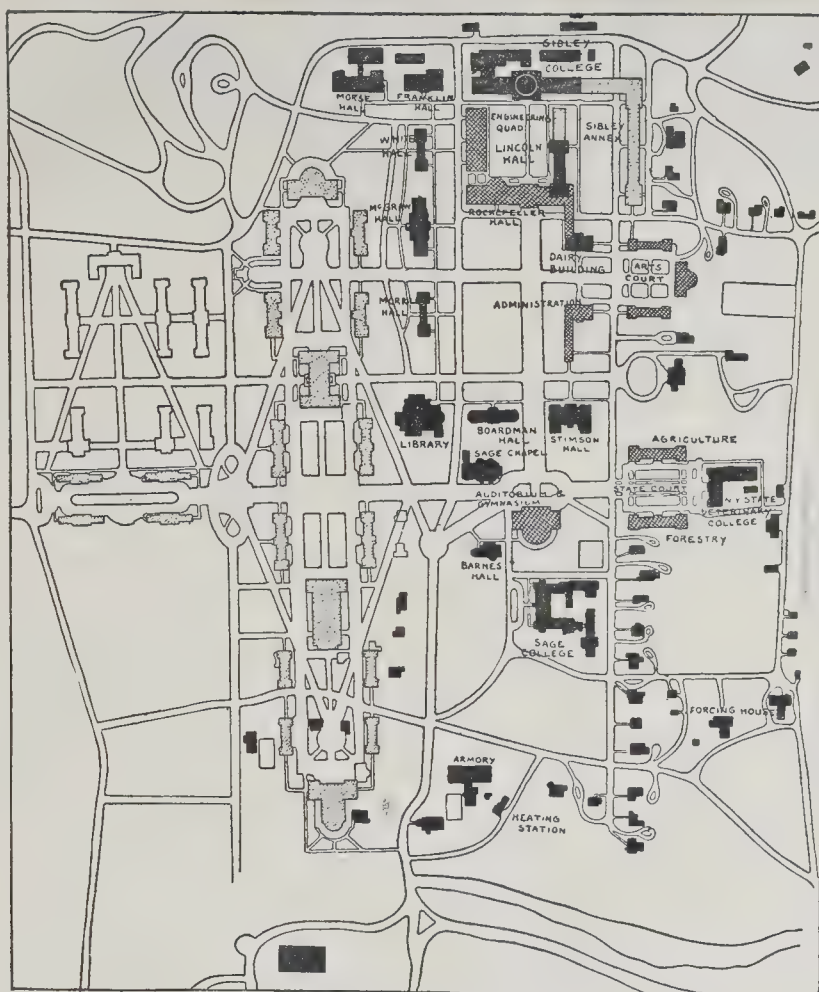
been found had they were used in the Palace of Knossos. Therefore one was forced to the conclusion that the upper part of the walls were formed of far worse material than the smaller houses on sites of very much less importance. In that respect it somewhat recalled Egyptian work, where they not infrequently found a wall beautifully decorated which in its own composition was entirely unworthy of such decoration. Of course, buildings in Egypt had a durability which could not be expected in other countries, and which could hardly have been expected in Crete. In fact, the preservation of this building in Knossos, for many reasons, was about the most miraculous fact in connexion with it. Dr. Evans had not had time to tell them that this building was lying with some of its frescoed walls hardly more than an inch or two below the ground. The plough had passed over it and the people had dug over it, and yet the thing remained. He could not say that he had been able to form any reason which would account for its preservation, except that Crete had always been a land of revolution, where man had too much to do in killing his brother man to interfere to any great extent with the remains of greater ages which had preceded him. The bricks found in the East of Crete were remarkable, if only for their great size. He was not acquainted with bricks in Egyptian buildings so great. They were 2 ft. square, but not more than 4 in. thick—more like thick tiles. The only other thing he would mention was the remarkable fact that the palace was not fortified, and not only was that the case with the palace, but also with the town. It was not singular in that. As far as he knew, the other sites were singularly devoid of fortification. If they considered what was the state of things in the countries surrounding Crete, not only in that age, but in all subsequent ages, it spoke of a very remarkable period in history, of which adequate explanation was not given, that there could be a whole land dotted over with large unfortified towns—that was to say, of towns which had no reason to protect themselves against each other, and apparently no reason to protect themselves against the outer world. It would seem to show that those words of "empire and dominion of the seas" even here were not out of place. That was to say, it was impossible to conceive that had Crete only had reference to itself and to a comparatively small Power, the Kings with their great wealth would have lived in an unfortified place. Not only that, but they had these painted things to show there must have been gold and silver vessels which must have rivalled those found at Mycæne. Those beautiful vases were modelled in clay in a most remarkable way, which spoke of the existence of a very large number of beautiful vessels in precious metals, such as gold and silver, and that was, of course, the great thing they hoped to find. They hoped some day to find gold and silver metals which gave such beautiful examples to the potter's art in Crete. That would not happen until they found the Royal tombs in a better state of preservation than anything yet found.

The Chairman said his remark to Mr. Macmillan as to the object of the meeting was rather with a view to explaining that the financial support of the Institute was not greater than it was. For himself, he could only say that he had been so intensely interested that he would certainly become a subscriber to the Society, and he hoped that many others who were there would do the same, for he understood there was a considerable deficit each year, which had to be borne by those who certainly ought not to bear it, for they also had to carry out the work. He now asked them to pass a hearty vote of thanks to Dr. Evans and Mr. Fyfe.

The motion having been carried, Dr. Evans expressed his thanks for the reception he had received, and said he was very greatly indebted to Mr. Fyfe for his successful work on the site of Knossos.

The Chairman announced that the next meeting, which was for the election of members, would be held on January 3.

SUNDAY SCHOOL, NEW HARTLEY, SEATON DELAVAL.—The foundation-stone has just been laid of a Sunday school for the New Methodist Connexion Chapel, New Hartley, Seaton Delaval. The schoolroom has been designed by Mr. Walter A. Ingledew, Tynemouth.



Plan for the Extension of Cornell University, U.S.A.

ENLARGEMENT OF CORNELL UNIVERSITY, U.S.A.

THE accompanying block plan (reproduced from a plan published in the *New York Tribune*) shows the immense scheme for the enlargement of Cornell University as proposed by the architects, Messrs. Carrere & Hastings, and accepted by the Trustees.

The existing buildings are shown in black, the proposed new ones in cross hatching. The plan unfortunately has no scale, but it will be sufficiently obvious that the scheme is a very grandiose one, and ought to be a great opportunity both for the University and the architects.

THE SANITARY INSTITUTE: DRAIN TESTING.

THE first meeting of the winter session of the Sanitary Institute was held on the 10th inst., at the Parkes Museum, Margaret-street, W., when papers were read and a discussion took place on "Drain Testing." The chair was taken by Professor W. H. Corfield.

Dr. Louis C. Parkes read the first paper, which, with one or two omissions, was as follows:—

"There appears to be no express statutory sanction for the testing of drains by the officers of Sanitary Authorities. Section 40 of the Public Health Act, 1875, requires every Local

Authority to provide that all drains within their district be constructed and kept so as not to be a nuisance or injurious to health. This section may in some sense be presumed to indirectly authorise and sanction the testing of drains, as it is difficult to see—drains being underground and out of sight—how the Local Authority can perform its duty under the section unless its officers ascertain by some test that the drains in the district are constructed and kept so as not to be a nuisance or injurious to health. Indirectly, then, but not expressly, there appears to be statutory sanction for the testing of any drain in a district, even if it is not actually a nuisance or injurious to health, to ascertain if it is constructed and kept so as not to be a nuisance.

In the case of drains which are a nuisance or injurious to health, there is the power to open the ground and examine the drain, which is conferred by Section 41 of the Act of 1875, upon the written application of any person to the Local Authority, stating that the drain is a nuisance or injurious to health (but not otherwise). Any person, in this case, would undoubtedly include the Sanitary Inspector, who, after reporting to his Local Authority that the drain is a nuisance, may proceed, after twenty-four hours' written notice, to the occupier of the premises, or in case of emergency without notice, to enter the premises, open the ground, and examine the drain. . . . According to the words of the section (41), in the event of the

drain on examination appearing to be in bad condition, or to require alteration or amendment, the Local Authority shall forthwith serve notice on the owner or occupier for the execution of the necessary works. . . . No doubt the section gives power to the Local Authority to expose the entire length of the drain for the purpose of its examination. But the words of the section certainly do not exclude the more usual method of exposing a portion only of the drain, with a view to the application of some test from the exposed portion. It is evident also that the section contemplates the doing of some damage in the course of the examination (it may be by removing a pipe or breaking into the drain), as, in the event of the drain being found to be in proper condition, any damage done is to be made good at the expense of the Local Authority.

In the Metropolis, under Sections 40 and 41 of the Public Health (London) Act, 1891, a similar power is given with respect to the examination and testing of drains as in Section 41 of the Act of 1875. It is true that the word drain is not especially mentioned in Sections 40 and 41, but the words actually mentioned—namely, 'water closet, trap, siphon, pipe, or other works or apparatus connected therewith'—are, no doubt, of sufficiently wide meaning to include drains. Moreover, Section 40 gives power to open the ground to ascertain the course of the drain, and it is unreasonable to suppose that the Legislature, whilst giving such

power to ascertain the mere course of a drain. intended to withhold the power to ascertain if the drain was in bad condition. Under these sections the Sanitary Authority can make the examination, without any previous notice in writing from 'any person' that the drain is a nuisance or injurious to health. . . . In the event of the drain being found in good order and condition, but not in accordance with the by-laws, the Sanitary Authority appears to have no power to insist upon its being made in accordance, but can merely have refunded, by the person offending, the expenses of the examination. . . .

Upon a review of all the circumstances, it would appear that whilst in the public health statutes there is no express authorisation of the testing of drains, there is absolutely nothing in the shape of any veto. Inferentially tests would seem to be sanctioned, as otherwise how can the local authority perform its statutory duty of ascertaining if the drains of its district are in good order or not? The nature of the drain test to be employed offers a fruitful field for discussion. Broadly speaking, the test employed should demonstrate defects, if they exist, and should not of itself do any damage in its application.

The Water or Hydraulic Test.—No one will dispute that all new drains should be so constructed as to be watertight, when tested under a reasonable pressure. With regard to old or existing drains, theoretically, they also should be watertight when tested under pressure. The argument advanced by the advocates for the application of the water test to all drains is, in my opinion, a sound one—the contention being that house drains are not uncommonly liable to become choked and obstructed. If the obstruction occurs at the lower end of the drain, then the latter becomes filled with sewage under pressure, and is practically put under a water test. An obstructed drain which allows sewage to percolate into the surrounding soil is a dangerous nuisance. To avoid such occurrences, it is said, every drain ought to be watertight.

Unfortunately, in practice, in the majority of cases, the rendering of an old drain watertight generally involves the relaying of the drain with new pipes and new materials in a new bed. I am aware that there is a certain patented method of cementing the interior of old drains without disturbing the pipes in their bed, which claims to render an old drain watertight. I do not know, however, if this method has been generally found satisfactory in practice. Where serious defects are found, and the drain is evidently in bad condition and incapable of repair, then relaying is essential, and this may be regarded as the 'necessary works' which the owner may be called upon to execute. In such a case, if taken into Court, the legal point is sometimes raised that there is no power conferred in the Acts enabling Sanitary Authorities to enforce the substitution of a new system of drainage for an old one, the new system being the modern one provided for in drainage by-laws of inspection-chambers, interception from the sewer, and the provision of means of ventilation. In my experience, although the magistrates are inclined to uphold this contention, they are usually to be convinced of the necessity for ventilation and interception from the sewer, even if they are not prepared to enforce inspection-chambers. I do not know of any authoritative decision upon the point as to whether, when a drain is relaid under notice from a Sanitary Authority, it must conform with the drainage by-laws or regulations of the Authority.

The chief difficulty that arises in connexion with existing drains is experienced where a drain, although not watertight under pressure, is working well, and is not obviously a nuisance at the time of inspection or examination. Such a drain may be incapable of repair so as to be watertight. There may be no evidence of nuisance in connexion with it, and no evidence of danger to health, beyond the fact that it is not watertight. It is doubtful, if under these circumstances, a notice to relay the drain is not somewhat exceeding the powers conferred by any Public Health Act; and this is the view which Petty Sessions Courts are apt to adopt. Theoretically, no doubt, the drain should be watertight, as even although there may be no evidence of leakage when running freely, at some future time the drain may become choked, and then leakage may occur. Where such a drain passes under an inhabited building, and, on testing, it is found that gas escapes

from the drain into the building, there is no doubt sufficient evidence of danger to health to justify the service of a notice to make the drain gas-tight, as is now required by statute for all drains under cellar-drawings in London.

I do not propose to discuss the relative merits of the water and smoke test for drains. . . . Unless some authoritative statement is made to settle this question, magistrates will possibly in future, if the recent Southwark decision is quoted, incline to regard the result of the water-testing of an old drain as no evidence of defects prior to the testing.

It seems to me that the main question for discussion to-night is as to whether the interests of the public health demand that all drains should be water-tight. If this question is answered in the affirmative, the next point to settle is whether the existing statutes confer the necessary powers to enable sanitary authorities to compel owners to relay all drains which are not watertight, even if found to be unproductive of nuisance at the time of examination. If there is a general consensus of opinion that such drains should be relaid, and that the existing statutes do not give the necessary powers, then fresh legislation will be required to meet the demand.

A paper on the same subject was then read by Mr. J. Osborne Smith, F.R.I.B.A. He said:—"In dealing with new buildings the treatment of drainage is comparatively simple and direct, and the work should be absolutely watertight and capable of resisting any hydraulic pressure likely to arise in practice. . . . In the case of old drains, however, their examination, testing, and adaptation, trouble and anxiety at once arise. It is sometimes said, 'Why preserve old drains at all? Remove them and put new ones whenever you alter or add to an old house.' This is what theologians call 'a counsel of perfection,' and if money were no object would probably be the course always adopted. But can one always definitely say that this drastic treatment is absolutely essential? . . . Drains more than, say, twenty-five years old, even those in connexion with well-built structures, should be regarded with suspicion, especially when they are inside buildings. Also those of any date in the ordinary speculative houses, particularly in districts where the supervision of the Local Authorities has been inadequate or perfunctory. Drains of more recent date, say, from ten to twenty years, which have been formed upon a good system may be regarded more favourably; they will not probably be as watertight as new drains ought to be, but they may be, and probably many still are, serving satisfactorily the purpose for which they were intended, and require only a few improvements to place them beyond reasonable reproach. Special attention must, of course, be given to such drains when within a building. I know many buildings having drainage of this class which is periodically tested, examined and cleaned, and is for all practical purposes as efficient now as when first formed. Such drains, if under a siding, should stand the severest test which can reasonably be applied to them. For those of this class which are outside the building, smoke under pressure, or a chemical test, are usually sufficient to discover defects which are important enough to need attention. The application of hydraulic pressure to old stoneware drains tends to further weaken any defective points.

When a drain becomes blocked by fat, house flannels, or other obstructions, and the sewage is held back for several days, a condition is set up which seriously increases the risk of injury to health. It will probably be agreed, however, that stoppages in well-constructed drains are not of frequent occurrence, and the risk of harm arising from slight leaks is therefore comparatively small; so small, I imagine, that the most enthusiastic or timid sanitarian would not for a moment think it necessary to incur the expense of opening up and uncovering drains to trace every slight leak which a severe water test might reveal in the drains of his own house. He would rather exercise a wise discretion, and only act when a reasonable test and examination indicated real and urgent need. . . .

The size of drains, as we know, seriously affects the character of drainage. Small bore pipes are now in favour, but that their indiscriminate use produces nuisances will probably be admitted by all who are practically acquainted with them. Small pipes often mean cleaner drains, but also, on the other hand, greater risk of siphonage of traps.

This is a point which should be specially considered when testing.

The position of a drain, apart from its vertical inclination, is obviously its most important in judging of its efficiency; its proximity to a building, distance below the surface, position in relation to natural strata, made-up ground, springs, wells, &c., should receive careful consideration. In short, all conditions and surrounding circumstances in connexion with drainage should be regarded from a common-sense practical standpoint. . . .

I do not think it possible, justly, to apply any hard and fast rules to the testing of the efficiency of old drainage. Careful discrimination, based upon knowledge, is absolutely necessary to arrive at a true estimate of its character. Haphazard guessing from meagre data on the one hand, and reckless application of rigorous, destructive tests on the other, are equally to be deplored. . . .

In conclusion, experience clearly shows that the examination, testing, and cleaning of drains, systematically and periodically, are essential to the satisfactory working of any system, however perfect. Windows, floors, flues, fire-places, cisterns, lavatories, and other portions of a building are, as a matter of course, periodically examined, cleaned, repaired, and defects remedied. Just as necessary is it that every system of drains should in like manner be maintained accessible, clean, and in good working order."

The following is part of the paper read by Mr. W. C. Tyndale, M.Inst.C.E.:

"Some method must be adopted of proving whether drains are watertight or not; the methods of testing are practically only two, namely, that of the smoke test and the water test; but the water test is the only one to my mind which is satisfactory for new work. It is frequently argued that such a test is an unfair one to place on a drainage system, but those taking this view must surely be forgetful of the fact that should a drainage system stop up, the sewage will apply exactly such a test. If it could be guaranteed that no stoppage would occur there might be something in the contention, but unfortunately it is the experience of any one who has had much to do with sanitary investigations that drains do stop up, and very often become surcharged almost up to the ground level. Such a test, moreover, constitutes no hardship for new work, as the constructor of a new system is aware of the conditions under which his work is to be done, that it has to stand such and such tests, and he will take the necessary care to insure the results being satisfactory, and this is done every day.

So much for the testing of new work. But turning to the subject of the testing of an existing drainage system, very different conditions present themselves; in fact, the question in this case is fraught with so many difficulties and is capable of so much argument, that it would almost seem impossible to do it justice in the short space of time available. . . .

The great difficulty lies in arriving at what is right and proper from the health point of view, and at the same time shall not be unfair in other directions. To put the matter in a more concrete form, we have the tenant of a house, his doctor, his expert—be he engineer or architect—and the Local Authority, all deeply interested in the soundness of a drainage system, while on the other hand we have the landlord or his agent, or both, who, while not wishing anybody's health to suffer, are keenly interested in avoiding unnecessary expenditure.

The system of drains in question may be comparatively new or of many years' standing; it may have served its purpose admirably for draining away sewage from a house, and in all probability the landlord believes or hopes that the system is free from objection. Doubts are cast upon it. Perhaps illness occurs, which induces the doctor at any rate to suspect defective drainage. A testing of the drains is suggested. The question is asked on behalf of the landlord what tests are proposed to be made, and he is generally informed that it is proposed to fill the drains with water. The landlord objects—saying that it is unfair, and likely to make the system which hitherto has been, so far as anybody can tell, sufficiently sound, leaky; the true condition, of course, cannot be ascertained without a testing, and it becomes a question whether the smoke test in this case should not suffice, and whether the application of the water test would not produce defects which do not exist, or aggravate

such as do exist so as to render them harmful.

These are the points round which so much discussion lately, both inside the law courts and out, has centred; and while I can say that I have had nearly thirty years' experience with this matter constantly before me, I must admit that I am unable to suggest any hard and fast rule which should be adopted.

It is undoubtedly hard on any tenant that he should be unable to have it proved to him conclusively that he is not subject to any malign influence from drains; but, on the other hand, it is simply monstrous to suggest that any one, possibly without real skill in these matters, should be at liberty to apply every conceivable test to a drainage system which, although unlikely, possibly is sound. For my own part, I think that when dealing with an existing drainage system of some or many years' standing tests should be applied gradually—that is to say, a beginning should be made with the smoke test, and afterwards the water test in sections and without undue pressure should be applied. Such a procedure, while putting no undue strain on a system should yet give quite sufficient indication of the state of affairs, and would enable any open-minded expert to form a very good opinion of the necessities of the case and what really was desirable to be done. When forming an estimate from a test of this sort the conditions of the situation of the drains, and the soil in which they are laid, should be taken into account, as these must necessarily be large factors in deciding the desirability or otherwise of renewing or repairing the system of drainage. . . .

It would save much trouble and hardship also if Local Authorities would observe a little latitude in particular cases, and accept the opinion of an expert of repute instead of always standing out for absolute water-tightness. Perhaps what I have just said may be construed as an inclination on my part to depart from advocating the necessity for absolute tightness in new drains, but this is not so in the least. The longer my experience in the matter the more I see the necessity for absolute soundness and permanent soundness in drains. To me it is aggravating to hear the age of a drain given as a possible reason for its unsoundness, as I always look upon it as a kind of reflection on one's profession in that we have not hitherto made drains which shall be permanently watertight. If a drainage system can be, and should be, watertight at first, why should it not be watertight for a month, and if for a month, why not for a year, and for any number of years? and if it is not so, surely it comes to this, that we have been hitherto using the wrong materials. I have for some long time been of opinion that stoneware drains are not sufficiently reliable for drains under or near a house. It is common experience that no matter how carefully drains have been laid and tested they develop leakage.

To what these leakages are due no one can say in all cases; doubtless, one reason which has not been sufficiently recognised is expansion and contraction due to varying temperatures of the liquid poured into them. This being so, it is my practice, wherever I can manage it, to lay all detailed drainage around a building in iron pipes. That this is not considered a very drastic measure is evidenced by the fact that many builders adopt the practice, and I find that even the builders of cheap houses in the district where I live are doing the same. I must say that, although I resent the tyranny of many by-laws, I should not be sorry to see it made obligatory by Local Authorities to lay all house drains with iron pipes. This, to my mind, is the only way in which healthy conditions of drains may be insured, and all the difficulties which we are met to consider may be avoided."

The Chairman briefly proposed a vote of thanks to the readers of the papers, which was seconded by Major Firth, and agreed to.

Mr. C. Payne (Liverpool) submitted that the testing of drains was absolutely necessary in order to insure that the materials used for the workmanship was sound, but as regards the extent of the testing that should undoubtedly have relation to the service required, the materials used, and the strength of the materials. He agreed that iron pipes were the right thing, but thought they were out of the question in the country. The smoke test, he considered, was unsuitable for stoneware drains, and very often the Local Authorities, by making inefficient tests, benefited the pay-

master at the expense of the dwelling. He could not see why any distinction should be made between old and new drains, if tests were necessary at all. While they were told that sewer gas was injurious to health it was illogical to suggest that all drains should not be made perfect. The engineer's duty was simply to state the facts and the risks, and it was then for the employer to decide what to do.

Mr. Max Clarke said the subject naturally divided itself into two absolutely distinct heads—viz., what they should require for new drains, and what they were supposed to put up with from old drains. On the latter point there was a great divergence of opinion, and it depended greatly on what the drains were supposed to do when put down. In London there were thousands of houses which had been drained within the last ten years which were supposed at the time they were laid to be perfect. Owing to the negligence of those who put them down, they were not perfect, and it was the duty of every expert who dealt with those particular drains to apply the water test without any qualification whatever. In a case he knew of a house in the country he hesitated as to whether the water test should be applied, and he must say he had expected to have heard from the readers of the papers a definite view as to the class of old drains which should be permitted to pass.

Dr. McClelland thought a matter which should be considered was when the drain should be tested, especially in new houses. Houses were constantly being built on made soil, and there was danger of subsidence, and it was necessary that a test should be applied a year or two after the house was erected. Where railway cuttings were built it often caused the drainage of the neighbouring houses to go wrong.

Mr. Chambers failed to see the difference between the testing of old drains and new drains, as perfection was required in both; the only distinction he would make was between rain-water drainage and sewage drainage, and certainly he would allow no leakage in the case of the latter. He contended that the smoke test for underground drains was simply a waste of time. He would adopt the water test for all drains below the surface, and the air test for drains above.

Mr. L. Young (Battersea) believed that it was necessary for new drains to be watertight; it was equally necessary for old drains to be watertight. He trusted there would be an authoritative pronouncement on that matter that night, so that sanitary officers might know what course to pursue.

A member asked Mr. Osborne Smith to define what a speculative-built house was.

Mr. Pettit said he had always heard it given out at the Institute that a drain should be watertight, and when he passed his examination he answered that question in that way. He would like Dr. Parkes to say whether a defective drain was a nuisance or not.

The Chairman said the drains ought to be tested three times before the builders left them, and if that was done in ninety-nine cases out of a hundred they would be found watertight on all three occasions. He believed that the smoke test was good for ascertaining whether a drain was unsound, but it was no good for telling them whether it was sound. As to the statement that the water test damaged drains, he believed it was a pure bogey, except where the joints were clay, and it was a good thing if they were damaged and pulled up. He preferred stoneware to iron drains, as they were cleaner, although he was sorry to say they did become leaky.

Dr. Parkes, in reply, said he had not said that drains not watertight should be passed, but he said that the existing Acts did not enable the Sanitary Authorities to compel all drains to be watertight. If the Institute did not feel that was satisfactory it was for them to go to Parliament with a Bill to compel all drains to be watertight.

Mr. J. Osborne Smith said he was a practical man, building houses and laying drains on all sorts of soils every month, and they might leave drains perfectly safely after the three tests, and yet those drains might not stand the water test at any time it might be applied. It was his firm belief that drains, if properly put down, did not need to be constantly tested with the severe water test. If the test was applied it would probably force a slight leak.

Mr. W. C. Tyndale also replied, and said he had spoken with no uncertain voice as to what should be applied to new drainage, but in that case no hardship was entailed. In the case of

old drainage other interests were concerned, and they must try and look at it from more than one point of view, and give a certain consideration to the owners that they should not be put to unnecessary expense. It did not follow that because a drain was defective it was a nuisance, and in such cases as that they had to rely on the medical men.

Mr. I. Young moved: "That this meeting of the Sanitary Institute is of opinion that all systems of drainage for conveying sewage should be capable of resisting a pressure of at least 2 ft. head of water."

Mr. Payne seconded the motion, and it was agreed to.

ARCHITECTURAL SOCIETIES.

MANCHESTER SOCIETY OF ARCHITECTS.—At a meeting of this Society held on the 11th inst., Mr. Alfred Darbyshire presiding, Mr. P. S. Worthington delivered an address, illustrated with lantern slides, on "Homes of the Monks during the Middle Ages." Mr. Worthington explained in detail the interesting features of the monastic buildings illustrated, both foreign and English, including Fountains and Furness Abbeys.—The annual dinner of the Society was held at the Queen's Hotel on the 12th inst. The President, Mr. Alfred Darbyshire, occupied the chair, and amongst others present were the Vice-President of the Royal Institute of British Architects, Mr. John Slater; Sir James Hoy, Mr. Edward Salomons, Mr. John Woolfall (President of the Liverpool Architectural Society), Mr. W. A. Royle, Mr. F. H. Oldham, Mr. John Ely, Mr. J. B. Gass, and Mr. J. W. Beaumont. The Chairman proposed the toast of "The Royal Institute of British Architects." Mr. John Slater replied. He said that while in recent years not so much had been heard of the vexed question of the compulsory registration of architects, many members of the profession, especially in the provinces, thought that a compulsory registration would be found a panacea for most of the evils from which architects and architecture were suffering. If registration were to come and be a success it could only be through the ranks of the Royal Institute. He was not altogether without hope that in the not far distant future some practical means of bringing that about would be found. With regard to the work and influence of the Institute, both had increased during the last year or two, and no one who had not sat at the Council of the Institute for some years could have the least idea of the enormous number of professional questions referred to that body. They had been consulted more than once lately by the Government and by public bodies with reference to matters of great public interest, and he was glad that that sort of spirit appeared to be gaining ground. The more municipalities and those who had to do with the architecture of buildings sought the advice of the local societies, the better it would be both for architecture and for the public. Architecture was a profession—or a business, if one preferred to call it so—but it was also one of the fine arts. Indeed, it was the mother of all the arts, because painting and sculpture, and what not, had only achieved their greatest successes when they enhanced the most brilliant pieces of architecture. Treating architecture as an art, no one could possibly exaggerate the influence on the younger generation when they were brought into contact with art and the matters of an early stage. Manchester artistic matters at an early stage. Manchester had some most admirable Board schools, well built and well equipped in every way; but with regard to their interiors, the classrooms were not quite as beautiful as they might be, and it would be a good thing if the students at the Art School were encouraged to do something towards the beautification of the Board schools. This would be splendid practice for the art students, and the educational effect on the children of the Board schools would be really great.—Mr. Edward Salomons gave the toast, "The Victoria University and Owens College," to which Mr. Alfred Hopkinson was to have responded; but Mr. Salomons read a letter from Mr. Hopkinson explaining that, in consequence of the death of his friend and colleague, Professor Withers, he could not take the part in the proceedings that had been assigned to him. Mr. Salomons said that it had been expected that Mr. Hopkinson would have made some announcement in regard to the proposed appointment of a professor of architecture at Owens College. There had been a wish on the part of the

College, and this had been cordially met by the Society, to appoint such a professor, and after many meetings of the Committee appointed by the College and the Society and the School of Technology, the scheme had at last been accomplished, and it had been agreed that a professor should be appointed to fill a chair at the Owens College and to be the teacher of architecture at the School of Technology. The appointment had not yet been made, but certain steps had already been taken towards making it. Mr. J. W. Beaumont proposed "Technical Education," and Sir James H.oy responded. Speaking of the prospective arrangement for filling a chair of architecture at Owens College, he said it was intended that this should be a joint professorship. The professor was to be partly paid by the College and partly by the School of Technology. The initiatory steps were progressing satisfactorily, and there was good reason to suppose that within the next twelve months such arrangements would be made as would place what one hoped would then be the University of Manchester in the same position in regard to the profession of architecture as was at present occupied by the University College of Liverpool. Colonel Eaton proposed "Allied Societies," and Mr. John Woolfall, of Liverpool, responded. Mr. J. B. Goss proposed "The City Architect," and Mr. H. Price replied. Mr. William Goldthorpe gave "The Manchester Society of Architects," and the President replied.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The usual monthly meeting of the Sheffield Society of Architects and Surveyors was held on the 11th inst. in the lecture hall of the Literary and Philosophical Society, Leopold-street, Mr. T. Winder presiding. Mr. J. P. Hunter was elected an associate, and Messrs. H. G. Warlow and A. W. Kenyon students of the Society. Mr. Edward Holmes then gave a lecture on "The Law and Practice with regard to Local Taxation," in the course of which he showed the relative increases in expenditure and in rateable value from 1871 to 1890, it being stated that the rateable value of land has decreased from 39,838,088l. to 31,312,342l., whilst during the same period that of buildings has increased from 55,157,300l. to 116,435,938l., or about 110 per cent.; that of railways from 4,871,048l. to 15,598,001l., or about 220 per cent.; and that of other properties from 5,005,898l. to 12,276,477l., or about 150 per cent. These figures work out to a total increase in the rateable value of the country of about 67 per cent., i.e., from 104,870,334l. to 175,622,758l. During the same period the expenditure out of locally-raised funds has increased from 17,646,720l. in 1871 to 39,934,754l., or about 125 per cent., so that the expenditure is increasing at a far greater rate than rateable value. On the motion of Mr. R. W. Fowler, seconded by Mr. Horace Wilson, and supported by Messrs. W. C. Fenton, J. Smith, and H. W. Lockwood, a hearty vote of thanks was accorded to Mr. Holmes for his lecture, and further discussion was deferred to a future meeting.

LIVERPOOL ARCHITECTURAL SOCIETY.—A meeting of this Society, of which Mr. P. C. Thicknesse is the Chairman, was held on the 15th inst. in the Law Library, 41, Castle-street, when a paper was read by Mr. David Beveridge on "Sir John Vanbrugh and his Work." With the aid of photographic slides shown on the lantern screen, Mr. Beveridge gave an interesting description of Vanbrugh's work in architectural design as it remained from his time in the reign of Queen Anne, the prevailing characteristic of his style being stateliness. This was notably shown in the architecture of Blenheim Palace, the chief residence of the present Duke of Marlborough, which was built in commemoration of the national victory of that period.

ULSTER SOCIETY OF ARCHITECTS.—The annual meeting of the Ulster Society of Architects was held on the 10th inst. in Ye Olde Castle Restaurant, Sir Thomas Drew, R.H.A., President, in the chair. The Honorary Secretary read the annual report, which contained the following:—When the last annual report (which was also the first) was presented, your Council was engaged in a struggle with the Belfast Corporation to obtain the suitable modification or withdrawal of the objectionable clauses in reference to the elevations of buildings contained in the Bill then being promoted in Parliament. Deputations from the Society waited on the Law and Improvement Committees and also attended meetings of the

Council for this purpose, but without avail. A petition to Parliament was agreed upon and duly presented, resulting in the rejection of the clauses, and thus a serious infringement of the rights of private property and certain disaster to architectural design in Belfast were happily averted by the action of the Society. The interests of the architectural student and the welfare of art instruction generally have been watched over by your representatives on the Consultative Committee of the Municipal Technical Institute as far as the limited scope of the powers delegated by the Technical Instruction Committee permits. The claims of Belfast to improved facilities for architectural education was laid before the Irish University Commission by your vice-president in evidence approved of by your Council. It is to be hoped that sooner or later such improved facilities may be provided. A Design and Sketching Club has been established under the supervision of your Council, but managed by a secretary and committee appointed by the members themselves. In co-operation with the Belfast Chamber of Commerce, the question of the re-issue of the Ordnance maps of Belfast on a reduced scale in substitution for the present 5-ft. scale is still under consideration with the object of having the re-issue on the present useful scale. There has been a substantial increase to the membership during the year, the present total being fifty-seven, while several important nominations have been sent in and await election.—The Report was adopted on the motion of Mr. H. Seaver, seconded by Mr. V. Craig. The following office bearers were elected for the ensuing year:—President, Sir Thomas Drew; Vice-President, Mr. W. J. Gilliland; hon. Secretary, Mr. N. Fitzsimons; hon. Assistant Secretary, Mr. W. B. Fennell; hon. Treasurer, Mr. H. Seaver; Members of Council, Messrs. W. J. Fennell, F. H. Tulloch, and J. J. McDonnell, J.P.; Associate Members of Council, Messrs. T. Houston and W. C. Maxwell; hon. Auditors, Messrs. J. St. J. Phillips and Vincent Craig.—The annual dinner was held on the same date in Ye Olde Castle Restaurant, Belfast, Sir Thomas Drew presiding. The Chairman proposed the toast of "Our Guests," and Sir Otto Jaffe, Sir William Whitt, Mr. A. E. Murray, and Mr. F. Batchelor replied. Sir Otto Jaffe, in submitting the toast of "The Ulster Society of Architects," said that combination had been found useful in commercial matters, and he believed it must also be of great benefit to their profession. They had not been successful in prevailing upon the Government to adopt their views regarding the scale of the Ordnance map for Belfast, but by showing a united front they might look forward with confidence to better results in the future.—The Chairman, responding to the toast, thanked the Society for having elected him President for the second year. The architects had had the audacity to attack the Corporation of Belfast and the Town Clerk, and it turned out that they were better lawyers than the lawyers of the Corporation. In their first effort at co-operation they had been successful, and had done a great deal to modify the conditions of competitions which had always been a burning question with local architects. In connexion with the annual exhibitions of architectural work at the Royal Hibernian Academy, he suggested that these works should be subsequently transferred to Belfast for public exhibition.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir J. McDougall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Shoreditch Borough Council 5,200l. for erection of working-class dwellings; Bermondsey Borough Council 7,295l. for underground sanitary conveniences; and Battersea Borough Council 9,285l. for erection of baths and wash-houses.

Board School Rehousing, Poplar.—The Housing of the Working-classes Committee reported as follows:—

"On March 25, 1902, the Council voted a sum of 56,751l. for the erection of dwellings on the Preston's-road and Norfolk-street sites, Poplar, for the accommodation of 1,030 persons of the working classes displaced by the School Board for London. On July 16, 1902, the Council accepted the tender of

Messrs. F. and T. Thorne for the erection on the Preston's-road site of six blocks of dwellings. By this tender the contractors undertook to build the first two blocks for a sum of 14,059l., and to build the remaining four blocks at a reduction of 33 per cent. on the prices named in the tender for the first two blocks. On this basis the cost of the six blocks would amount to 49,676l., or a saving of about 850l. on the architect's estimate. The Council will remember that the dwellings to be built on the Preston's-road site will be situated on either side of, and in close proximity to, the Blackwall Tunnel. Since the acceptance of the tender we have been advised that the nearness of four of the blocks to the tunnel is such as to make it advisable that the character of their foundations should be changed so as to reduce as far as possible the lateral pressure on the tunnel. As at first designed, these foundations consisted of piers, upon which the dwellings would be carried by means of arches. Acting with the advice of the Council's Engineer and Architect, we now propose that they should be constructed in the case of each block of dwellings of a concrete slab with a wide spread. By the adoption of this method of construction any danger from the exertion of lateral pressure on the tunnel will be avoided. The change will involve an estimated cost for foundations for 1,030l. in addition to the estimate of 49,676l. for the erection of the six blocks, but, having regard to the saving above referred to, it does not appear probable that this extra cost will appreciably affect the estimated financial results as reported by the Finance Committee on March 25, 1902. We recommend that an additional expenditure not exceeding 1,050l. in respect of the foundations of four blocks of working-class dwellings on the Preston's-road site, Poplar, be sanctioned."

Dr. Longstaff pointed out that the facts mentioned in the report showed that in this work, as in the case of the foundations of Vauxhall Bridge, either the late Engineer had been rash or the present Engineer was over cautious.

The recommendation was agreed to.

Third-class Season Tickets.—A long Report was submitted by the Local Government and Taxation Committee on the question of the issue of third-class season tickets on railways. It was shown that the total number of stations within a distance of twenty miles of London for which third-class season tickets are now issued is 232, or 47 per cent. of the number for which first-class season tickets are issued, viz., 489. It was recommended that the Report should be sent to the Board of Trade. The Report was adopted.

Seaver, Southwark.—It was agreed that the tender of Mr. Clift Ford, amounting to 5,638l. 8s. 1d., for the reconstruction of main sewer in Union-street, Southwark, between Gravel-lane and Southwark Bridge-road, be accepted.

Electric Supply Bill.—The London County Council (Electric Supply) Bill was approved and it was agreed to petition for leave to bring in the Bill.

London Building Act, 1894 (Amendment), Bill.—The Parliamentary Committee reported as follows:—

"In accordance with the instructions of the Council on November 4 last, we have prepared the London Building Act, 1894 (Amendment), Bill to amend the provisions of the London Building Act, 1894, relating to safety from fire, on the general lines indicated in the Report of the Building Act Committee presented on that date.

The proposals in the Bill may be shortly summarised as follows:—

1. To require adequate means of escape from any new building, of which the level of the upper surface of any floor is of a greater height than 50 ft. above the level of the footway, to be provided for persons employed or dwelling in or frequenting or resorting to any story of such new building as may be above such height; this constitutes an amendment of Section 63 of the London Building Act, 1894, which provides for means of escape from the upper stories of buildings of which the height, calculated in a similar manner, exceeds 60 ft.
2. Similarly to require means of escape to be provided before January 1, 1903, in any existing building, other than a dwelling-house occupied by not more than one family, which exceeds the 50 ft. limit as calculated above.
3. To require adequate means of escape from fire to be provided in any building or part of a building, not being a dwelling-house occupied by not more than one family, in which sleeping accommodation for more than forty persons is provided or in which over forty persons are employed.
4. To amend Section 74 of the Act of 1894 by making provision with regard to the walls, floors, or other structures which separate one building from another, or one set of rooms from other sets of rooms in the same or other buildings, and with regard to means of escape from buildings used partly for trade and manufacture and partly as dwelling-houses.
5. To make provision with regard to the con-

struction of, and the materials to be used in, the roof of a shop projecting beyond the main front of a building of which it forms part, and in which building persons are employed or sleep, and to require, unless other means of escape from fire are provided, a passage or passages to be constructed to form separate and direct means of communication between the street and the main building; and

6. To make provisions with regard to the construction of lift shafts in buildings other than dwelling-houses occupied by not more than one family.

Dealing with the means of escape from high buildings or buildings in which over forty persons work, or in which sleeping accommodation for over that number of persons is provided, we have specially provided that this Bill, if passed, shall not apply to buildings the use of which is at present regulated under the Factory and Workshop Acts 1901, or under Acts relating to common lodging-houses in London.

The Council will remember that before it decided to promote this Bill it had been in communication with the Home Secretary, and it may, therefore, be of interest to report that a letter has now been received from the Home Secretary, to whom a copy of the draft proposals was sent, which leads us to hope the Home Office will favourably consider the Bill when it is before Parliament.

We have given directions for copies of the Bill to be circulated to all the members of the Council, and we recommend that the London Building Act, 1894 (Amendment) Bill, be approved; that the Council be advised to petition for leave to bring in the Bill, and that the Bill and petition be deposited pursuant to the Standing Orders of Parliament, with such necessary alterations (if any) in the Bill as the Parliamentary Committee may consider desirable.

The following amendment was moved by Captain Hemphill, second by Alderman Dew, "That the word 'thirty' be substituted for the word 'forty' in the third and fourth lines of Clauses 12 (a), 13 (1), (b), and 13 (ii) and in the sixth and seventh lines of Clause 25 (1), (b)."

Captain Hemphill said that it was no use spending large sums of money on the Fire Brigade if they did not take care that buildings in which workpeople were employed, and where poor people slept, were not provided with means of escape from fire. They would be told that it would be no use altering the number to thirty, as forty was the number mentioned in the Factory Acts, and that the House of Commons would not carry the alteration into effect. The Council had nothing to do with that; their duty was with the public.

Mr. Dew said that in a large number of cases owners of property had been able to show that they employed only thirty-eight or thirty-nine people, and it was desirable in the interests of these people to make the alteration suggested.

Dr. Longstaff, Chairman of the Building Act Committee, opposed the amendment.

Mr. Beachcroft said the Bill had been hastily prepared, and he hoped, as the subject was full of difficulties, that they would not go on with it until next year.

Mr. Burns, M.P., strongly supported the amendment, and Mr. Radford, Chairman of the Committee, opposed it.

The amendment was, however, carried by 48 to 23.

Mr. Stuart Sankey moved a further amendment in the following terms:—(a) "In cases where any building within the meaning of this Act is situated within the City this Act shall be read as if the Corporation were named therein instead of the Council. (b) That this Act shall not apply to the City unless it be adopted by a resolution of the Common Council." He complained that the Bill had been hurriedly framed by the Committee, and the result was that there had been no time to consult the City. They would have either to amend the Bill, or to meet the opposition of the Corporation in the Committee-room. The Committee of the Council had drafted a Bill of a drastic character; and to carry it out would cost hundreds and thousands of pounds. The whole measure had been hastily framed because of the fire in Queen Victoria-street. Mr. Sankey proceeded to analyse the Bill, pointing out how injuriously it would affect the City how onerous were its provisions, and how drastic its penalties.

Mr. Alderman Alliston seconded the amendment, because he thought that if the City of London were exempted from the Bill at once it would be better than fighting out the question in the House of Commons.

Dr. Longstaff, Chairman of the Building Act Committee, said he could not detect a single argument in Mr. Sankey's speech which would

not apply equally to districts outside the City.

Mr. Henry Clarke, the deputy chairman, said that Mr. Stuart Sankey did not wish that the Bill should not be inoperative in the City. He only desired that it should be put in force by the Common Council.

Mr. Burns said it would be a calamity to exempt the City from the operation of the Act. It would be contrary to the wishes of the jury at the Queen Victoria-street fire, and also to the views of Sir Homewood Crawford, who represented the City.

Mr. McKinnon Wood said the trend of legislation during the past few years had been in the direction of placing the City in line with other Boroughs in London.

Mr. Beachcroft said that it was quite clear, after the experience of the Queen Victoria-street fire, that it would never do to treat the City differently from any other part of London.

Mr. Sankey asked leave to withdraw his amendment, but the Council refused, and demanded a division. On a show of hands there were only four in favour of the amendment. The Council then attempted to force a division, and, upon one being called Mr. Sankey and Mr. Alliston left the Council Chamber. As there were no tellers, the division was not taken. The recommendation of the Committee was then agreed to.

The Works Department.—The Works Committee submitted the following half-yearly statements of works completed by the Works department. We omit the several tables:—

"In accordance with standing orders, we append to this report statements showing the estimated and actual cost of (I.) estimated works, and (II.) jobbing works completed during the half-year ended September 30, 1902. The eighteen estimated works included in Statement No. I. are those which have been actually completed and certified during the half-year, and comprise, with one exception, the whole of the works completed within that period.

The erection of the superstructure of Horton Asylum, which was commenced in September, 1898, was completed during the half-year, but the measuring up of the work, which is being done by an outside firm of quantity surveyors, is not yet completed. . . . The total cost of the works included in the statements gives no indication of the turnover of the department, because some of the expenditure on these works occurred previous to the half-year in question, while on the other hand a large part of the expenditure during the six months was upon works which are still unfinished. The approximate expenditure on estimated works for the half-year was 158,000. The net result of execution of the eighteen works included in the statement is a balance of cost below final estimate of 9,620l. 2s., equal to nearly 10 per cent. The Council will note with satisfaction that seventeen of the works have been carried out at a cost below final estimate, while in the case of one work only (No. 13) has the amount of the final estimate been exceeded. The standing orders provide that we shall obtain the Council's approval to any excess of cost over final estimate, and it is therefore necessary that we should ask the Council to approve the excess [12l. 8s. 4d.] in the case of this work. . . . The number of estimated works referred to as executed and not yet included in the half-yearly statements of completed works submitted to the Council in accordance with standing orders is fifty, representing an estimated expenditure of approximately 1,157,815l. In the case of five works, viz., Horton Asylum—erection of superstructure, Horton Asylum—erection of central station, Horton Asylum—epileptic colony, Hackney Wick sewer, and the diversion of the northern low-level sewer, Lots-road, we have ascertained that the actual cost will exceed the amounts of the accepted estimates, but it is impossible to state the amount of the excess until the works have been measured and the accounts agreed. It does not, of course, follow that the cost will in all these cases exceed the amounts of the respective final estimates, and in the case of at least one work we believe that this will not be the case. The progress and cost of the other works in hand is at present satisfactory. Statement No. II. shows the results of the execution of jobbing works (a) during the year 1901-2 and (b) during part of the year 1902; the result being a balance of cost below schedule value of 1,728l. 3s. 2d. and 204l. 18s. 3d. respectively."

The recommendation was agreed to after discussion, in the course of which it was suggested by one or two speakers that some of the work had been sublet by the Department, and it was on such work that some of the profits had been effected.

Theatres.—The following proposals have been agreed to:—

Fire-resisting screen at the Illington Empire at the Royal Agricultural Hall (Mr. R. Verner).

Fire-resisting screen, Royalty Theatre, Dean-street, Soho (Mr. W. Emden).

Fire-resisting screen, Tivoli Music Hall, Strand (Mr. W. Emden).

Quantities.—An offer of Messrs. Fowler & Huggan, who look out the quantities for Blackwall Tunnel, to take out the quantities for the construction of Rotherhithe Tunnel, was agreed to.

Greenwich Tunnel—Commemorative Tablets. The Bridges Committee reported as follows:—

"We have had under consideration the question of obtaining tablets to commemorate the construction of Greenwich Tunnel, and have obtained designs from Messrs. J. W. Singer & Son, Ltd., to supply and fix two bronze tablets for the sum of 250l. We may state that the cost of the two tablets at Blackwall Tunnel was 350l. There is a balance on Messrs. Cochran & Sons' contract out of which the expenditure of 250l. be sanctioned for fixing two commemorative tablets at Greenwich Tunnel, and that the offer of Messrs. J. W. Singer & Son, Ltd., to do the work for this amount be accepted."

Mr. Beachcroft moved and Lord Carrington seconded to reduce the amount to 100l., and, after discussion, this was agreed to by 43 to 12.

Assistant for the Engineer's Department.—Authority was given for the appointment in the Engineer's Department of an additional assistant at a commencing salary of 500l. a year.

Tramways.—The Highways Committee recommended, and it was agreed,

"That the estimate of 605l. submitted by the Finance Committee be approved; and that the expenditure of a sum not exceeding 1,370l. be authorised in connexion with the reconstruction, for electrical traction, of the Westminster to Tooting, &c., section of the London County Council Tramways, for reconstructing two short connecting lengths of tramways close to the Elephant and Castle, and two across St. George's Circus, and for the doubling of the present single line at the Tooting terminus.

That the offer of Messrs. J. G. White & Co. to carry out the work specified in the above resolution at prices based upon their existing contract with the Council for the reconstruction of the Tooting to Westminster, &c., lines be accepted; that the work be carried out under the supervision of Mr. Kennedy, under his agreement with the Council.

That the preliminary capital estimate of 4,000l. submitted by the Finance Committee be approved; that the expenditure on capital account of sums not exceeding, in all, that amount be authorised, for the preparation of plans, the making of surveys &c., in connexion with the reconstruction, for electrical traction, of the Council's (Northern) Tramways, to be empowered to make the necessary arrangements for the engagement of the outdoor portion of the additional staff required for this work."

Mr. Crooks moved—"That the Council do call a conference of all the administrative authorities of London to consider the present lack of employment, and to make representations thereon to the Secretary of the Home Department and the President of the Local Government Board, and, if necessary, to call a further conference of all public bodies throughout the United Kingdom, with a view of approaching his Majesty's Government and urging upon them the necessity of a national scheme for dealing with this problem."

Mr. Macdonald seconded, and the motion was carried unanimously.

The Council adjourned shortly before eight o'clock until Tuesday, January 20.

BOOKS RECEIVED.

MODERN SCHOOL BUILDINGS. By Felix Clay, B.A., Architect. (E. T. Batsford. 25s.)

THE ARCHITECTURE OF GREECE AND ROME. By the late W. J. Anderson and R. Phené Spiers, F.S.A. (B. T. Batsford. 18s.)

WHO'S WHO: 1903. An Annual Biographical Dictionary. (Adam & Charles Black.)

GARDENS OLD AND NEW. Vol. II. Edited by John Leyland. (Offices of Country Life.)

ANDREA PALLADIO; HIS LIFE AND WORKS. By Banister F. Fletcher, A.R.I.B.A. (Geo. Bell & Sons.)

RESTORATION OF CLAVERLEY CHURCH.—All Saints' Church, Claverley, six miles from Bridgnorth, was reopened for Divine worship on the 7th inst. The work of restoration has been carried out in accordance with the plans of Mr. W. Wood Bethell, and the estimate of the architect was 4,500l. The work included the necessary repairs to roofs and walls, the lowering of the floor to its original level and so unearthing the bases of the Norman columns, the removal of the galleries. The plaster and whitewash have been taken from the walls, and this led to the discovery of some rare examples of Norman art as already mentioned by us.

THE LATE MR. FOURDRINIER.

MANY who have had business relations of various kinds with this journal will hear with great regret of the death of Mr. Douglas Fourdrinier, who has been publisher of the *Builder* for forty years, and whose death has taken place under peculiarly sad circumstances. He has been one of the victims of that terrible disease, cancer, which the medical profession are hoping to find some means of curing or eradicating. Some little time since he underwent an operation for the removal of a cancerous growth in the tongue, which appeared to be successful, and it was hoped that he might live for some years. Not long after, however, the disease recurred, and he had to be told, and to tell his friends, that his days were numbered. Happily, it may be said, both for himself and for those who loved him, his days were shorter even than was predicted, and he was spared from a long extension of lingering illness. He died on Wednesday morning the 17th inst., at his house in the West Kensington district, to which he had quite recently removed from Walton (Surrey). He was sixty years of age.

Mr. Fourdrinier was of an old Huguenot family, who migrated to England in (we believe) the seventeenth century; and his position as publisher of an architectural paper had a certain hereditary suitability; for one of his ancestors was Paul Fourdrinier, well known in his day as the engraver of many architectural subjects in Kent's and other illustrative publications, and Paul Fourdrinier's son was the inventor of an important paper-making machine. To Henry Fourdrinier, the father of Paul the engraver, there is a memorial tablet in St. Mary Woolnoth Church.

Mr. Douglas Fourdrinier was known among his friends as a most admirable amateur actor; in fact on the stage there was nothing of the "amateur" about him, so far as style and finish in acting went. He was an admirable man of business, and all who had to do with him corresponded with him on the business of his publication will bear witness to his courteous and amiable manners.

Mr. Fourdrinier leaves a wife and four children.

Illustrations.

DESIGN FOR A ROYAL MEMORIAL CHAPEL.

HIS design was submitted in the last competition for the Tite Prize, under the motto "Bramante." The designer is Mr. John Swarbrick, of Manchester, who has since qualified for election as an Associate R.I.B.A.

The design is based, in accordance with the conditions, upon a sketch plan left by Leonardo da Vinci, and the designer sought to make his treatment of it expressive of joyous thanksgiving for noble lives. The chapel was considered as the central feature of an extensive scheme, enclosed by a colonnade, and comprising ornamental sheets of water. The materials were intended to be externally Portland stone, with white marble statuary; and internally Portland stone, a little black marble, some bands and all carved enrichments of white marble, the plain clerestory shafts, and certain unenriched dados, and friezes of polished pale green-streaked marble.

The decorative treatment was to consist mainly of carving and sculpture, with a sparing use of coloured marble inlay, mosaic, and pigment. The lower portion of the exterior is strengthened in effect by horizontal rustication, which is terminated by a miniature colonnade. The two small campaniles, at the entrance contain spiral staircases—one for ascent and the other for descent. The most prominent external features are the plain counter-forts or buttresses, crowned with emblematic statuary, representing the Virtues. An inscribed frieze extends around the octagon, and, beneath, a band containing the haloed heads of saints.

The large dome is supposed to be covered with copper, but the small cupolas and little

lantern spire are of Portland stone and were intended to be secured at the base with metal bands to counteract the thrust. The cross at the summit to be of gun-metal.

PLANS FOR A TUBERCULOSIS SANATORIUM.

THESE plans were submitted by Mr. Arnold Mitchell in the recent competition for a Royal Sanatorium for Tuberculosis. They contain points which may be of interest at a time when the subject is being a good deal discussed. The following is the architect's explanation of his intentions in the plan:—

"In the absence of specific directions other than that the site must slope towards the south, and that 100 patients must be accommodated—twelve with two rooms each and eighty-eight with one room each—an absolutely free hand was given to competitors.

The scheme embodied in these plans was prepared by Mr. Arnold Mitchell after consultation with Dr. Jobson Horne, the doctor doing the essay work and the architect the planning.

The main idea is that the whole building shall be so arranged as to secure the maximum of sunshine and the maximum of air. The whole of the patients' rooms are on the main front, facing south. This front is curved in segmental form to secure further shelter, and each patient's room has windows in two facets. No room is covered in any way with a verandah. The verandahs, however, form a vital part of the scheme. These have been arranged on the same line of front between the rooms, and can be opened or closed at pleasure, both back and front, obtaining an absolute blow through. The patient, therefore, whether in the room or in the verandah, has the fullest advantage of sunshine and air without the disadvantage attendant upon the ordinary arrangement. A further gain is derived in consequence of the division of the patients' rooms into blocks of eleven—allowing grouping of different stages of the disease.

The entrance hall is placed in the rear of the patients' block in order to secure perfect quiet and tranquillity on the part of the patients.

An endeavour has been made to carry out the sunshine and blow-through idea, even into the servants' quarters, all the rooms here being in single line and with south aspect. The better-class patients are housed in a separate block, balanced on the other wing by the nurses' building. These have been treated separately, so that as far as possible the residents in these blocks may be free from the feeling of being part of a large institution; their partial detachment and their open prospect goes a long way in this direction.

The service difficulties must necessarily be great in such a building, but in this case they are no worse than those commonly met with in the majority of large hospitals and asylums. The fall in the ground permits a thorough service corridor below the ground floor level of the main block, and this works out on the ground level for the detached buildings. Meals would be conveyed in covered trollies to the serving-rooms provided. The resting-rooms, outdoor dressing-rooms, and doctors' rooms are also upon this level. The serpentine covered terrace shelter is so planned that much or little sun and wind can be obtained at various times."

ELECTRIC STATION ON THE SEVERN.

The original water-colour drawing from which the illustration is taken was made from the building after its erection, and hung in this year's exhibition of the Royal Academy.

Externally Ruabon pressed bricks and Girsill stone dressings have been used for the walls, and the roofs are covered with grey Aberdeen slates.

The electrical installation was supervised by Messrs. Burstall & Monkhouse, of Westminster. The generating works are adequate for lighting the whole of Messrs. Pryce Jones's manufacturing and business premises, in addition to supplying the motive power for machinery. The boilers were supplied by Messrs. Davy, Paxman, & Co. A portion of the premises on three floors is fitted up as a laundry with the latest machinery.

Messrs. Ed. Davies & Sons, of Newtown, were the general contractors, and the constructional steelwork was supplied by Messrs. Rubery & Co. Mr. George Hornblower, of London, was the architect.

LONDON AND COUNTY BANK, CHATHAM.

THESE new premises, situated at the junction of Railway-street and High-street, Chatham, have been recently completed. The front walls are faced entirely with Portland stone, and the roofs are covered with green Westmoreland slates. The joined work to the bank portion of the building is all constructed in teak, and the fittings in the bank office are of the same material. On the two floors over there are arranged suites of offices and rooms for a caretaker.

The carved panels on the frieze are designed in connexion with the Naval and Military Associations of Chatham.

Mr. W. J. Adcock, of Dover, was the general contractor, and Mr. C. L. Gooch acted as clerk of works. The architect is Mr. W. Campbell Jones.

No. 1, BERKELEY-SQUARE, W.

THIS is a new house occupying an irregular-shaped site with three frontages, the principal fronts having west and south-west aspects, and the best views being from the bay over the grounds of Lansdowne House, and down Berkeley-street to Piccadilly.

The fronts are faced with Portland stone, and the woodwork is oak. The building was carried out by Mr. John Garlick, of Sloane-street, from the designs of Mr. R. G. Hammond, of London.

The drawing was exhibited in last year's Royal Academy.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lewisham.—(a) That the resolution of the Council of January 28, in regard to the erection of a two-story addition at the rear of No. 30, Burnt-ash-road, Lee, be rescinded. (b) That the Council do not consent to the erection of a two-story addition at the rear of No. 30, Burnt-ash-road, to abut upon Taunton-road (Messrs. G. Bush & Son for Mr. A. Fish).—Agreed.

Lines of Frontage and Projections.

Lewisham.—A one-story store-shed at the rear of No. 1, Ardgowan-market, Ardgowan-road, Lewisham, to abut upon Downhill-road (Mr. A. C. Baker for Mr. G. Pauling).—Consent.

Lewisham.—A house on the east side of Bromley-road, Catford, to abut upon Inchmery-road (Mr. W. Bailey for Mr. J. Reeves).—Consent.

Hackney, North.—That the application of Mr. G. R. Woodruff for an extension of the period within which the erection of houses with bay windows on the east side of Mount Pleasant-lane, Upper Clapton, between Baker's Hill and No. 121, Mount Pleasant-lane, was required to be commenced and completed, be granted.—Agreed.

Hampstead.—Two-story bay-windows and wood and tile pent-roofs in front of proposed houses, Nos. 148 to 158 (even numbers only), inclusive, Fordwych-road, Hampstead (Messrs. Done, Hunter & Co. for Mr. H. Neal).—Consent.

Lewisham.—That the application of Messrs. Johnson & Aldridge for an extension of the period within which the erection of buildings on the southern side of Manor Park, Lee, was required to be completed, be granted.—Agreed.

Lewisham.—A conservatory addition at the rear of No. 179, Hither Green-lane, Lewisham, to abut upon Ennersdale-road (Messrs. J. Outhwaite & Son for Mr. J. Outhwaite).—Consent.

Marylebone, West.—A porch on the north side of No. 33, Montagu-square, to abut upon Montagu-place (Mr. F. W. Foster for Mr. H. S. Cantley).—Consent.

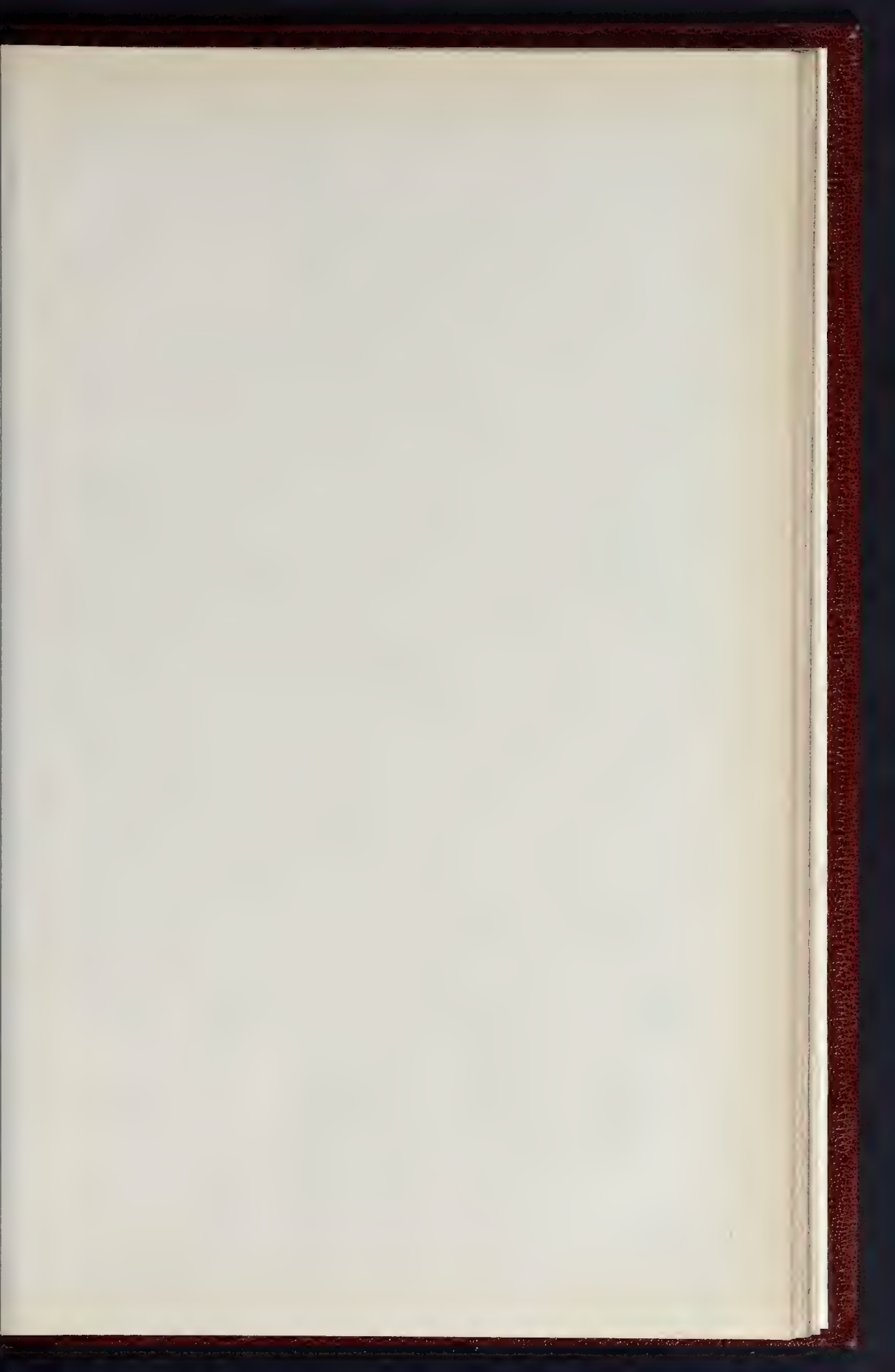
St. Pancras, West.—A conservatory at the flank, and the retention of a summer-house at the rear of No. 20, Wyneham-road, Camberwell, abutting upon Elmwood-road (Mr. A. E. Mullins for Mr. Percy).—Consent.

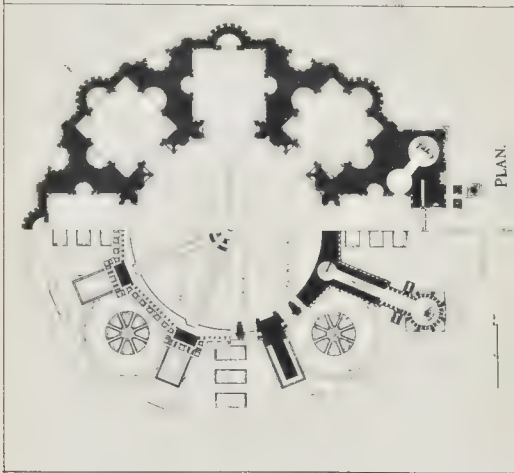
Brixton.—Retention of a wood, glass, and zinc roof at the side of No. 144, Coldharbour-lane, Brixton, abutting upon Eastlake-road (Mr. G. T. Stevens).—Consent.

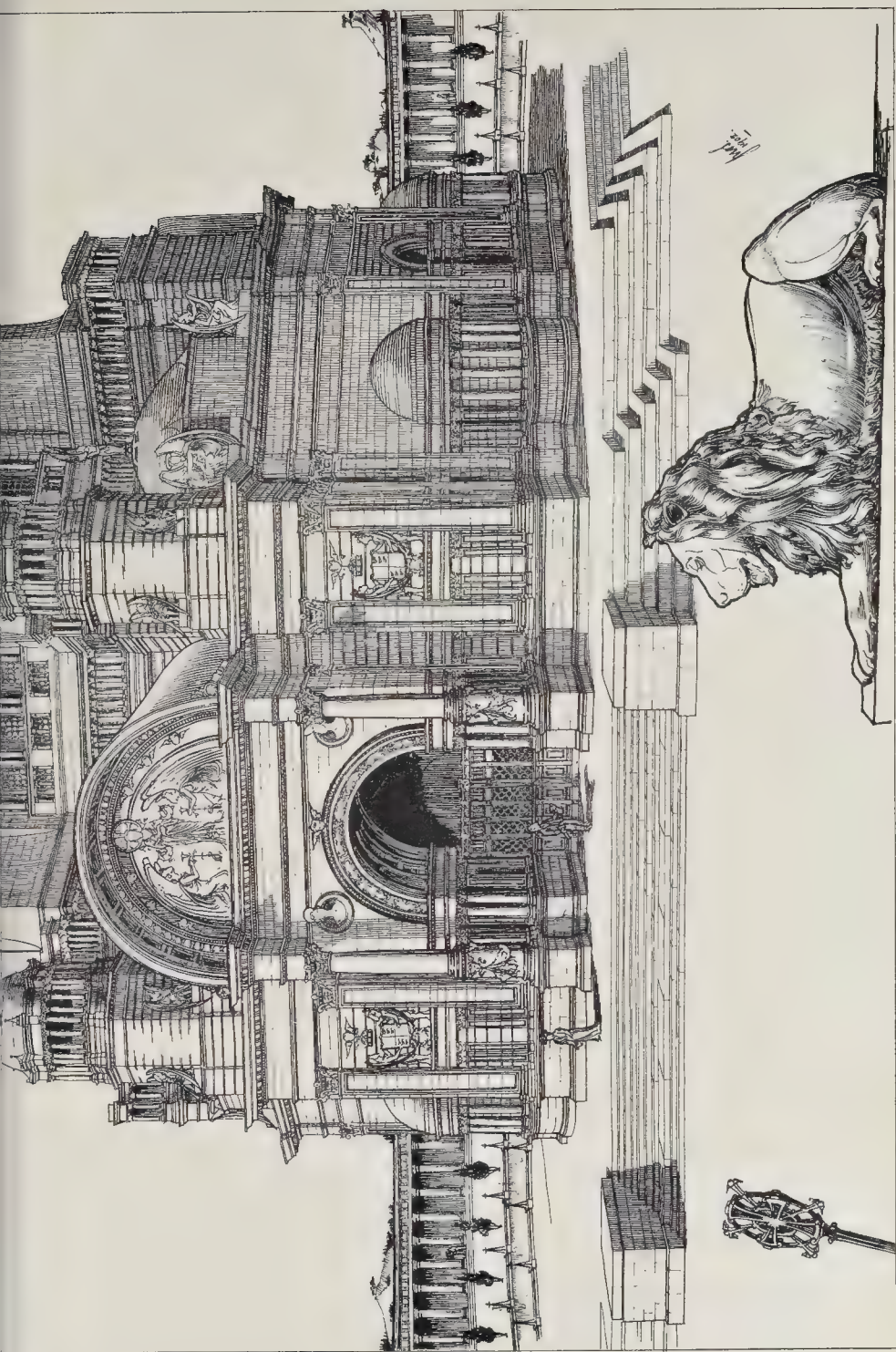
St. Pancras, West.—An addition to the London Temperance Hospital, on the east side of Hampstead-road, St. Pancras (Mr. J. A. Tregelles for the Board of Management of the hospital).—Refused.

Bethnal Green, North-East.—A one-story shop upon the forecourt of No. 394, Hackney-road, Bethnal Green (Mr. E. C. Homer for Mr. H. Warden).—Refused.

Fulham.—Two houses with shops on the west side of Munster-road, Fulham, to abut upon Horder-road (Mr. J. Huddett for Mr. B. M. Goldhill).—Refused.



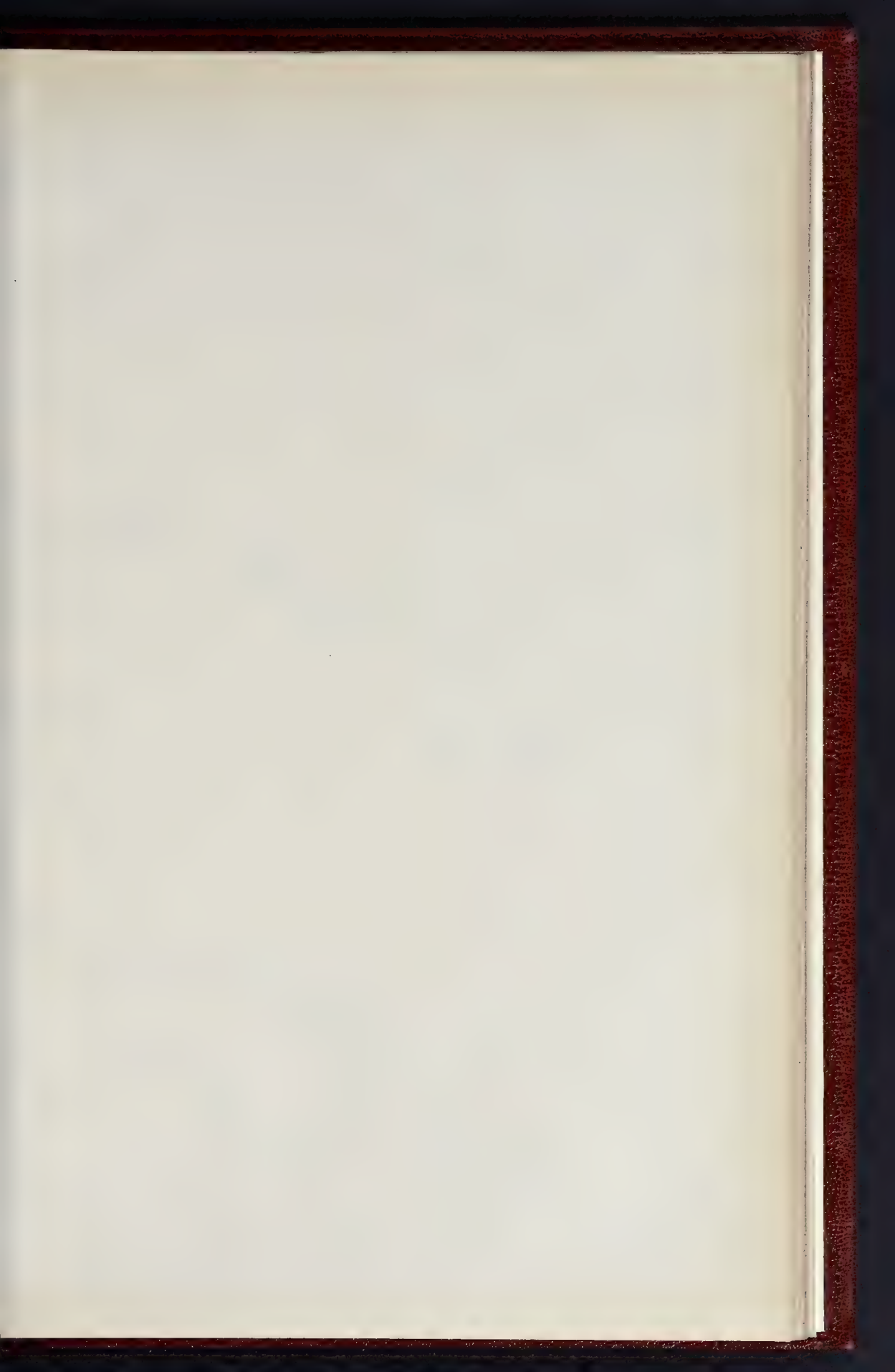


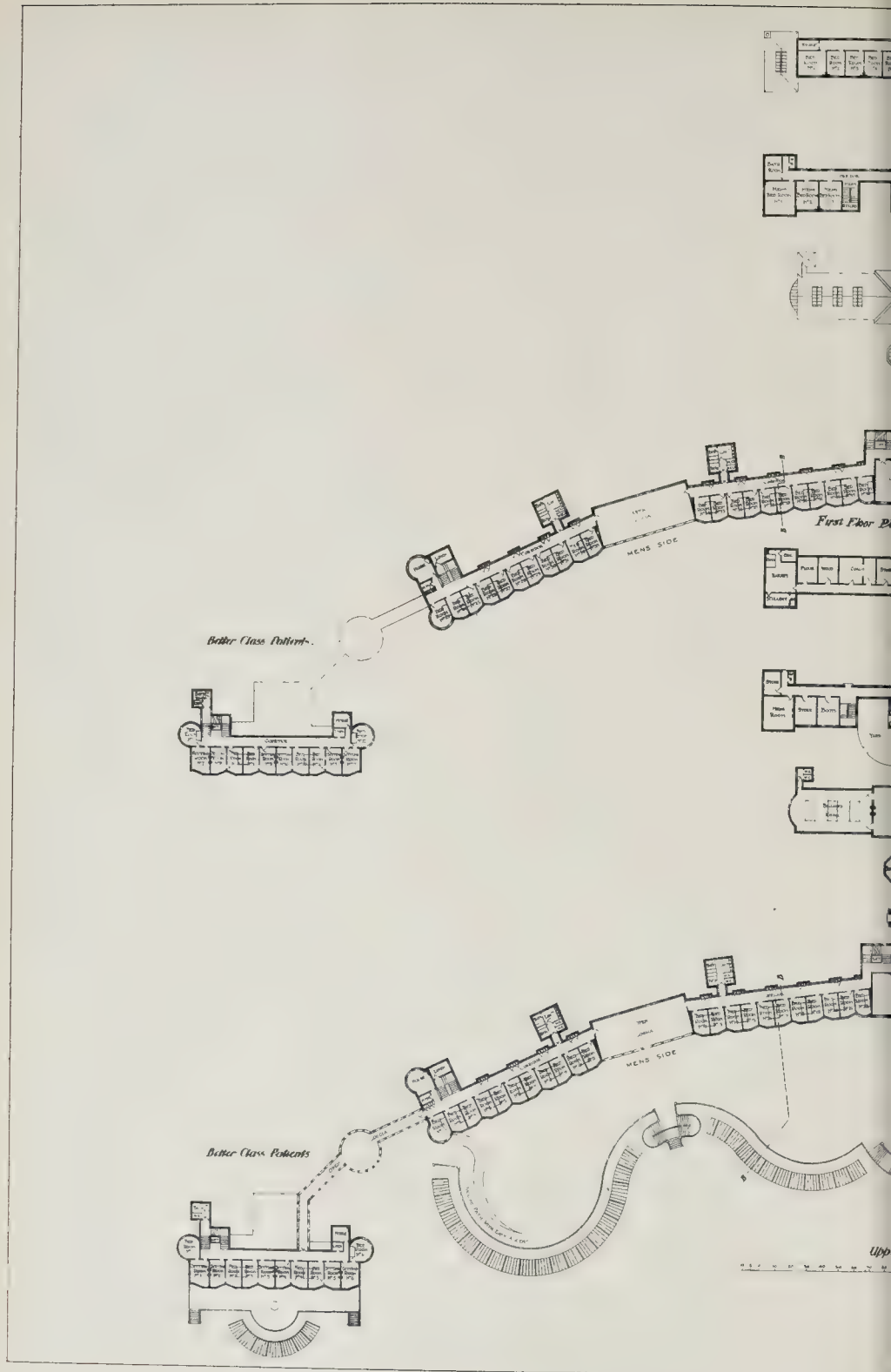


PHOTOGRAPH BY MR. J. SWARBRICK

DESIGN FOR A ROYAL MEMORIAL CHAPEL—By Mr. J. SWARBRICK

Submitted in Competition for R.I.B.A. Soane Medallion, 1902.





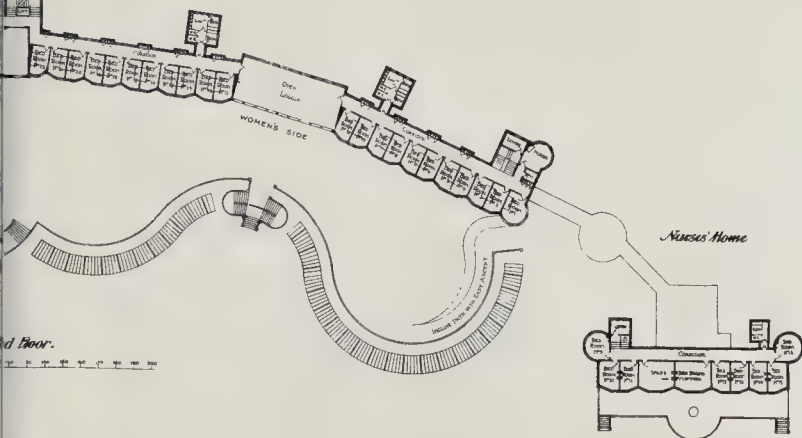
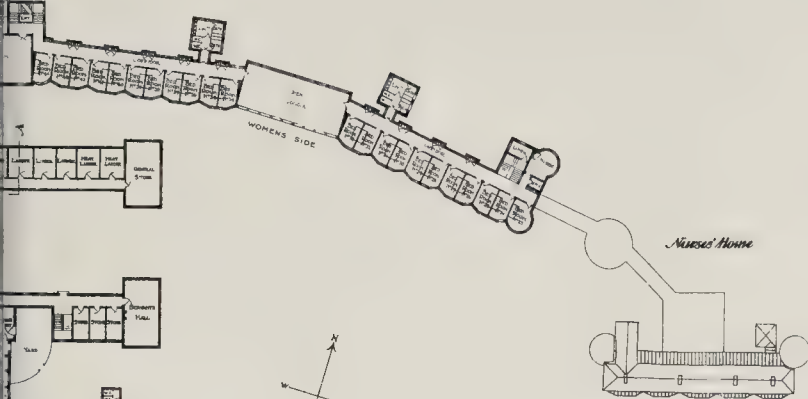
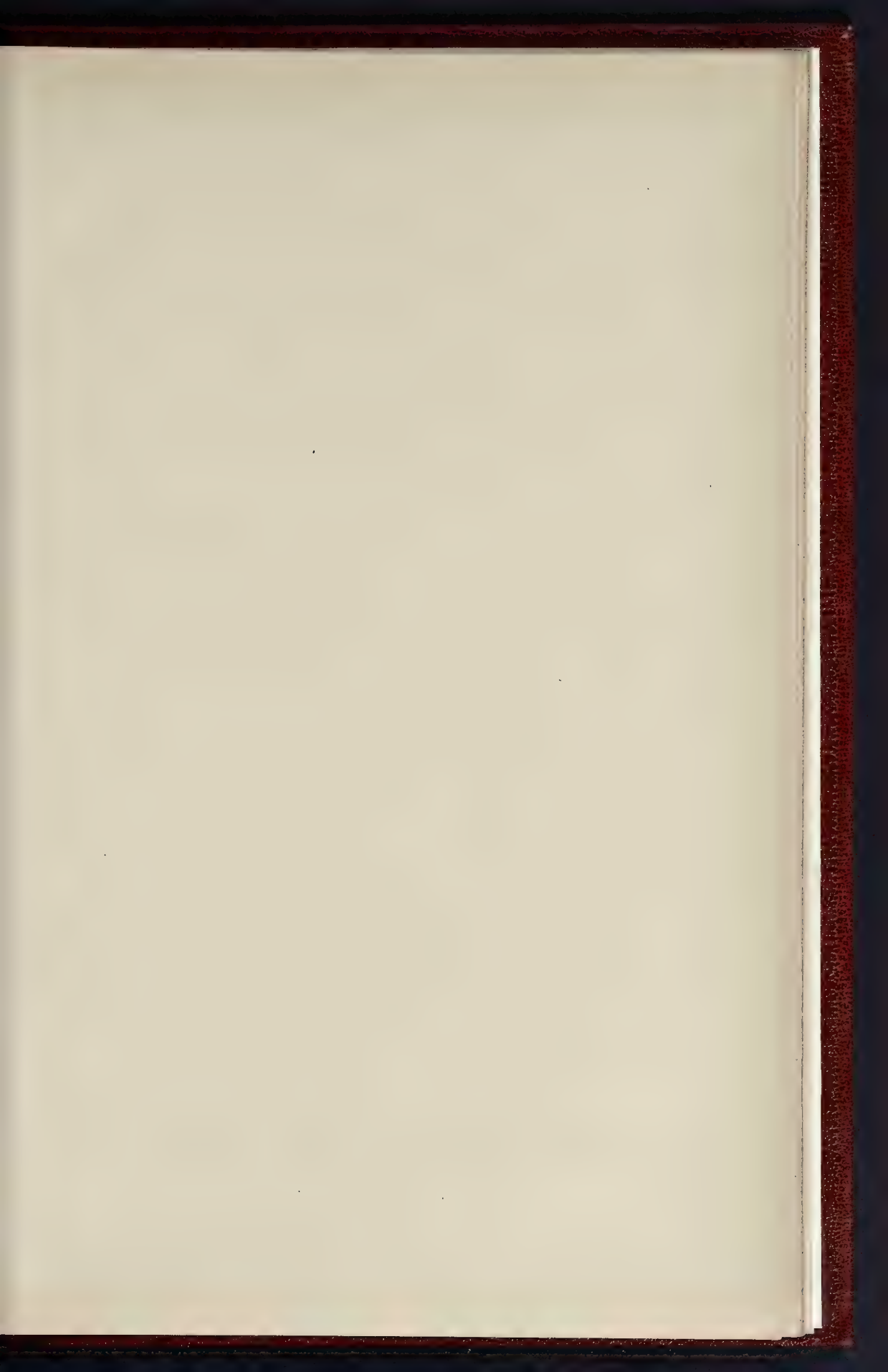


PHOTO LITHO SPRAGUE & CO. LTD. 4 & 5 EAST HARDING STREET FETTER LANE E.C.





PHOTOGRAPH BY A. S. EASTHARDING STREET FETTER LANE, E.C.

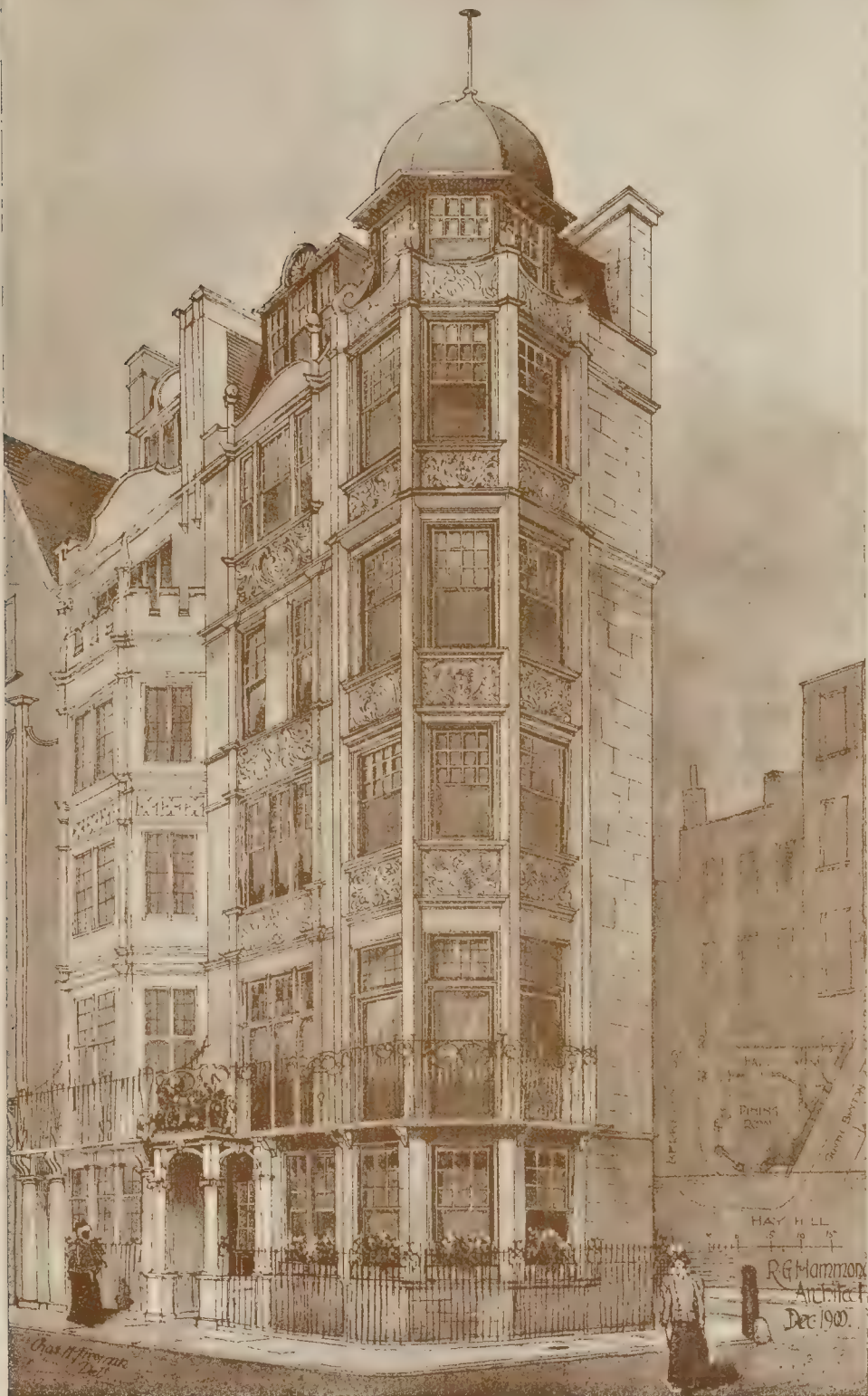
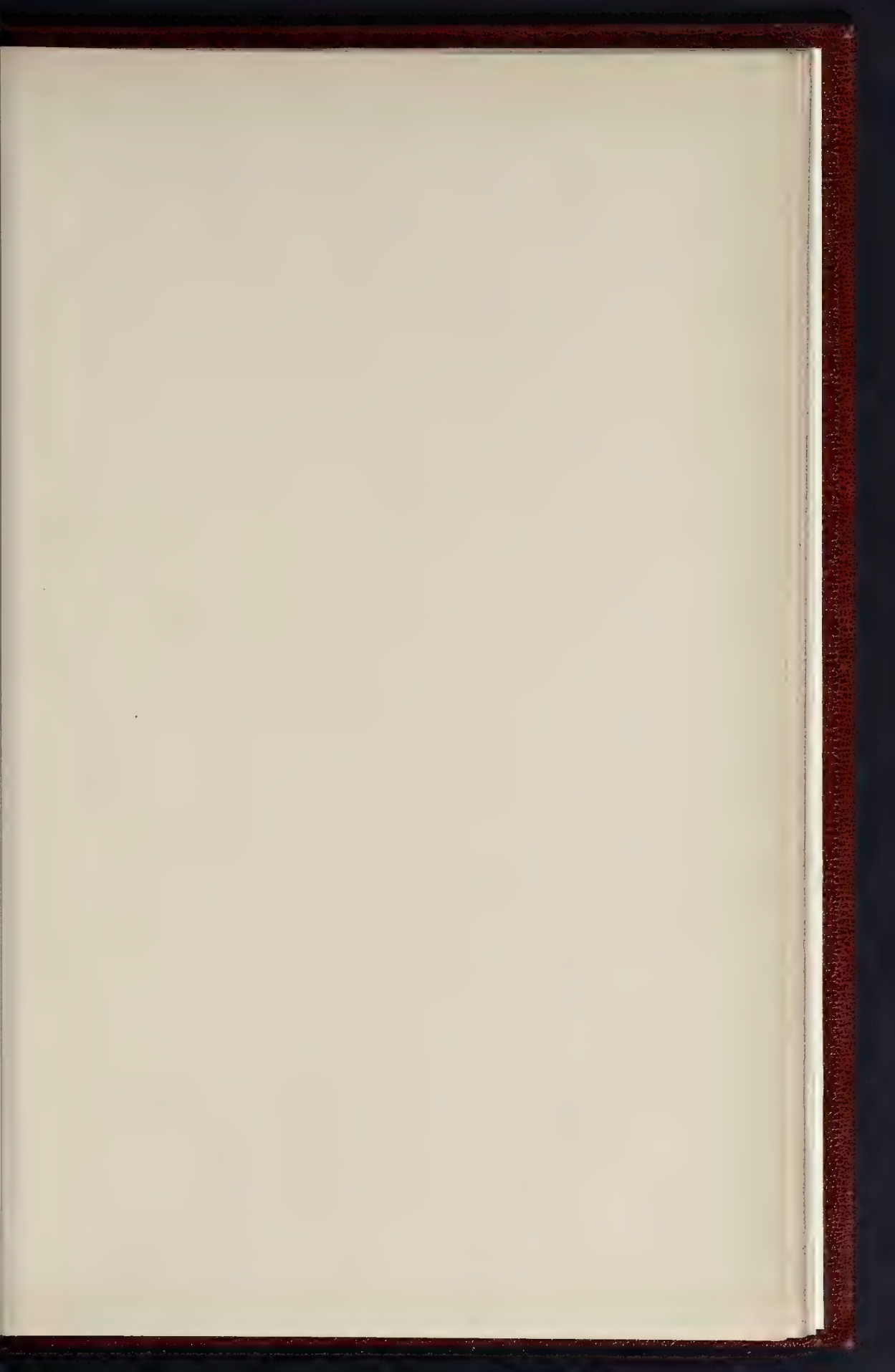
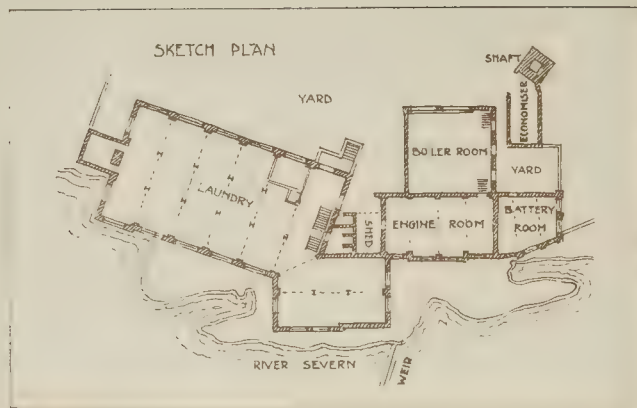


PHOTO COURTESY OF THE ARCHITECTS R. G. HAMMON & SONS, 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.





ELECTRIC STATION, &c. ON THE SEVERN



NA PHOTO SPRAGUE & CO. LTD. 4 & 5 EAST HARDING STREET FETTER LANE E.C.

Norwood.—One-story shops on the east side of Norwood-road, Lambeth, between No. 333 and Norfolk Lodge (Mr. C. M. Quilter for Mrs. F. Parker).—Refused.

Poplar.—The retention of an illuminated sign in front of the Palace Theatre, Bow-road, Poplar (Mr. B. Crewe for Mr. C. Macnaghten).—Refused.

Width of Way.

Bethnal Green, South-west.—The completion of the erection of a warehouse building commenced to be erected on the south side of Princes-court, Bethnal Green (Mr. R. Button).—Consent.

Bermondsey.—A one-story building on the east side of Weston-street, Bermondsey (Mr. E. Crosse for Messrs. J. Salomon & Co.).—Consent.

Limhouse.—Re-erection of the Waterman's Arms beerhouse on the south side of Maroon-street, Limhouse, to abut upon Conder-street (Messrs. Crossman, Prichard, & Co. for Messrs. Mann, Crossman, & Pauling Limited).—Consent.

Lines of Frontage and Width of Way.

Woolwich.—That the application of Mr. A. E. Habershon on behalf of Mr. J. Stevens for an extension of the periods within which the erection of three houses at the south-east end of Elm-grove, The Slade, Plumstead, was required to be commenced and completed, for consent to an alteration in the position of two of such houses, and the erection of an additional house, be not granted.—Agreed.

Lines of Frontage, Width of Way, and Construction.

City.—An enclosed corridor across Freeman's court, City, to connect No. 1 with the rear of No. 99, City-street (Mr. E. Norman for Messrs. Viney, Price, & Goodyear).—Refused.

Hampstead.—A wood and iron office in the garden at the side of No 153, Finchley-road, Hampstead (Mr. J. D. Hunter for Messrs. C. W. French & Sons).—Refused.

Width of Way and Height of Buildings.

Deptford.—Buildings on the north and south sides of Blake-street, New King-street, Deptford, to a height exceeding the proposed width of Blake-street, and with the boundary of the space between the proposed block of buildings on the north side of Blake-street and Barnes-alley, at less than the prescribed distance from the centre of the roadway of the latter street (Mr. R. Robertson for the Housing Committee of the Council).—Consent.

Space at Rear.

Lewisham.—A modification of the provisions of Section 41 with regard to open spaces about buildings, so far as related to the proposed erection of a house on the east side of Radford-road, Hither Green, with an irregular open space at the rear (Mr. J. Stanford).—Refused.

Deviation from Certified Plans.

Strand.—Certain deviations from the plans certified by the District Surveyor under Section 43 of the Act so far as relates to the proposed rebuilding of No. 1, Coventry-street, St. James's, Westminster (Messrs. H. Cooper & Sons for Mr. H. Appenrodt).—Refused.

Formation of Streets.

Wandsworth.—A deviation from the scheme sanctioned on November 20, 1900, for the formation of new streets on the Du Cane and Crooke Ellison estates on the south-west side of Streatham High-road, Streatham, so far as relates to the position of the proposed continuation of Ellison-road (Messrs. Montagu Holmes & Son and Mr. W. Grellier).—Consent.

Lambeth, North.—That an order be issued to Messrs. R. B. Grantham & Son, sanctioning the formation or laying out of a new street for carriage traffic to lead from Webber-street to Short-street, New-cul, Lambeth (for the Ecclesiastical Commissioners).—Consent.

Clapham.—That an order be issued to Mr. J. Cobelick sanctioning the formation or laying out of new streets for carriage traffic upon the Heathfield Estate, West Side, Clapham Common, Clapham.—Consent.

Hackney, North.—That an order be issued to Mr. C. Newston, sanctioning the formation or laying out of a new street for carriage traffic to lead from Warwick-road to Mount Pleasant-lane, Hackney, and in connexion therewith the widening of a portion of Mount Pleasant-lane (Lord Amherst of Hackney).—Consent.

Hampstead.—That an order be issued to Messrs. Hart & Waterhouse refusing to sanction the formation or laying out of a new street for carriage traffic, out of the north-east side of East Heath-road, Hampstead (Mr. H. Bailey).—Agreed.

Hampstead.—That an order be issued to Mr. E. Owers refusing to sanction the formation or laying out of a new street for carriage traffic upon the Burgess Park Estate, Finchley-road, Hampstead (Major A. Burgess and Major H. Burgess).—Agreed.

Cubical Extent and Construction of Buildings.

Deptford.—The erection at Messrs. Farquharson Bros. & Co.'s wharf, approached from the north

side of Rollins-street, Deptford, of two sheds, each to exceed in extent 250,000, but not 450,000, cubic feet, and to be used only for the purpose of the storage of timber, and the site of such shed to be without a layer of concrete (Messrs. Farquharson Bros. & Co.).—Consent.

Working-class Dwellings.

St. Pancras, East.—Dwelling-houses, to be inhabited by persons of the working class, and proposed to be erected on a site adjoining St. Martin's gardens and Pratt-street, Camden Town (Mr. J. Farrer).—Refused.

Dwelling-houses on Low-lying Land.

Woolwich.—Two houses on low-lying land situated at the south-east corner of De Lucy-street, facing Abbeywood-road, Plumstead (Mr. J. T. Young for Mr. C. E. Pearson).—Consent.

* * * The recommendations marked † are contrary to the views of the Local Authorities.

THE POST OFFICE LONDON DIRECTORY.

THE Post Office London Directory (the 104th annual publication) has just been issued by Kelly's Directories, Ltd. (182, High Holborn, W.C.). No alteration has been made in the arrangement of the various divisions of the Directory, experience, no doubt, having shown that if the work is to be confined to one volume the present arrangement is a good one; but we are inclined to think that the "streets" section might be separately issued. The Directory, invaluable as it is, has grown to an inconvenient size. The opening of the Post Office London telephone system and the rapidly increasing use of the telegraph and telephone services have added very considerably to the number of additions in the "Commercial" division, where these particulars are given, whilst in the "Conveyance" section the population of the places mentioned in the Census Reports 1901 is given as far as these Reports have been issued. The Directory, which has been brought up to date, now contains 3,396 pages, exclusive of advertisements, an increase of forty pages over the edition for 1902. As an example of the amount of labour caused by a simple change of name, the publishers mention the amalgamation of the Union Bank of London with Messrs. Smith, Payne, & Smiths, and their allied firms, under the style of the Union of London & Smiths Bank, Limited, which has necessitated the name being altered in more than nine hundred places, chiefly in the Banking section.

With this excellent work, which is ably assisted, is again issued a very useful map of London, mounted on 11 in.

Correspondence.

CHEAP COTTAGES.

SIR,—The recent correspondence in the *Builder* on the subject of cheap cottages for workmen has induced me to study a form of construction employed in France, which I believe would present many advantages in economy of construction and maintenance, solidity, and appearance over that generally employed, possessing at the same time considerable improvements in a sanitary and health point of view. Cottages built on the principle I briefly describe further could be easily built for about 350*l.*, the pair to contain the accommodation required by Mr. Thos. Moody in his letter in your issue of November 22. The principle is that of the Cottancien construction, already described in the *Builder*, employing brick and cement materials in various forms with a continuous interweaving of steel-wire core throughout. The main walls of cottages built on this method consist of a combination of brick of ordinary dimensions and large brick slabs about 1 ft. 6 in. by 1 ft. 7 in. tied to the brickwork and floors by means of steel cores. These walls are supported on small brick foundations of simple caisson form, so combined with the formation of the ground floor, also of brick, as to form a solid platform floor foundation. The first floor and the staircase are formed of steel-cored cement panels so combined as to produce when boarded a soundproof, fireproof, and sanitary floor. The roof is constructed in a similar manner, and for such economical buildings would be a flat roof, attached to the walls by means of the steel cores, and made hollow so as to afford a comfortable, warm, and weatherproof covering. The usual lath-and-plaster partitions are replaced by slight partitions of the same cored brick slabs, which may be plastered, papered, or left visible as may be desired. The combined brick and brick-slab walls have the

advantage of being rapidly erected, and they may be made to look very clean and effective. The exterior walls are lined on the interior with plaster slabs so arranged as to form a hollow wall with the exterior brick, and are therefore dry and warm. The floors on this method have the advantage of being fireproof, and they can be made soundproof; they are essentially sanitary, for unlike the ordinary boarded and plastered timber floor, which allows dirt and vermin to collect in its hollow space between floor and ceiling, and imbibes all water from vessels accidentally upset in the bedrooms, showing an unwholesome-looking stain in the ceiling of the living-room beneath, this floor is entirely damp-proof. The partitions are solid and are much to be preferred to the lath-and-plaster partition from a sanitary and fireproof point of view; the staircase possesses the same advantages. The partitions dividing off the kitchen and scullery may be left unplastered if formed of stone-ware slabs, and can be periodically cleaned. The brick platform foundation can be left visible in the kitchen and scullery, and boarded in the living-room. This form of construction, besides its cheap to erect, has the advantage of costing little or nothing for maintenance, an important point when a net percentage on the outlay is considered. This construction, however, has not the advantage required by Mr. Moody of being readily erected by any intending builder; it is somewhat of a speciality, but this would hardly prevent its employment when its advantages are considered. I do not know as yet either whether this form of construction would meet the requirements of the by-laws, but I hope to have an opportunity of testing this for a short street of cottages I am at present designing for possible erection in the North of England.

Paris, December 13.

A. VYE-PARMINTER.

BUILDING v. BY-LAWS.

SIR,—Lately, when putting soil-pipes inside a warehouse, I decided that extra strong cast-iron pipes with deep sockets run with lead were the best to use. But after they were fixed the Local Board pointed out that a new by-law required them to be of lead, and insisted on having them taken out and ones put instead. The curious reason given was that the lead pipe was more "accessible"; whereas it was the same reason (among others) that decided me to have iron; as such pipes do not require casing, any defect arising would be at once visible. A lead pipe in a warehouse must be placed to protect it from injury, and thus be concealed from view. It has happened in my experience that such a cased lead pipe had been defective for a very long time before being discovered, on account of casing concealing it. This decided me to use iron pipe, which I still think is best for such positions.

Now, what I would ask your readers is—why should an architect's judgment be entirely overruled in matters of detail, when his only object is to use the best possible material, by the arbitrary enforcement of a cast-iron By-law insisted upon without reference to special circumstances?

CHARLES JAS. CLARK, A.R.I.B.A.

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

25.—THE EXAMINATION OF OILS.

WHEN an oil of any specific description is adulterated with a cheaper oil it is generally easy to detect the presence of the adulterant, but more difficult to identify it. The accurate estimation of the proportion of the adulterant is in some cases impossible, owing to the similarity between the properties of the genuine oil and those of the adulterant; but, as a rule, it is possible to make an approximate estimate from the results of a series of tests.

Some of the most useful simple tests for oils are the determination of:—

1. Specific gravity.
2. Flashing point.
3. Colour under acid test.
4. Potassium hydrate required for saponification.
5. Iodine absorption.
6. Rate of drying.
7. Odour when heated.
8. Composition of ash.

When examining an oil of unknown quality, it is useful to have at hand a sample of genuine oil of the same description, in order that the behaviour of the two oils under the various methods of treatment may be compared.

Specific Gravity.—The specific gravity of oil may be determined by means of a specific

gravity bottle. This bottle, when filled with distilled water at 15.5 deg. C., holds a known weight of distilled water (usually either 50 grammes or 1,000 grains), and when the bottle has been filled with oil at 15.5 deg. C., instead of with water, and weighed, the difference between the weight of the dry bottle and its weight when filled with oil is noted. To find the specific gravity of the oil, divide the weight of the oil by 1,000, if the bottle be of 1,000 grains capacity; or multiply by 0.02, if the bottle be of 50 grammes capacity. The weighing is, of course, accomplished with grain weights if a 1,000-grain bottle be used, and with gramme weights if a 50-gramme bottle be used.

Another method of determining the specific gravity of an oil is by means of an hydrometer. An hydrometer is a weighted glass bulb having a long graduated stem, the weight being adjusted to suit the gravity of the liquid to be examined. The oil is poured into a cylindrical jar, warmed or cooled to 15.5 deg. C., and the hydrometer is then allowed to float in the oil. The depth to which the hydrometer sinks depends upon the gravity of the oil, but a portion of the graduated stems always remains above the surface of the oil, and the figure on the stem at the surface of the oil represents the specific gravity of the oil.

A table showing the specific gravities of some of the commercial oils was given at the conclusion of Chapter 19.

Flashing Point.—The flashing point or flash point is the temperature at which the oil emits vapour which in contact with air forms an explosive or inflammable mixture. This may be determined by means of Abel's flash point apparatus. For liquids having a flash point below 150 deg. Fahr. (66 deg. C.) the oil cup is immersed in a water-bath, but for oils having a higher flash point the oil cup is lifted out of the water-bath and placed in a copper air-bath heated by a small flame. The test consists in slowly heating the oil in a closed metal cup having a small sliding door at the top. Every time an increase of 1 deg. Fahr. in the temperature of the oil is recorded by the thermometer immersed in it the slide is slowly drawn open and a small test flame, supplied either by gas or a small oil lamp, is automatically dipped below the lid of the cup. When the oil has been heated to its flashing point, the introduction of the test flame causes the vapour confined in the cup above the surface of the oil to "flash" or burn for a moment with a blue flame.

The following table shows the flashing points of some of the common oils and spirits:—

Oil or Spirit.	Flashing Point.	
	Degrees Fahrenheit.	Degrees Centigrade.
Benzene	Below 32	Below 0
Benzine or petroleum spirit	Do.	Do.
Shale naphtha	Do.	Do.
Coal tar naphtha	Do.	Do.
Methylated spirit	57-59	14-15
Petroleum burning oils	75-120	23-49
Turpentine spirit	93-98	34-37
Rosin spirit	97-102	36-39
Lubricating shale oils	266-365	130-185
Lubricating mineral oils	392-420	200-216
Rosin oil	310-320	154-160
Linseed oil, raw or boiled	About 500	About 260

The adulteration of linseed oil with rosin oil, or of turpentine spirit with petroleum spirit, may therefore be detected by determining the flashing point of the oil or spirit. Unfortunately, most of the fixed vegetable oils have flash points approximating more or less closely to that of linseed oil, and the determination of the flash point will not, therefore, reveal the presence of, say, cottonseed oil in an adulterated sample of linseed oil.

Sulphuric Acid Colour Test.—Place about twenty drops of the oil upon a white tile, and then allow two drops of strong sulphuric acid to fall upon the centre of the surface of the oil. The following table shows the colouring effect of the acid upon some of the commercial oils:—

Oil.	Before stirring.		After stirring.
	Before stirring.	After stirring.	
Linseed oil, raw	Brown or greenish-brown clot.	Mottled dark brown.	
" " boiled	Brown clot.	Mottled dark brown.	
Cotton seed oil, crude	Very bright red.	Dark red, nearly black.	
" " refined	Reddish brown.	Dark reddish brown.	
Castor oil	Yellow to pale brown.	Nearly colourless, or pale brown.	
Resin oil, brown	Bright mahogany brown.	Dark brown, with purple fluorescence.	
" " pale	Mahogany brown.	Red brown, with purple fluorescence.	
Petroleum lubricating oil	Brown	Dark brown, with blue fluorescence.	

A more complete list showing the effect of strong sulphuric acid upon the different oils can be seen by reference to Phillip's "Engineering Chemistry" or Allen's "Commercial Organic" analysis.

Saponification Test.—Oils derived from different sources require different quantities of potassium hydrate for complete saponification. The differences between the quantities required are not in all cases considerable, but the saponification test is, nevertheless, often very useful.

Two grammes of the oil are weighed in a flask and 25 c.c. of a standard alcoholic solution of potassium hydrate are added. The flask is then connected to a vertical condenser, heated on a water-bath, and shaken from time to time. Saponification is complete in about thirty minutes. The flask with its contents is allowed to cool, the excess of potassium hydrate is found by adding a few drops of alcoholic solution of phenolphthalein to serve as an indicator, and then titrating with standard sulphuric acid. A blank experiment is then made by boiling 25 c.c. of the alcoholic potassium hydrate in the flask alone, and titrating as before. The standard solutions are of semi-normal strength, and from the difference between the quantity of standard acid required by the potassium hydrate alone and that required when the hydrate was heated with 2 grammes of oil, the per centage quantity of potassium hydrate required for saponification of the oil can be calculated.

The following table shows the quantity of potassium hydrate required for the saponification of 100 parts of some of the commercial oils:—

Oil.	Per centage KOH for saponification.
Linseed oil	18.7 to 19.5
Cottonseed oil	19.1 " 19.6
Cocanut oil	22 " "
Castor oil	17.6 " 18.1
Sperm oil	12.3 " 11.7
Rape oil	17.0 " 17.6
Mineral oils	Not saponifiable.

Rosin oil usually consists mainly of unsaponifiable hydrocarbons, but contains variable quantities of saponifiable matter and of acid bodies, which enter into combination with potassium hydrate to form neutral salts. When the rosin oil is refined with caustic soda solution these latter bodies are to a large extent removed.

Iodine Absorption.—In the iodine absorption test devised by Baron Hübl an alcoholic iodine solution is gradually decolourised by contact with the oil, the decolourisation being due to the fact that the iodine enters into combination with the fatty acid of the oil. The quantity of iodine decolourised by a given quantity of oil is different with different oils, and the proportion of iodine absorbed by the oil under examination affords, therefore, an indication of the source of the oil.

The test is applied thus: 2 grammes of the oil are dissolved in 100 c.c. of chloroform; 10 c.c. of this solution are placed in a stoppered bottle, 20 c.c. standard alcoholic solution of iodine and mercuric chloride being then added. If the solution becomes nearly colourless after standing fifteen minutes, a further addition of 10 c.c. of the iodine solution is made. The solution is then allowed to stand for two hours. The quantity of free iodine which remains in the solution is then ascertained by adding potassium iodide and starch and titrating with sodium thiosulphate. The quantity of iodine absorbed by 100 parts of oil is called the "iodine equivalent" or "iodine degree."

The following table shows the different proportions of iodine absorbed by different oils:—

Oil.	Iodine Absorbed.
Linseed oil	158 per cent.
Walnut oil	143 " "
Cottonseed oil	106 " "
Rapeseed oil	100 " "
Castor oil	84.4 " "
Olive oil	82 " "
Cocanut oil	8.9 " "
Rosin oil	10 to 50 per cent.
Mineral oils	About 8 " "

Rate of drying.—Smear a slip of glass with the oil to be examined. Smear another slip of glass with oil of the same description, but known to be genuine. Place the slips side by side in water-over, and note the length of time which elapses before the oil becomes dry, and also the appearance and degree of solidity of the dried oil.

Odour when heated.—Heat a small quantity of the sample in a small covered porcelain crucible to about 130 deg. C., and observe odour emitted. If much fish oil be present, its odour will be readily perceptible.

Composition of ash.—Cautiously burn 50 grammes of the oil in a porcelain crucible. When the whole of the oil and soot has disappeared, examine the ash. If driers have been added to the oil, the ash will contain lead oxide or other metallic compound.

Examination of volatile oils.—When examining turpentine spirit, the sample should be subjected to distillation at the temperature at which the oil or spirit boils when genuine. The specific gravity, flash point, and boiling point of the sample should also be ascertained.

COMPETITIONS.

UNDESIRABLE COMPETITIONS.—The Competition Reform Society have sent to all their members a request to refrain from competing for the Proposed Poorhouse, Motherwell, and for the Proposed Church and Church Room, Burton-wood, Lancashire, the conditions in both competitions being unsatisfactory. The Committee are endeavouring to obtain a revision of the conditions.

CEMETERY, MOTHERWELL.—In the competition for cemetery Motherwell, the first premiated design was that submitted by Mr. Gordon T. Frew, C.E., 140, West George-street, Glasgow. The second premiated design was by Messrs. Dodd & Dodd, 37, Waterloo-street, Birmingham; and the third by Mr. Wm. Boyce, C.E., Cemetery Lodge, Cathcart.

CHURCH, &C., SOUTHEND.—The competition recently held for Church, Clergy House, and Hall at Southend, has resulted as follows:—First premiated design, by Mr. W. J. Tapper, A.R.I.B.A., 1, Raymond-buildings, Gray's Inn, London, W.C. Second premiated design (hon. mention), Messrs. Lucas & Stratton, 2, Vernon-place, Bloomsbury-square, London, W.C. Third, Mr. C. A. Nicholson, A.R.I.B.A., 2, New-square, Lincoln's Inn, W.C.

GENERAL BUILDING NEWS.

BAPTIST CHURCH, DERBY.—The foundation-stone has just been laid of a new Baptist chapel to supersede the old structure in Rutland-street, Derby. The new building, a portion of which has been erected, is situated at the junction of Pear Tree-road with Portland-road, Goodale-street, and Richmond-road. The main frontage is to Pear Tree-road, and will be in view of the whole length of Richmond-road. The chief features of the front will be the central porch with the doorway deeply recessed, three two-light traceried windows above the porch, and there will be a small tower and spire at the south-east angle. The building will be Transition in style. The plan is cruciform, having nave, north and side transepts and choir. Besides the main entrance in the centre of the front, there are two sideways leading to the vestibule by which the nave is reached, and from which access will be provided by two staircases to the end gallery over front lobbies, &c. The nave will have a sloping floor (falling towards the rostrum), and will be lighted by four two-light windows on each side, separated by buttresses. If it is hereafter found desirable, small galleries to accommodate about fifty persons in each may be added in the transepts, the windows being arranged in two tiers so as to permit of this being done. There are three vestries on the ground floor level, and with separate entrances at the west end of the church, and a choir vestry is also placed over the minister's vestry and in proximity to the choir stairs and doorway. Connecting passages lead from the baptistry to two of the vestries. In the basement will be the heating apparatus and storage for fuel. The facings of the red bricks from Sileby, and the dressings of Derbyshire stone. The windows will be glazed with lead lights and cathedral-tinted glass, and there will be green slates with red ridge tiles to the roof. The artificial lighting will be by electricity from the town mains. Accommodation will be provided for about 500 on the ground floor and in the choir, and for some 150 in the end gallery. The land on the north side of the church will be utilised by the erection of a lecture hall to hold about 200, with retiring-room, &c., at the rear. The buildings are being erected from the plans and under the superintendence of Mr. W. J. Tapper, A.R.I.B.A., 1, Raymond-buildings, Gray's Inn, London, W.C.

tendence of Mr. A. H. Goodall, architect, of Nottingham, whose design was selected in a limited competition, and the contract has been let to Mr. John Young, builder, of Derby.

WESLEYAN CHURCH, CARBIS BAY, CORNWALL.—The memorial stones of the new chapel which the members of the Wesleyan body at Carbis Bay are erecting were laid recently. The building faces north-east, the chief material in its construction being elvan from Trelohan Downs, with dressings of granite from Helston. It is to be seated with pitch-pine with open timbered roof. The windows are to be figured lead-lights, and the building will be in the Gothic style. Its length is 70 ft. and breadth 55 ft., with a nave 66 ft. high. There will be no gallery, but the seating accommodation will provide for 286 people, with a pulpit on the ground floor. A minister's vestry, choir vestry, lavatories, &c., will also be provided, and a heating chamber. The contract is in the hands of Mr. J. R. Glasson, the architect being Mr. O. Caldwell (see p. 578).

NEW AISLE, FISHPOND CHURCH, BRISTOL.—On the 4th inst. the foundation stone of the new aisle, Fishponds Parish Church, was laid. The estimated expenditure for the work amounts to 1,550l. The new aisle, which is 20 ft. wide, is only the first part of a scheme of proposed enlargement and improvement of the church, for which plans have been prepared by the architect, Mr. W. Lang Barker, Hereford. The next work to be undertaken is intended to be a vestry at the east end, for which an archway is being left, and then the present vestry adjoining the tower at the west end can be added to the church by means of an archway in the west wall, the seat for additional worshippers. When further enlargement is required, the aisle on the south side will probably be added, which will bring up the accommodation to considerably over 1,000. The thirteenth century, in which style the chancel and its two aisles were added some time ago, has been adopted for the new aisle and vestry, the former of which will add 250 sittings, and Mr. Barker's design is to be carried out in the aisle. The walls will be plastered internally, the masonry outside corresponding with that of the chancel, and the roof will be of open timber, the flooring being of wood blocks and the seats of pitch pine, varnished.

CHURCH, NORWICH.—The foundation-stone has just been laid of the new Church of St. Mary Magdalene, an offshoot of St. James's, Fockliffe. The new church will occupy a site abutting on Silver-road, at a point just opposite Knowlesy-road. The design of the new church has been prepared by Mr. A. J. Lacey, the architect. At present it is only intended to build the chancel and two bays of the nave adjoining vestries. The walls will be built of brick and blue has stone lined externally with local flints and Monk's Park stone. The roof will be of pitch-pine, while the nave roof will be covered with Broseley tiles, and the aisles with Cumberland green slates. The walls internally will be stuccoed. The floors under the seating will be laid upon coak beams, the pavement of the nave will be laid with encaustic tiles, and the chancel and vestry floors with similar tiles of a better quality. There will be an east window with five lights. A bell gable will be erected at the west end when the remaining bays of the nave are completed. The church when finished will accommodate 500 worshippers. The total cost of the erection will be about 100l. The builder is Mr. J. W. Lacey.

SCHOOL, KINFANES, N.B.—On the 1st inst. the new school at Kinfanes was opened. The school has been built for one hundred pupils, the accommodation of the old school having proved insufficient. It is situated to the east of the former school, and the front extends about 50 ft. There are two classrooms—one an infant department—besides cloak-rooms for boys and girls. In the playground are shelter sheds. The following is a list of the contractors:—Masons, Messrs. Fraser & Morton; joiners, Messrs. Stewart & MacFarlane; plumber, Mr. James McLeish; slater, Mr. W. G. Ramsay; plasterers, Messrs. James Mackay & Sons; and painters, Messrs. Alexander Douglas & Sons (all of Perth). Mr. H. J. Bell, C.E., Perth, was the architect.

COUNCIL OFFICES, FARNHAM.—In our issue for the 6th inst. we gave a short description of new "Council Offices, Guildford." The new buildings are at Farnham and not Guildford.

RESTORATION OF WALTON CHURCH, LANGLISHIRE.—Mr. Richard Calver, J.P., has promised 5,000l. to the fund for the proposed restoration of Walton-le-Dale church. The architect for the restoration is Mr. Seddon, of London.

WORKMEN'S HALL, NEW ENGLAND.—The New England Workmen's Hall, the foundation-stones of which were laid last April, has now been completed. The building has been erected at a cost of about 3,000l., and it provides billiard and bagatelle room, smokeroom, reading-room, committee-room, a bar, bathroom, a large public hall with stage, dressing-room, gallery, &c. Mr. A. Ruddle was the architect, and Messrs. Sibley Brothers the builders.

METHODIST SCHOOL CHAPEL, GREAT HARWOOD.—The formal opening ceremony of the new Primitive Methodist school chapel in Orchard-street, Great Harwood, took place recently. The school has a frontage in Orchard-street, and is planned as a portion of a large scheme, the plan being arranged

on the central hall principle. The main schoolroom is 53 ft. 6 in. by 28 ft., and on three sides of it are suites of classrooms, also in number of varying size. At the end opposite to the platform is a gallery, used for purposes of assembly. Each classroom is provided with an electric bell controlled by the superintendent from the platform. There is classroom accommodation for 300 scholars, and for assembly purposes 406 adults, or a mixed audience of 540. Special attention has been paid to sanitation, heating, and ventilation, and provision made in the basement for fuel, tea-making, &c. The wall on the principal front is faced with Yorkshire parapets, the remaining external walls with semi-plaster bricks, and the structure roofed with Welsh slates. The work has been carried out from plans by and under the superintendence of Mr. John B. Thornley, architect, Darwen.

CO-OPERATIVE PREMISES, CHELMSFORD.—The Chelmsford Star Co-operative and Industrial Society, Ltd., has just opened new premises. The new buildings are situated in the rear of the Society's Central Stores, facing the Public Hall-road, and occupy the site of old bakeries, flour store, stable, &c. The building has been carried out by Mr. Henry Potter, builder, of Chelmsford, at a cost of about 1,500l.; and the Co-operative Wholesale Society, of Broughton, Manchester, have executed the fittings at a cost of about 280l. Messrs. Charles & W. H. Pertwee, of Chelmsford, have acted as architects.

NEW CEMETERY CHAPEL, SCARBOROUGH.—A new cemetery chapel has been erected by the Scarborough Burial Board. The whole scheme, including chapel, caretaker's lodge, and stables, has cost 3,000l., Mr. F. A. Tugwell being the architect.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Messrs. Anthony Scott & Sons, architects, have removed their offices from Drogheda to 34 Lower Sackville-street, Dublin.

THE CHRISTMAS HOLIDAYS.—Next week the *Builder* will be published on Wednesday, the 24th inst., and to ensure attention all communications for the Editor must reach our office not later than Tuesday morning next.

LIVERPOOL HOUSING ASSOCIATION.—Under the auspices of the Liverpool Housing Association a lecture was delivered on the 11th inst. at "Cliff-road Unitarian Church, Seacombe, by Mr. Edmund Rathbone, the subject being "The City Beautiful." Mr. Rathbone said that the first step towards making a city beautiful was to arouse the desire for such a city in the public mind. The spirit of beauty which prevailed in the olden time, when beautiful cathedrals were erected, seemed to have passed away. The Bishop of Liverpool, however, appeared to think that this spirit could be revived, and he (the lecturer) hoped such would be the case. But he did not think that a beautiful city would be built unless a religious feeling permeated the hearts of the people. In Liverpool many buildings, in his opinion, were ruined by name plates and advertisements, and the Association would try to obtain the control of the placing of advertisements. The lecturer advocated the planting of trees in public streets, and thought the municipality should make street fittings artistic. It was disgraceful that the city should make money by letting out spaces on tramcars for advertising purposes. In order to complete St. George's Hall, he suggested that the merchants, shipowners, and tradesmen should subscribe for the erection of statues to be placed in the spaces already provided.

MEMORIAL TO QUEEN VICTORIA.—The memorial to Queen Victoria in St. Mildred's Church, Whippingham, Isle of Wight, is now approaching completion. It takes the form of a reredos with ornamental panels, and the decoration of the chancel generally. This work has been carried out from designs, and under the superintendence, of Mr. A. Nutt, the architect who designed the Coronation Annex for Westminster Abbey. The distinctive feature of the reredos, which has been worked in alabaster, is a central panel depicting the Last Supper, all the figures in which are wrought of the purest white marble. On either side is a miniature panel, the one denoting the sacred emblems of the Bread and the other the Wine, represented by wheat ears in white marble, and a bunch of grapes, all in white marble. There are two larger panels representing the Alpha, with the words, "Holy, holy, Lord God Almighty," and the other the Omega, with the inscription, "Heaven and earth are full of Thy glory." The steps approaching the altar are of Belgian granite. A figure of the patron saint of the Church of St. Mildred, in embossed stone, fills a niche at the side of the reredos, and on the corresponding side is a figure of St. Catherine. The effect in each case is enhanced by the introduction of tiny red marble shafts or pillars. On either side the new oakened roof above the sanctuary are figures of three angels representing the Heavenly host, produced in gilt and Oriental colouring, each bearing a scroll. A new stall, with oak tracery doors, has been placed opposite the Rattenberg Memorial Chapel in the chancel.—*Standard.*

COURT OF COMMON COUNCIL.—At the meeting of the Court of Common Council on the 11th inst. the Streets Committee reported, in reference to the

letter from the London County Council relative to the breaking up of streets in London by companies and others, that the Council had addressed a letter to the Home Secretary with a view to the appointment of a Select Committee of Parliament to hold an inquiry into the subject, and asking the Corporation to co-operate in impressing upon the Government the importance and urgency of the question. The Committee recommended that the request be complied with, on the understanding that the Council would take no action in the matter inconsistent with the Corporation retaining complete and absolute control over the streets in the City. The report was agreed to. The Court authorised the Billingsgate and Leadenhall Markets Committee to join with the London County Council in its scheme for the construction of a river embankment along property adjoining Shadwell Market (in connexion with the Rotherhithe and Ratcliffe Tunnel) by arranging for its extension along the entire front of the market, at an estimated cost of 15,000l. A report from the Improvements and Finance Committee submitting for acceptance a tender amounting to 1,000l. 17s. 6d. for constructing a subway from Thames-street between Monument-street and Fish-street-hill, and for the necessary paving works in connexion with the widening of that thoroughfare, and recommending that it be referred to the Comptroller to complete accordingly, was carried. At the same time the Improvements Committee was asked to report on the subject of the widening of Newgate-street.

COMMONS AND FOOTPATHS PRESERVATION SOCIETY.—A meeting of the Executive Committee of the Commons and Footpaths Preservation Society was held on Thursday, the 11th inst., at 25, Victoria-street, Westminster, under the presidency of the Right Hon. G. Shaw Lefevre. The Secretary's Report upon private Bills to be introduced into Parliament during the ensuing Session was considered. Among the Metropolitan Open Spaces which will be interfered with by railway Bills are Back Common and Acton Green, Chiswick; Shepherd's Bush Green, Hammersmith; Peckham Rye Common and Tooting Bec Common. Over 11 acres of Tooting Bec Common are within the limits of deviation of the proposed London and Brighton Electric Express Railway. Several proposed tube railways will affect Hyde Park, St. James's Park and Green Park, and the Metropolitan District Railway seeks to acquire further land on the Victoria Embankment. It was further stated that 338 acres of common land in Yorkshire, Monmouth, Sussex, and Glamorgan would be acquired for purposes of water undertakings, and that the various Metropolitan Improvement Bills would involve the enclosure of portions of Wood Green Common, Eltham Common, and the Old Hyde-well Bogial Ground. It was resolved to communicate with 442 Local Authorities within whose area rights of way would be interfered with by railway companies, and the solicitor was directed to report upon various Bills which affect common land. Among other matters considered at the meeting were the proposed extension of Hampstead Heath, and the Hainault and Lambourne Open Space Scheme. It was stated that the Society had, since the last meeting of the Committee, secured the reopening of twelve obstructed rights of way, and the restitution of a considerable area of common land.

A GOVERNMENT APPOINTMENT.—We hear that Mr. James Ramsome, of Argyl-place, Kensington, W., has been appointed Consulting Architect to the Government of India, and will shortly proceed to take up his duties in Calcutta. Mr. Ramsome was elected an Associate of the Royal Institute of British Architects in 1893. He was the architect of "Burley Hill," in the New Forest, illustrated, together with two plans, in our issue of October 21, 1899, and has planned and designed many houses at Leicester, Marlborough, Aldeburgh, and elsewhere in the provinces. Of his work in the neighbourhood of London we may instance houses on the Wimbledon Park estate, at Roehampton, and in Marryat-road, Church-road, and Burghley-road, Wimbledon.

A CANAL FROM LONDON TO SOUTHAMPTON.—Under the scheme for constructing a canal from London to Southampton, it is proposed to reinstate and utilise the old canal which was originally made in the reigns of Kings Richard I. and John between Winchester and Woodmill, about 24 miles above the ferry across the Itchen at Southampton. The canal was made by Godfrey, Bishop of Winchester, who embarked the Itchen at Old Alresford, and was restored by the citizens of Winchester, temp. Charles II.

WINDOW, SANDHURST COLLEGE CHAPEL.—A stained-glass window has just been unveiled and dedicated at Sandhurst College chapel, in memory of Lieut. R. H. C. Coë. The window was designed and executed by Messrs Joseph Bell & Son, Bristol.

PROPOSED RAILWAYS TO BRIGHTON AND DOVER.—Messrs. F. H. Behr and Mr. R. Elliott-Cooper are appointed engineers of two proposed lines, to be constructed on the mono-rail principle, from a common terminus in the Strand to the Bedford Hotel, Brighton, and to Dover via Chatham, the lines being carried in a tube beneath the Thames and thence along a viaduct to their point of divergence at Clapham Park. It is calculated that the journey of 49½ miles to Brighton will be accom-

plished in twenty-five minutes, and that to Dover in forty minutes. Messrs. Behr and Elliott-Cooper are engineers to the Manchester and Liverpool Electric Railway, for which an Act was obtained in 1901, and of which the Warrington section will, it is expected, be completed in six months time.

CEMENT GRINDING.—We have received a circular from Messrs. Kaye & Co., of Rugby, who were the pioneers of the Warwickshire cement industry in 1854, calling attention to the improved grinding machinery recently laid down in their works. The Warwickshire has deposits are said to be particularly suitable for the manufacture of Portland cement, as all the necessary ingredients are present in the raw material in an extremely fine state of division. As a drawback to this natural advantage, the clinker is so exceptionally hard and tough that its reduction to fine powder has always been difficult. Messrs. Kaye & Co. state that they have successfully solved the problem by the aid of their new grinding plant, and announce that for the future their ordinary grade of cement will leave less than 10 per cent. residue in a 76-mesh sieve. The proportion of residue previously left in this sieve was upwards of 20 per cent. This increased fineness is clearly desirable, as it will considerably enhance the value of the cement.

SITES FOR NEW BOARD SCHOOLS, LONDON.

The School Board for London have just issued their annual schedule of the fresh sites in respect of which they will apply for a Provisional Order for the erection of new Board schools or the enlargement or improvement of existing school houses and buildings. The number of sites scheduled is sixty-five, but inasmuch as there are three pairs of alternative sites the actual number to be acquired is sixty-two. Taking the mean of each pair of alternative sites, we find that the aggregate area of the gross number of sites amounts to 20 a. 2 r. 28 p. The fresh sites are distributed among the divisional districts as follows:—*Westminster.*—On the northern side of Deary-lane, near Kemble-street (one). *Tower Hamlets.*—Poplar—Gardens of five houses in St. Leonard-street and fronting Imperial-street; 24, Moolteith-road; and land and factory premises in Cheval-street, Millwall; Stepney—Nineteen houses in Walden and Varden streets and some adjoining school buildings; 537, Commercial-road East and garden ground; eight houses in Northey-street; garden ground in Dalgleish-street; land on the east side of Rowton Houses, Fieldgate-street; six houses in Brook-street, Ratcliff; six in Cottage-grove, or ten in St. Peter's-road; six in Fordham-street; twelve in Finch-street and Osborn-place; and land fronting the junction of Ocean-street and Ben Jonson-road, Trafalgar-square (fourteen). *Marylebone.*—Twelve houses and land in their rear, New End and Streatley-place, Hampstead; 7 and 8, Clifton-villas; 25, Lupton-street; and three houses in Tonbridge-street, St. Pancras (four). *West Lambeth.*—Wandsworth—One of two vacant plots in Francis-can-road; houses in Stratford-grove, Putney; Shandon-road; and New Park-road, and vacant lands in Greyhound, Burntwood, and Garratt lanes; Lambeth—nine houses in Langley-lane, with land, &c., in the rear; 1-7, Priory-grove; 46, Acre-lane; lands at Denmark Hill and Gipsy-road, and either nine houses in Hackford-road, with the recreation ground at their rear, or twelve in that road and Russell-street (fifteen). *East Lambeth.*—S.E. 5, Grosvenor-street, Boundary-lane, Southwark (one). *Hackney.*—Shoreditch: five houses, yards, &c., in Ormsby-street; eleven in Wenlock and Herbert streets; three in Gloucester-row; seventeen in Minter-street and eighteen in Nicholas-street, and twenty-one in Nichols-square; 31, Oswald-street, Hackney; 226 and 228, Highbury-street, Stoke Newington; eight houses in Chatsworth and Rushmore-roads, Bethnal Green; eight in Havelock-place, with land, &c., at the rear, seven in Lyte-street, and seven in Vivian-road, Hackney (eleven). *Greenwich.*—Land having frontages to McLeod and Basilidon roads; 65, Cinway-road; and 26 and 28, Woolwich-road, Maryon Park, with land adjoining; Deptford—28 to 34 (even), Mornington-road, and part of the gardens of four houses in that road; and one of two sites in Avignon-road on either side of the Shortlands and Nunhead railway line; Greenwich—50, Halstow-road; 2, Albion-hill; 65, Knott-street; and vacant land in Randall-place (ten). *Finsbury.*—Seven houses in Collier-street, Winchester-street; Islington—6, Richard-street; 52-4, Hallford-street; 40, Romilly-road; eleven houses with garden ground in Hanley and Grenville roads, and twenty in Tollington and Shelburne roads (six). *Chelsea.*—Four houses in Rabbit-row, the Mall, Kensington, with adjoining yards and other premises; 38 and 40, Lime-grove; and eight houses in Ulver-street, with some work and sheds facing Bulwer-street, Shepherd's Bush (three). *DISCOVERIES AT ALPHAMSTONE CHURCH, ESSEX.*—During the progress of some restorations at Althamstone Church, Essex, some interesting discoveries have been made. When the old plaster was scraped off, one of the chancel walls was found to be built, not of flint like the others, but of red bricks, with here and there white stones of varying shapes and sizes. One of these being extracted, it was found, although somewhat damaged, to be beautifully moulded on the inner side. Large numbers of similar stones have been removed, and the work is still in actual progress. Practically all of

the stones which originally formed the *sedilia* have been recovered, besides numbers of others which form portions of the tracery of what was apparently a fine window. Five small inscriptions have been found on these stones which, it is hoped, may be deciphered. Alphamstone Church is of great antiquity, and is of especial interest apart from these discoveries. It has an unusually fine chancel arch, which until the present work was begun was entirely covered with plaster. The font, which is believed to be 700 years old, was likewise plastered.—*Standard.*

THE "VIA EASTERN" TELEGRAPHIC CODE.—We have received a copy of the book containing this code, compiled by Mr. R. T. Atkinson, and issued under the authorisation of the Eastern Telegraph Co. It is exceedingly full and varied in its possibilities of expression. The code words are formed on the basis of taking Latin words or Latinised forms of words and making groups of variations on them. Both subjects and code words are arranged in alphabetical order in parallel columns so that the code words wanted can be found at a glance.

LANCASHIRE, CHESHIRE, AND NORTH WALES BUILDING TRADES EMPLOYERS' FEDERATION.—The half-yearly meeting of this Federation was held recently at the Mosley Hotel, Piccadilly, Manchester, when Mr. George Macfarlane (of Manchester), the President of the Federation, was in the chair, and there were present Messrs. S. Smetthorpe (Oldham), H. Lever, A. G. White, and W. Tomkinson (Liverpool), T. H. Kellett (Preston), James Storrer (Stalybridge), and about fifty other representatives from the chief towns of Lancashire and Cheshire. The Chairman congratulated the Society on its continued success, and hoped that no effort would be spared to strengthen and extend its influence. They had a membership at present of nearly 2,000, but he hoped that measures which were being down for their consideration would have the result of nearly doubling their numbers, and thus forming one of the strongest building trades employers' organisations in the country.

ARCHÆOLOGICAL DISCOVERY.—Mr. William Le Queux, who is making excavations of Roman remains at Castor, Northamptonshire, on Saturday last week discovered in a field, close to the remains of the ancient Fosse-street, the floor and boundary walls of a temple. The floor is 40 ft. long by 20 ft. wide, tessellated in a design of white and red, and is in perfect preservation. Quantities of red fresco have been dug out, together with bones, ashes, Roman pottery and glass. In the centre of the floor is a large pear-shaped hollow, about 3 ft. deep, 18 ft. wide, in the middle of which are the remains of the base of the altar.

GRANITE TRADE, ABERDEEN.—The granite trade of Aberdeenshire reveals a slightly increased activity as compared with the previous year. The output from the quarries has been slightly over that of 1901. Big works, however, are in prospect, and the extension of the Marischal College buildings and the erection of the Post Office promise to keep the quarry masters busy. In the monumental branch business has been brisker than in the former year, though it has now commenced to fall off with the past month. Again, a scarcity of local granite has been experienced, owing to the pressure on the resources of the quarries. The building branch of the trade has been almost entirely proscribed. The importations of foreign granite amounted in all to 10,280 tons, or 4,327 tons less than in 1901; but this is attributed to the large stock on hand at the close of that year.

ROYAL ACADEMY PRIZE DESIGNS.—We find that we made an error in attributing the prize design for a plan of a formal garden to Mr. A. W. Blomfield; this prize was awarded to Mr. G. Thow Smith.

HISTORIC GLOUCESTERSHIRE CHURCH COLLAPSES.—A large portion of the historic parish church of Avening, near Stroud, collapsed with a terrific crash recently. The church is one of the oldest in the kingdom, and the Norman portion is the most complete of its kind in any part of the country. Recently the state of the edifice has created some anxiety, and after consulting competent architects the officials decided to carry out a scheme of repair which is now in progress. The part which has collapsed is the west end, and fortunately is of a more modern character than the other portion, which has luckily been preserved. No one was injured by the falling debris, but several workmen had narrow escapes. Some parts of the church date back even prior to Norman times, and every effort is being made to retain these interesting features.—*Birmingham Gazette.*

BUILDING COLLAPSE AT SHEFFIELD.—More than one old building in Sheffield has failed to stand the stress of time, and has collapsed recently, and on the 13th inst. the West End Hotel, which stood some little distance back from Glossop-road, was almost entirely wrecked. Fortunately, the collapse was gradual, and the final fall was anticipated, so that the damage to property no personal casualty has to be added. The building may be said to have fallen in sections, a portion giving way in the afternoon, and leaving other parts so manifestly dangerous that the landlord and his family were persuaded to leave the premises some hours before the final collapse took place. The owners of the hotel have been carrying out extensive alterations, the main

idea being to bring forward the front of the building some 12 ft. or 14 ft. It was on the lower side of the house that the first collapse took place, and at a point where excavations had been made to a depth below the original foundations of the frontage wall. About half-past three in the afternoon, without any warning, the wall of the cellar fell in with a loud crash. The men employed on the work had a narrow escape, for they had left the spot where the wall fell only a moment or two before. Steps were at once taken to prevent a further collapse, but at various intervals there were minor cracks, and early on Saturday morning the building fell with a tremendous crash, the whole place being literally wrecked.—*Birmingham Post.*

SUNDERLAND BUILDING TRADES ASSOCIATION.—Speaking at the annual dinner of the Sunderland and District Building Trades Association, the President (Mr. J. B. Stott) alluded to the state of affairs that existed in the trade some years ago when, owing to the fact that the masters were sitting still, the men generally got all they asked for. He recalled the time when some of the employers met to consider an application for an advance from the men, who thought they were behaving generously in not asking for more. The master builders had been compelled to put their organisation on efficient lines as a result of the rapacious greed of the employees. With regard to the subject of disputes generally, he urged that, when a settlement could be arrived at by conciliation, they should not go to war, for this made both sides poorer. Dealing with the matter of present outlook, he said the time had come when workmen should see that inflated wages could not be kept up on a falling market, for unless they saw that they would be simply locking the door on the building trade. A man must be blind who could not see that they were going to have depression in their trade as well as in other branches, and the masters and the men would have to consider the matter more wisely. He thought the time was coming nearer and nearer when they would have to tackle the question, and he expressed a hope that they would do it in a conciliatory spirit.

EDINBURGH AND LEITH MASTER BUILDERS' ASSOCIATION.—The annual dinner in connexion with the Edinburgh and Leith Master Builders' Association took place on the 18th inst. in the Royal British Hotel, Princes-street, Edinburgh. About 130 gentlemen were present. Mr. Robert Lamb, President of the Association, occupied the chair, and Messrs. Knox and McLeod and Councillor Forrest acted as croquiers. The loyal and patriotic toasts having been honoured, Mr. James Millar proposed "The Lord Provost, Magistrates, and Town Council of Edinburgh," and "The Corporation suggested that the Corporation might undertake the erection of working-class houses, and thus do something to relieve the distress in the building trades. His opinion was that no private individual could build houses for that class of people under the present conditions of the building trade. He also suggested that on inquiries into the housing question evidence should be taken from builders, architects, or house factors, as well as from other experts.—Baillie Bryson, who acknowledged the toast, said he was opposed to Corporations taxing one class of the population for the housing of another class. Councillor Doble, who also replied to the toast, said, in regard to the housing of the working-class houses, it was matter for consideration whether the proposed cheap electrical transit to the districts surrounding the city might not materially assist the erection of cheap working-class houses. If the proposed electrical tramways were laid, some experiment might be made in the housing question. Mr. A. Hunter Crawford proposed "The Edinburgh and Leith Master Builders' Association." Speaking of the Dean of Guild Court regulations, he said he would like to hear the civic authorities in their efforts to get good work put up in Edinburgh. The excellent quality of the building work in Edinburgh had been largely helped by the building regulations. Under these regulations there was in Edinburgh greater freedom in carrying out work than was to be found in other cities. Convener Barton replied. Mr. James Hall proposed "The Scottish Building Trades Federation." He thought there was no present necessity for working men's houses. There were 2,581 empty houses in Edinburgh this year, or 350 more than there were empty last year. He thought that more houses were wanted for the poor people. There were empty houses with rents as low as 6s., and there were 1,100 empty houses rented at between 10s. and 12s. In the West Port and Tron-square the Corporation had built houses, the tenants in which had come complaining to him that they would not stay in them—they were so cold. If the bricks had been pressed, it would not have been so bad, but they were bricks with irregularities that crows could build their nests in. Councillor Forrest, who replied, agreed with Mr. Hall that the demand for workmen's houses was not so great as some people would like to make out. He remarked that the Building Trades Federation had not been taken up so enthusiastically as was to be desired, and he urged that everybody connected with the building trade should come into the combination.—Lord Dean of Guild Bruce proposed "The Architects and Surveyors." He said that the Scottish style of building impressed one too

much with its stability and solidity. That was all very well in its way, but he would like to see less of solidity and more of beauty in their elevations. The architects who most succeeded in that respect were sure to be the most successful in their profession. Speaking of Princes-street, he said that the house of the architect, which had formed one of its attractions, and he hoped that where buildings there required to be heightened it would be done at no distant date. In regard to the Usher Hall—the site for which he thought was the best possible—he trusted that the Town Council would arrange for competitive plans being asked for, so that rival architects might have an opportunity of sending in plans. Mr. Lorne Campbell, in reply, said that architects had not in every case made the best of their opportunities in regard to the aesthetics of the buildings they designed. The Dean of Guild Court had no control over that matter, and he did not know that it would be wise to give the court that control. The architects of Edinburgh were at one with the Lord Dean of Guild as to the propriety of asking competitive plans for the Usher Hall. He thought it would be a slight to the architects of Edinburgh if the designing of the Usher Hall were kept in a city department. A public-spirited man like Mr. Usher would have decried that scheme should it have been carried out in public-spirited way, and the only way of doing that was to give all the architects of Edinburgh, or the whole of the architects of the kingdom if they liked, a chance of preparing plans for the hall. Edinburgh had a very unenviable reputation in regard to such competitions. On several occasions premiums had been paid for designs, and the risk that the main building did not come within the description of a building over 30 ft. high, and undoubtedly scaffolding was being used on the new wing and also in connexion with one of the chimneys, but his submission was that the plaintiff being at work and engaged at the cesspool at the time of the accident, he was not working upon the main building, and therefore the accident did not happen "on, in, or about" the main building.

THE RIVER LEA.—The Rivers Committee of the London County Council reported as follows at the meeting of the Council on December 18, 1902, directed to a Report by the Engineer of the Lea Conservancy, dated November 28, 1902, which contains some interesting figures showing the reduction in the quantity of water in the River Lea and its tributaries. It appears from gaugings taken at Field's Weir, between the intakes of the New River and East London Water Companies, that the mean daily flow for the month of October last was 10½ million gallons; the mean daily flow for the first ten months of 1902 was 20½ million gallons; the mean daily flow for the first ten months of each year for the past twenty years (1882-1901) was 82½ million gallons. The Report also states that the river was found to be dry above Church-street, Luton, and that the bed of the tributary Mimram was entirely dry above Kington Mill, and that there was only a small pool below the same. The bed of the tributary Reb was also dry at Westmill, and that of the Beane at Frogmore Park. The Report of the Water Examiner for October, 1902, shows that the average quantity found to be dry abstracted during that month by the New River Company from the River Lea above Field's Weir was 16,865,499 gallons, while the average daily quantity taken by the East London Water Company from below the weir and from storage was 6,721,139 gallons. No particulars are given as to what proportion of the 6,721,139 gallons was taken from storage, but there seems to be no doubt that, except for a small quantity required for navigation purposes, the Water Companies abstracted all the water of the River Lea during the month in question.

NEW ALTAR, ST. PATRICK'S R.C. CHURCH, COATBRIDGE, GLASGOW.—The new altar erected at St. Patrick's, Coatbridge, to the memory of the late Canon O'Keefe has just been dedicated. The design is by Messrs. Pugin & Pugin, London.

WATER SUPPLY, FYLDE.—A Local Government Board inquiry was held at the Blackpool Town Hall on the 3rd inst. by Mr. W. O. E. Meade-King, M.P., into the application of the Fylde Water Board to borrow £50,000 for the construction of a new reservoir to hold 32½ million gallons of water at Griedale Lake, Burnace-with-Bonds. Mr. T. Loftus, clerk to the Fylde Water Board, said that £37,727½ was required for the new reservoir, 20,000 for the general extension of the water main, and 1,680 for miscellaneous work. The proposed term of the loan would be sixty years. Mr. Meade-King said the site was close to the other reservoirs, convenient to the present works, and near to the main pipe leading from the intake at Calder Vale. The plans were explained by Mr. Waring.

LEGAL.

BRICKLAYER'S CLAIM UNDER THE WORKMEN'S COMPENSATION ACT.

The case of Harrison v. Guthrie & Son came before the Court of Appeal composed of the Master of the Rolls and Lords Justices Romer and Mathew on the 12th inst. on the appeal of the defendants from a decision of the County Court Judge of Durham, sitting at Darlington, awarding the plaintiff £50 a week compensation under the provisions of the Workmen's Compensation Act, 1897, in respect of personal injuries sustained while in the defendants' employment.

Mr. Shortt appeared for the appellants; and Mr. Ruegg, K.C., and Mr. Chester-Jones for the respondent.

Mr. Shortt said that the plaintiff was a bricklayer employed by the defendants, who were a firm of contractors executing a contract for the building of a new wing on to a dwelling-house. There were a viney and outhouses which were physically attached to the main building. There was also a garden wall, at the end of which was an engine-house, and some 60 yards distant from that engine-house there was a cesspool into which the premises were drained. On the day the accident occurred there was a heap of bricks laying close by the cesspool and which were being used in repairing the cesspool. The plaintiff, who almost immediately before had been employed in the viney, went to the heap of bricks, and while in the act of "chipping" one of the bricks a piece of grit went into his eye. This occurred on November 21, 1901, and on November 23 he went to hospital, where his right eye was operated upon, the doctor stating that the piece of grit had caused an abscess to form.

The Master of the Rolls hoped that the plaintiff had not lost the use of his eye.

Mr. Shortt replied that he was sorry to say that he had, and there was also a risk of the other eye being affected.

Mr. Ruegg stated that the man's other eye had actually become affected.

Mr. Shortt said that the learned County Court Judge held as a fact that the working on this cesspool was working "on, in, or about" a building over 30 ft. high where a scaffolding was being used. It was not open for his (the Counsel) to suggest that the main building did not come within the description of a building over 30 ft. high, and undoubtedly scaffolding was being used on the new wing and also in connexion with one of the chimneys, but his submission was that the plaintiff being at work and engaged at the cesspool at the time of the accident, he was not working upon the main building, and therefore the accident did not happen "on, in, or about" the main building.

Lord Justice Romer said he supposed that the cesspool was connected by means of drains with the house?

Mr. Shortt said that that was so. His submission, however, was that that fact did not render the cesspool a part of the main building.

The Master of the Rolls, without calling upon counsel for the respondent, in giving judgment, said that this court could not interfere with the findings of fact of the learned County Court Judge. Mr. Shortt could only succeed by establishing that there was no evidence on which the learned County Court Judge could find that the injured man was working "on, in, or about" a building over 30 ft. high. The question was whether the cesspool was a part of the house which was being repaired by means of scaffolding. It undoubtedly was an essential part of the house, and was physically connected by a drain with the house. That being so, he thought there was ample evidence on which the learned County Court Judge could come to the conclusion he did, and therefore the appeal must be dismissed with costs.

The Lords Justices concurred.

TRADE LABEL CASE SETTLED IN CHANCERY DIVISION.

MR. JUSTICE KEEWICH, in the Chancery Division, on the 11th inst., concluding the hearing of the case of Alcott v. Lefroy, an action by the plaintiff, a manufacturer of red gum paving-blocks used for paving purposes, against the defendant, the Agent-General for West Australia, for an injunction and damages in respect of an alleged label contained in a Report prepared by a Mr. Herbert Stone to the effect that the blocks of red gum then being laid in Whitehall, and supplied by the plaintiff, were unsatisfactory. The defendant printed and published the Report in the autumn of 1901. The Report stated (*inter alia*) that the blocks being used at Whitehall were not of the same quality as those used in the experimental strips; that whatever durability the best of the mature wood might possess when sound and properly seasoned, it was of no value in the condition in which it was supplied at Whitehall; that as the mature sample supplied by the plaintiff showed the liability of the wood to the attacks of vegetable parasites, the wet and sappy wood must be liable to a much greater degree; and that the blocks laid would open in a great number of cracks when exposed to the sun in the same way as those at the back of the statue in Waterloo-place, and that each crack would admit moisture and become a focus of decay. The defendant pleaded a denial that the words complained of were defamatory, and alleged that they were fair comment on a matter of public interest. Defendant further pleaded that the words complained of were true in substance and in fact, and that the same were published by him pursuant to his duty as Agent-General for West Australia to protect the commercial interests of West Australia.

Mr. Warrington, K.C., Mr. Foote, K.C., and Mr. George Cave appeared for the plaintiff; and Dr. Blake Odgers, K.C., Mr. Stewart Smith, K.C., and Mr. G. Lawrence for the defendant.

In the result the action was settled on terms *n* stated.

Dr. Blake Odgers, on behalf of the defendant, stated that his client was not interested in any wood paving firm or company, and that he employed Mr. Herbert Stone to make the report in perfect good faith. He now discovered that the statements in that report could not be substantiated, and he regretted having published them.

Mr. Warrington said that the plaintiff had suffered a considerable amount of injury from the statements made in the report, but after his learned friend's expression of regret on behalf of the defendant he had no desire to pursue the matter vindictively. There would accordingly be judgment upon the terms arranged.

His lordship thought the case had been settled in a very satisfactory manner.

THE LEYTON VIBRATION CASE.

THE case of Hawkes v. the Leyton Urban District Council came up before Mr. Justice Buckley in the Chancery Division on the 12th inst. on a motion by the defendants that an order made by his lordship on April 30 last year whereby a writ of sequestration was directed to issue against the defendant Council might be discharged, or, alternatively, that the operation of the order might be directed to be stayed until further order.

Mr. H. Terrell, K.C., in support of the application, said that in February, 1900, his lordship gave judgment against the Council, restraining them, their servants and agents, from causing a nuisance by employing gas-engines in connexion with their electric-supply works at Leyton. That order had been stayed until December 17 of this year on the defendants undertaking to make certain alterations and to cease altogether to use their gas plant. This had been done. Steam-engines had now been substituted for the gas-engines, and the gas-engines had not been worked since.

Council on behalf of the plaintiff said he understood the defendants' gas plant had been entirely disconnected and would never be used again. Under these circumstances he did not oppose the application provided the plaintiff's costs as between solicitor and client were paid by the defendants.

His lordship accordingly discharged the order and directed the defendants to pay the costs.

ACTION AGAINST ARCHITECTS FOR GOODS SOLD.

THE case of Gardner v. Wimperis and Arber came before Mr. Justice Wright, sitting without a jury, in the King's Bench Division on the 11th inst. It was an action by the plaintiff, who carried on business as Starke Gardner & Co., metal workers, to recover from the defendants, a firm of architects, of London, the sum of £450 for goods supplied.

Mr. Ernest Pollock appeared for the plaintiff; and Mr. Witt, K.C., and Mr. Dennis for the defendants.

It appeared that Mr. Arber was the architect for the erection of the New Palace Theatre at Plymouth. During the course of the work it was found necessary to erect a porch or portico, which involved a certain amount of metal work, and in consequence of a letter sent by the defendants to the plaintiff a verbal contract was entered into whereby the plaintiff agreed to supply the metal work. This he did, and sought to recover the amount from the defendants.

The defence set up was that the defendants were only the architects for the building of the theatre, and that plaintiff knew there was an undisclosed principal to whom he was to look for payment.

Mr. Arber, the defendant, was called, and stated that the theatre cost £60,000. He did not issue a certificate to the plaintiff as early as he might, but he wrote plaintiff that his account had gone forward to the proprietor, with a view to its being paid.

His lordship in giving judgment wished he could assist the plaintiff, but he could not. It was said that this work was done under a contract, and that defendants should pay. No question of custom had been suggested, and there was no writing in the case. The sole question was whether or not the intention of the parties that there should be a contract between them. In answering that question he went by the plaintiff's evidence alone. He did not pay any attention to defendant's evidence. But on plaintiff's evidence alone it did not look at all as if there was any intention that the defendants should do anything but act as architects on behalf of somebody. It was plaintiff's business to inquire the name of the buyer if he wanted to know it. He could not help thinking that it was not the intention of the parties that Mr. Arber should be personally liable. He did not think it was. That being so, he did not see how the action could possibly succeed. He dismissed the action, but did not feel inclined to give defendants any costs.

ACTION FOR BREACHES OF A COVENANT IN A LEASE.

MR. JUSTICE LAWRENCE and a special jury had before them the case of Lord Howard de Walden v. Bruton on the 12th inst., an action by the plaintiff to recover possession of Nos. 29 and 30

Saville-street, Marylebone, in consequence of breaches of covenant by the defendant, Mr. E. J. Bruton, a retired solicitor, the assignee of the lease of the premises in question.

The plaintiff was the owner of the premises, and in December, 1900, the defendant became the assignee of a lease of Nos. 29 and 30, Saville-street, granted by the trustees of the will of the fourth Duke of Portland to a Mr. Barber. This lease contained a covenant by the lessee that he would not allow to be carried on on the premises the trade, business, or calling, amongst other things, of a brothel-keeper. The plaintiff's case was that this covenant had been broken, as the premises in question, which consisted of a number of flats, had been used for immoral purposes. There was no suggestion that the defendant had any personal knowledge of the improper use to which the premises were put, but it was contended that he was responsible for the breach of the covenant.

In the result a settlement was arrived at, the defendant admitting the breach of covenant and that the premises were improperly used, but without his knowledge, and undertaking that there should be no future breach of the covenants in the lease. On these terms the action was stayed.

Mr. Lawson Walton, K.C., and Mr. Earle appeared for the plaintiff; and Mr. Duke, K.C., and Mr. G. Hohler for the defendant.

PLASTERER'S LABOURER'S CLAIM UNDER THE WORKMEN'S COMPENSATION ACT.

THE case of *Wagstaffe v. Perks & Son* (Handel Firth, third party) came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Romer and Mathews, on the 18th inst., on the defendants' appeal from a decision of Judge Smyly, sitting in the Derby and Long Eaton County Court.

It appeared that the matter arose out of a claim by the plaintiff, a plasterer's labourer, for compensation under the Workmen's Compensation Act, 1897, in respect of personal injuries sustained by him while in the employ of the third party, Handel Firth, who was sub-contractor to the defendants—a firm of builders. The plaintiff sued the defendants as "undertakers" of the work on which he was engaged at the time of the accident, and in the County Court he obtained judgment against them for 13s. 7d. a week compensation during incapacity. The defendants thereupon sought to be indemnified as against the sub-contractor who, they submitted, was the "undertaker" of the work within the meaning of Section 4 of the Act. The learned County Court Judge, however, held that Firth was not liable to indemnify the defendants, on the ground that they themselves were the "undertakers" within the meaning of the Act. Hence the present appeal of the defendants.

At the conclusion of the argument of Mr. Hextall, counsel for the appellant (the third party was not represented by counsel), the Master of the Rolls, in giving judgment, said that unless the sub-contractor was himself liable in some form or other, the defendants could not claim to be indemnified as against him. The whole question depended upon whether the sub-contractor was the "undertaker" who undertook the construction of the building in question. The sub-contractor contracted with the defendants to find the labour for the plaster work and do the work with materials supplied to him elsewhere. The question therefore was whether a person who had undertaken to do certain work with materials supplied to him by others than the defendants was to be considered as the "undertaker" within the meaning of the Act. The House of Lords, in the case of *Cooper & Crane v. Wright*, had laid it down that a sub-contractor could be as much an "undertaker" with regard to the work he had undertaken to carry out as was the original contractor himself. On this authority, therefore, he must hold that the sub-contractor in this case was the "undertaker" in the meaning of the Act. The decision of the learned County Court Judge would therefore be reversed, and the defendants must be held to be entitled to be indemnified by the sub-contractor.

The Lords Justices concurred.

The appeal was accordingly allowed, with costs.

ACTION AGAINST A WOOD-PAVING COMPANY FOR ALLEGED NEGLIGENCE.

MR. JUSTICE WRIGHT, sitting without a jury in the King's Bench Division on the 11th inst., concluded the hearing of the case of *The Westminster Electric Supply Co., Ltd. v. The Improved Wood Pavement Co.*

In this case the plaintiff company have Parliamentary powers for the supply of electric energy in the City of Westminster, such energy being distributed to the plaintiffs' customers by means of (*inter alia*) insulated copper mains laid beneath the roadway in the districts supplied by the plaintiffs. These mains are composed of a copper core surrounded by alternate layers of jute and lead, the whole being enclosed in a lead casing to protect the mains from the action of water. In October, 1900, the defendants were engaged in laying wood pavement on a portion of the roadway in Berkeley-square, W., under which

the plaintiffs' mains were laid, and the plaintiffs' case was that through the alleged negligence of the defendants in laying the pavement one of their mains was damaged by a pick or wedge being driven through the covering of it. Through this the main became exposed to the moisture of the surrounding earth and thus became rotten and lost its insulating qualities, the electric current thus being enabled to escape and the lead covering and jute insulation of the adjacent main was thereby destroyed and the main rendered useless, thus stopping the supply of the current to the plaintiffs' customers. The plaintiffs claimed damages from the defendants the expenses they had been put to in putting down a considerable length of new main and also the expenses of taking up and relaying the wood pavement to the satisfaction of the Local Authority.

The defendants denied the alleged negligence and also the alleged damage to the plaintiffs' mains.

In the result his lordship, after hearing the evidence, in giving judgment, pointed out that there had been no cross-examination by the plaintiffs' counsel of the defendants' witnesses as to the specific dates on which the damage was alleged to have been caused. It appeared that the damage was no cause of action by the plaintiffs against the defendants. There must be judgment for the defendants with costs.

Mr. Horace Avory, K.C., and Mr. Kennedy appeared for the plaintiffs, and Mr. Bray, K.C., and Mr. Spencer-Bower for the defendants.

IMPORTANT POINT UNDER THE FACTORY AND WORKSHOP ACT, 1901.

MR. JUSTICE BUCKLEY, in the Chancery Division, on the 16th inst., delivered a considered judgment in the case of *Toller v. Spiers & Pond, Ltd.*

The question in the case was whether the plaintiff, who is the owner, within the Factory Acts, of a building called the City Mills building, in Upper Thames-street, could compel the defendants to allow him to enter upon their demised premises for the purpose of executing certain works in compliance with a notice of the London County Council dated July 1st last.

It appeared that the building in question is a large one situated in Upper Thames-street. The structure consists of a basement, a ground floor, and seven floors above. The building from the basement up to and including the fourth floor, (the second floor excepted) formed one factory within the meaning of the Factory Acts, and this was in occupation of the defendants under a lease of a term of years. The fifth, sixth, and seventh floors formed another floor in the occupation of a firm of packing-case makers under leases expiring in 1911. The only staircases in the building were at the extreme northern end, the consequence being that if a fire were to occur in the centre of the building the southern end might be cut off from the northern end. The London County Council served a notice upon the plaintiff to the effect that it was advisable to have an alternative means of escape by a staircase at the southern end, but inasmuch as the second floor was not a factory within the meaning of the Acts, there was no power to interfere with the occupier of that floor, and, therefore, the material part of the works required by the notice consisted in the construction at the southern end of a staircase starting at the level of the third floor and going up to the seventh floor, and communicating with each floor of the building intermediate between the 3rd and the seventh floors.

His Lordship held that the staircases in the building were, for the purposes of the Factory and Workshop Act, 1901, separate factories, and did not constitute a tenement factory, and that the Council could only proceed legally under the Act if the building in question was a tenement factory. To support the action it was necessary to find in the Act a provision that two factories which had a common owner should, for the purposes of Section 14, be deemed to be one factory. There was no such provision in the Act. He thought that the plaintiff was wrong in contending that he had as against the defendants the legal right to enter and do these works, and the action must be dismissed with costs.

Mr. Asbury, K.C., and Mr. R. J. Parker appeared for the plaintiff; and Mr. Buckmaster, K.C., and Mr. Clauson for the defendants.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

15,830.—A COMBINED VICE, WORK-HOLDER, AND TABLE: *H. Brett*.—On the frame or table is mounted a right and left handed screw, which adjusts the jaws. A screw clamps the table, which revolves upon a centre, to the bed; a screw-clamp secures the work to a saw-table, and is held between the jaws and kept steady with notched pieces. There are arm-rests, which are adjusted with screws.

15,029.—PROCESS OF MAKING COLOURED DESIGNS ON STONE, CEMENT, MARBLE, AND OTHER SURFACES: *E. E. Hippie and T. Holm*.—Contour lines, painted several times over, are drawn upon the surface of the warmed stone with a pen or a fine brush wetted with a blackened water-glass solution

or some similar fluid that will close the pores. On the two sides of the contour line are respectively applied coloured fluids that will not mingle with one another, as, for instance, oil, turpentine, ether, wax, resin, or petroleum on the one side, and glycerine, spirits of wine, ammonia-water on the other side, so that the line retains its sharpness in the body of the stone or marble as the one fluid limits the expansion of the other below the line. The process extends to the colouring, if desired, of the stone, in which case the laying-in of the colours may be facilitated by the employment of a framework of metallic strips shaped in accordance with the contour lines. In the case of a thin slab, it is stated that the pattern will extend right through when it is applied upon both sides.

15,045.—APPARATUS FOR MINING CONCRETE: *R. H. Taylor*.—At each side of a cylinder is a cone having opened ends that run upon roller bearings, the frame being mounted on a bow carried by trunnions. A bevel-wheel in engagement with a pinion on a shaft through one trunnion turns the container, which a quadrant upon the other trunnion turns into the position for discharge. In the normal position the feed-end fits closely against the mouth of the mine.

15,058.—AN AUTOMATIC CUT-OFF FOR GAS-COCKS: *H. Rostin and S. Scherl*.—The automatic closing of the cock of the main pipe is effected when a switch is worked by means of the extinction of a gas jet fed by the pipe. As the switch closes, an electrical current energises an electro-magnet so that the armature drawn from a pivot on a pivoted lever that serves to stop a stud projecting from a weighted segment mounted upon the axis of the cock. A weight suspended from the segment shuts the cock with the fall of the pivoted lever.

15,072.—A WORKMAN'S CRAMP: *W. F. Templeton*.—The jaws are pivoted on to blocks that slide upon rails in engagement with screws upon the latter. On the spindle to which the arms are pivoted is a bevel wheel that engages with bevel wheels at the ends of the screws. All the jaws can be moved inwards or outwards together when the squared ends of the screws or of the spindle are turned. Sliding rods keep the sides of the jaws in alignment, and a screw that works in a slotted quadrant fixes the arms at any angle desired.

15,054.—SIPHONICAL DISCHARGE: *S. Grimmer*.—To a sleeve which slides freely upon a rod is fastened a flexible siphon, of which the mouth is fixed, and which weighted levers normally sustain above the water-level; a rod will lower the crown of the siphon below the water-level when the flush is to be started. For a bell siphon a telescopic stand-pipe may be used, and the siphon may either enter in a rigid pipe that slides freely in the stand-pipe, or be set outside the cistern.

15,085.—A SUPPORT FOR THE HEELS OF SHOES, DERRICKS, &c.: *W. H. Burbridge*.—The spherical head and the collar of the vertical pivot-pin fit into the cup of a casting which is secured to the wall, &c., and the heel of the job may fit some part of the head in order to lessen the amount of strain upon the pin.

15,123.—AN ELECTRICAL TERMINAL COUPLING: *T. Jacob*.—A split sleeve which has a cone-shaped exterior and a screw-nut fastens a conically-bored case having a connecting lug to the end of a conductor; wedges may be substituted for the split sleeve.

15,145.—GLAZING APPLIANCES: *S. Roberts*.—A wooden core cut to shape and covered with lead or other non-corrosive metal forms the cap, which is fastened to the bar with nuts and bolts. The joints are rendered watertight with packing-strips of asbestos.

15,150.—AN APPLIANCE FOR USE WITH ARC LAMPS: *J. Lawrence*.—The barrel of a winch for lifting or lowering an electrical arc lamp turns about a fixed support that extends from the bracket, a pawl which slides vertically in both the bracket and the support has a straight stem with two teeth that engage with ratchet teeth in the flange of the barrel, but not when the stem of the pawl is raised with a handle, the insertion of the handle into the support causes a projection from it to enter a slot in the front end of the barrel so that the latter can be turned.

15,158.—A ROAD-BREAKING MACHINE: *H. V. Barclay*.—For breaking up concrete, bitumen, asphalt, and similar surfaces the inventor arranges a row of vertical rods having cutting tools at their ends in a frame wherein they are worked with cams upon a horizontal shaft as they engage with tappets on the rods. The fall of the cutters is regulated by stops upon rods, which are joined adjustably to the tappets. The steel cutters are fastened on the rods with thumb-screws or grippers having wedge shaped collars that slide on the rods. As in a frame wherein they are worked with cams upon a horizontal shaft as they engage with tappets on the rods. The fall of the cutters is regulated by stops upon rods, which are joined adjustably to the tappets. The steel cutters are fastened on the rods with thumb-screws or grippers having wedge shaped collars that slide on the rods. As in a frame wherein they are worked with cams upon a horizontal shaft as they engage with tappets on the rods. 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a movement downwards of the cap, whilst contrary effect will follow as the cap is raised by raising the cross-shaped extension on the nozzle and of the partial shutting of the openings. The engagement of its lower end with a collar on, or a groove in, the nozzle obviates any vertical motion of the outer tube.

16,165.—TOPS FOR CHIMNEYS AND VENTILATION SHAFTS: *J. Brown*.—The uptake, which has slits the cross-shaped extension on the nozzle and of the partial shutting of the openings. The engagement of its lower end with a collar on, or a groove in, the nozzle obviates any vertical motion of the outer tube.

16,170.—A LIFT VALVE: *W. H. Wilson*.—For reducing shocks in screw-down valves, a short spindle carrying two valve-discs which are faced with washers is swivelled on to the principal spindle. Both valves close without shock as the lower and after washer first makes contact with its seating, a channel in the casing carries leakage past the spindle.

16,182.—BOARDS FOR ELECTRICAL JUNCTION BOXES, &c.: *E. Waskowsky*.—The boards have insulating caps which are fastened upon base-plates. Recesses in the blocks take clamping-bolts, around which air spaces are left. The branch wires are laid between the insulating blocks, the cable wires being secured at the upper clamping-bolts.

16,184.—FLANGE JOINTS AND SCREW UNIONS FOR PIPE COUPLINGS: *H. S. Cronbie*.—Of the two parts of the coupling one has an annular recess upon its face to be closed internally by the flange, and formed to take the metallic packing-ring, whilst the other part has a rounded or convex face, a screwed sleeve, or bolts through projecting flanges couple the two parts together.

16,185.—A GUARD FOR WOOD-PLANING MACHINES: *J. Malkin, J. F. Binns, and J. Foster*.—A guard, which should be gradually loosened upwards, has a cover made of two semi-circular parts whereof one is mounted upon an upright rod of which the height is adjusted in a bracket; the other part slides lengthwise in the former part and is secured in its place with a screw and a slot.

16,249.—FITTINGS FOR SINKS, LAVATORY BASINS, BATHS, &c.: *E. Stephenson and S. Robinson*.—The cone-shaped end of the overflow pipe is arranged in engagement with a conical valve seating, which is fastened by its flange. The discharge valve is opened and closed by the turning of the overflow pipe, the conical end and the valve seat having their ports arranged accordingly. A spindle, which engages with a cross-bar, and is kept down with a spring, rotates the overflow pipe.

16,293.—FLUSHING APPARATUS: *J. Burghum*.—The float of the inlet cock is utilised as the crown and inlet of the siphon for discharge. When the crown is pressed down by the hand, water flows to the outlet and so starts the flush. In another form an intermittent and automatic action is brought about by means of a well at the base of the float which is emptied with an auxiliary siphon, and a dribbling time passage is fitted on the inlet cock.

16,352.—A CHAIN PIPE-WRENCH: *J. H. Williams & Co.*—The chain is linked to a rivet which is affixed either centrally or eccentrically to the upper and bottom of the tool. The tool and engaging with the cable chain (or with pins upon a flat chain), secure the loose ends of the chain which, when so secured, rests in a space into which it can be put from the side. The flat sides of the head are in a line with the handle, and the head should be toothed in order that one may use either hand.

16,373.—APPLIANCES FOR USE WITH RAIN-WATER AND VENTILATION PIPES: *C. Severs*.—The invention comprises a holdfast or bracket, and a sliding socket-section for facilitating the cleaning of the pipe and its connexions. Grooved jaws of the holdfast take lugs formed at the sides of the bracket, which are then fastened with set screws which can be removed so that one can lift the socket part or cause it to slide along the upper section of the pipe.

16,400.—CONSTRUCTION OF TERRACES, SUBWAYS, AND ROOFS: *T. Potter*.—Until the concrete has become set it is held up with beams and centering-boards laid upon removable wedges on T-shaped hangers secured to the walls, in order that the concrete shall not crack it is moulded in short widths. Water is carried off by gutters or channels fitted in the joints.

16,427.—IMPROVEMENTS IN GRABS: *F. E. Hulett*.—The cutting edges of the grab work in flat curves as they come together; to the front ends of the jaws are rotatory blocks carrying from each cable pass rollers that run upon the edges of the former plates, which constitute cams and, in combination with springs, effect a quick action. A ratchet device provides for the turning of the switch in only one direction; the contacts, which have suitable arc-ing tips, may be connected with fuses or conductors to the terminals, and a single pole or other variation of switch may be produced by varying the contacts or the number of arms.

16,721.—CONSTRUCTION OF FOUNDATIONS IN WATER-CHARGED SOIL: *N. Schietkewitz*.—For laying a foundation in sand, gravel, or other soil that is charged with water the inventor forces liquid cement through pipes into the ground whilst water is being pumped up through another pipe. As soon as cement is seen in the suction-pipe the apparatus is lifted up, and the layer of gravel above is charged, and so on, until the surface is reached. Plugs of wood or metal inserted in the tubes will be removed

16,495.—A METHOD OF GLAZING: *G. Tolley*.—The lead strip which is used for fastening the sheets to wooden or metallic bars have ribs and wings, and gutters to carry off the water of condensation.

16,508.—MANUFACTURE OF ARTIFICIAL STONE, SLABS, TILES, &c.: *L. Nobis and A. Wenzel*.—A composition is made of water, Portland cement mixed with asbestos-powder, and blast-furnace slag mixed with asbestos. During the process of moulding the goods may be strengthened with asbestos-braids inserted into the mass. The braids, from 4 in. to 6 in. long and from 2 mm. to 5 mm. thick, are stretched in a frame and soaked in a thin mixture of asbestos-powder, water-glass, and powdered glass; a coating of that admixture is then applied to them.

16,501.—A FUEL-ECONOMISER: *A. Gomersall*.—The contrivance, which may be made either in one piece or in two, has a false front and a false bottom, the latter being arched at the middle so as to constitute an air-chamber. Bars or pierced slots are fitted in the false bottom. The thickness of the grate-bar should be gradually lessened upwards. If the appliance is made in two pieces, the front portion slides in front, or fits on the top, of the bottom portion.

16,588.—A NON-CONDUCTING COVERING FOR WALLS, PARTITIONS, PIPES, &c.: *G. A. Herdman*.—The covering material consists of slagwool treated with an adhesive substance, such as silicate of soda, and is then pressed in a mould by ramming it around a mandrel and inside a sleeve of malleo to make it into tubes. (Confer also No. 3,443 of 1900.)

16,600.—A GUARD FOR WOOD-PLANING MACHINES: *J. Malkin, J. F. Binns, and J. Foster*.—A guard, which should be gradually loosened upwards, has a cover made of two semi-circular parts whereof one is mounted upon an upright rod of which the height is adjusted in a bracket; the other part slides lengthwise in the former part and is secured in its place with a screw and a slot.

16,628.—AN ELECTRICAL INTERRUPTER: *H. C. Newton*.—A metallic bridge is mounted upon a rod which a motor reciprocates so as to cause it to dip into and out of some mercury in a chamber divided into compartments; the height of the mercury can be varied by means of a saddle or block. In other forms of the appliance pivoted bridge-pieces are used.

16,634.—ARTIFICIAL MARBLE: *O. Herwig and E. Liebaug*.—An intimate admixture made of magnesium chloride, magnesite, flint, kaolin, and water is poured upon polished plates of glass or other substance, and is then taken off when it has become hard. Pigments may, if desired, be added to the ingredients. The composition is intended for the manufacture of washcoating, steps, slabs, window benches, and similar goods.

16,665.—SHAFT TOPS FOR VENTILATION PURPOSES: *J. Orr and T. McCulloch*.—The top has a flared head fitted with a perforated top plate, and having a separate cover, conical rings being introduced in some instances between those parts. Short tubes may be fitted on to the openings in the top plate, and the plate and cover are in one form shaped as a cylinder.

16,684.—EXPANSIBLE PULLEYS FOR ROPE-TACKLE: *D. N. Bertram and S. Milne*.—The two halves of the pulley, each of which has arms, a boss, and one half of the rim, are divided in a plane through the bottom of the groove. One half is moved away from the other for adjusting the diameter, and the two halves, which may be held together with springs, are joined to one another with a set of crossed and pivoted levers, of which the inner ends engage with the bosses and the outer ends with the rims. The boss of the left-hand half of the pulley is held up with the boss of a bracket wheel screwed upon a sleeve on which is a brake-wheel that will bring it to rest and provides for adjustment during the movement of the pulley.

16,697.—MEANS OF WARMING BUILDINGS: *R. Roeder*.—A radiator or heater has a double-walled chamber which is divided into compartments and has ribs on its interior. It has also an inner box into which, and thence to the outlet, the heating medium flows up the compartments.

16,710.—ELECTRICAL SWITCHES: *H. W. Cox*.—The fixed contacts of a double-pole switch are arranged in two pairs, between which insulating-plates are laid; other plates pivoted in recesses in a rotatory block carry the contact-brushes, and have rollers that run upon the edges of the former plates, which constitute cams and, in combination with springs, effect a quick action. A ratchet device provides for the turning of the switch in only one direction; the contacts, which have suitable arc-ing tips, may be connected with fuses or conductors to the terminals, and a single pole or other variation of switch may be produced by varying the contacts or the number of arms.

16,721.—CONSTRUCTION OF FOUNDATIONS IN WATER-CHARGED SOIL: *N. Schietkewitz*.—For laying a foundation in sand, gravel, or other soil that is charged with water the inventor forces liquid cement through pipes into the ground whilst water is being pumped up through another pipe. As soon as cement is seen in the suction-pipe the apparatus is lifted up, and the layer of gravel above is charged, and so on, until the surface is reached. Plugs of wood or metal inserted in the tubes will be removed

by the raising of the tubes or the pressure of the cement.

16,732.—FASTENINGS FOR WINDOWS: *A. L. Whithead*.—One end of a plate is pivoted on to the meeting-bar of the upper sash, and its other end has cross-bars which serve to guide the bolt; the window is fastened by turning the plate over the lower sash, whereupon the bolt will fall against its face. When the bolt is lifted and the plate is turned about its pivot to liberate the sashes the window can be opened.

16,738.—A PILE-DRIVING MACHINE: *T. Mobs*.—The ram-block works out of the frame and within a tube that slides in guides upon the frame and has a cap fitted with grippers which hold the pile; a boat carries the ram-frame, rack-and-wheel gearing lifts and lowers the hollow tube, wedges through a screwed rod draw the grippers of the cap together. The tube can be set at any angle desired, as the ram-frame is pivoted upon a bracket, and mechanical instead of hand power may be used for raising the ram-block.

16,739.—MEANS OF STOPPING LEAKS IN PIPES: *J. Dunn*.—For packing a leak in elbows, tees, and other joints without disconnecting the pipe the inventor devises a compressible packing-ring, which is held in its place by an outer ring and a clamp which he secures on the pipe with inwardly projecting set screws. The four sections of the outer ring are hinged to one another with complementary tenons, which enable the parts to move lengthwise.

16,762.—ELECTRICAL SWITCHES: *H. C. Newton*.—For affording good contact at the pivot and a quick break when the switch is opened the switch-blades have their two members hinged together and pivoted in a post, or they are similarly connected. When in the "on" position the pressure together of the free ends in the contact-jaws imparts a resultant pressure on the post. In another form two adjustable screws effect the pressure upon the switch-blades.

16,775.—MEANS OF HEATING WATER FOR BUILDINGS, HOT-HOUSES, &c.: *R. Stubbs*.—A set of tubes, joined to one another at their ends by cross tubes or a hollow flat box, forms a hollow water chamber which is placed above a saddle-shaped boiler and communicates by two pipes with the flow-pipe and the return-pipe; two other pipes from the water-jacket of the flue communicate with the flow-pipe and the return-pipe respectively.

16,788.—A BALL-AND-FLOAT VALVE: *J. Ashen*.—For the rapid filling of a flushing cistern and for similar purposes the inventor causes the float-arm, which is joined to the cock, to be locked when in the opened position by means of a pivoted arm on which a float is mounted, and of which a tooth, near the pivot, engages with a rack upon the arm of the valve-float during the filling of the cistern. The locking-rod will be lifted and released when the cistern is full.

16,794.—MANUFACTURE OF BRICKS: *The Baron V. Barrelo*.—For making and hardening bricks that contain lime, a compound of unsalted lime, 1 part, and ground ashes, clinker, or sand, 2 parts, with water enough for slaking the lime, is put into a drum which is rolled to and fro upon rails. A mixture containing about 10 per cent. of lime is obtained by adding more ashes or sand. The moulded goods are hardened by the action of steam in a cylinder for about twelve hours, at a pressure of 110 lbs. to the square inch. The drum has a water-supply pipe, steam-tight covers, a safety valve, a pressure gauge, &c., and the moulded bricks are stacked upon a table in a truck that runs upon rails in the steaming cylinder.

MEETINGS.

FRIDAY, DECEMBER 19.

Architectural Association.—Mr. W. H. Bidlake on "The Study and Delineation of Old Buildings." 7.30 p.m.

Institution of Mechanical Engineers.—Mr. J. N. S. Williams on "Recent Practice in the Design, Construction, and Operation of Raw Cane Sugar Factories in the Hawaiian Islands." If time permits, there will be presented to the meeting a brief Report from the Committee appointed by the Council in April last to consider and analyse the written communications received in continuation of the discussion on the standardisation of flanges and flanged fittings. 8 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. P. R. Way on "Electricity Supply from Double-Current Generators." 8 p.m.

SATURDAY, DECEMBER 20.

The Craft School (Globe-road, Bethnal Green, E.).—Mr. G. Laurence Gomme on "Old Christmas Customs." 8.30 p.m.

TUESDAY, DECEMBER 23.

Institution of Civil Engineers.—Paper to be further discussed—"The Rupa-Nagpur Bridge, Bengal-Nagpur Railway," by Mr. S. Martin-Leake. 8 p.m.

SATURDAY, DECEMBER 27.

Royal Institution.—Professor H. S. Hele-Shaw on "Locomotion: on the Earth, through the Water, in the Air." 1.30 p.m.

SOME RECENT SALES OF PROPERTY

ESTATE EXCHANGE REPORT.

December 2.—By STRAKER & SON (at Abingdon).
Llantilio Pertholey, &c., Mon., Little Llwynyfrank Farm, 84 a. 1 r. 32 p., f. y. 52l. 10s. 4d. 1,500

By ROBERT DAV.

Sydenham—180, Sydenham-rd. (S), ut. 61 yrs.,
H. 34 ft., y.r. 240..... £350
H. 34 ft., y.r. 325 and 15, H. 34 ft., y.r. 250.....
G. 32 ft., y.r. 601..... 590
By Geo. HEAD & Co.
Westcliffe-on-Sea, Essex.—77, Hamlet Court-rd.
(S), ft. 102..... 275
Norwood—43, Portland-parade (S) and 2, Oakley-
mews, ut. 68 yrs., G. 15 ft., y.r. 701..... 630
By Wm. F. LAING.
Leyton—173, Gange, Fargate, ut. 634 yrs., G. 1.
54, y.r. 211..... 185
Stepney—53 to 59 (odd), Gold-st., and 4,
Brilliant-st., ut. 27 yrs., G. 10 ft., w.r. 1431..... 850
By MARION & CARVAY.
Dulwich—47, Lancaster-rd., ut. 77 yrs., G. 15 ft.,
er. 801..... 825
Stepney—71, Mallock-rd., with builder's yard in
rear, ut. 234 yrs., G. 4 ft. 10 in., y.r. 261..... 270
Limehouse—33, Rhodeswell-rd. (S), l. w.r.
171, 43..... 300
G. 10 ft., for main Dock-rd., ut. 29 yrs., G. 3 ft. 10 in.,
y.r. 421..... 250
5, Dunstan-rd., ut. 47 yrs., G. 3 ft. 10 in., w.r.
241..... 125
By RUTH & VINCE.
Wildesden—39, 33, 34, and 35, Victor-ter. (S), ft.
17, y.r. 1751..... 2500
High-st. (S), 15 ft., G. 1 ft., y.r. 361, reversion in
61 yrs..... 880
Bayswater—24 and 26, Newton-rd., ut. 18 yrs.,
G. 15 ft., y.r. 951..... 505
By STRIMON & SONS.
Wimbledon—7, Lower Downs-rd., ut. 80 yrs.,
G. 12 ft., er. 501..... 330
*Contractions used in these lists.—F.g.r. for freehold
ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for
improvement ground-rent; g. for ground-rent; c. for rent;
f. for freehold; c. for copyhold; l. for leasehold; p. for
possession; e.r. for estimated rental; w.r. for weekly
rental; q.r. for quarterly rental; y.r. for yearly rental;
p.a. for annuity term; p.a. per annum; yrs. for years;
la. for lane; st. for street; rd. for road; sq. for
square; pl. for place; ter. for terrace; cres. for crescent;
gdn. for avenue; gdn. for garden; yd. for yard; gr. for
grove; b.h. for beer-house; p.h. for public-house; o.
for offices; s. for shops.*

PRICES CURRENT OF MATERIALS.
* * * Our aim in this list is to give, as far as possible, the
average prices of materials, not necessarily the lowest.
Quality and quantity obviously affect prices—a fact which
should be remembered by those who make use of this
information.

BRICKS, &c.
s. d.
Hard Stocks ——— 1 3 0 per 1,000 alongside, in river.
Rough Stocks ——— 1 0 0 „ „ „ „ „ „
Grizles ——— 1 10 0 „ „ „ „ „ „
Facing Stocks ——— 2 13 0 „ „ „ „ „ „
Shippers ——— 2 5 0 „ „ „ „ „ „
Rough Stocks ——— 2 7 0 „ „ „ „ „ „ at railway depot
Red Wire Cut ——— 2 12 0 „ „ „ „ „ „
Best Fareham Red ——— 3 13 0 „ „ „ „ „ „
Best Red Pressed ——— 5 0 0 „ „ „ „ „ „
Best Fareham Red ——— 5 0 0 „ „ „ „ „ „
Best Blue Pressed ——— 4 5 0 „ „ „ „ „ „
Staffordshire ——— 4 11 0 „ „ „ „ „ „
Do, Bulstone ——— 4 11 0 „ „ „ „ „ „
Best Stourbridge ——— 4 8 0 „ „ „ „ „ „
Fire Bricks ——— 4 8 0 „ „ „ „ „ „
GLAZED BRICKS.
Best White and
Ivory Glazed
Stretchers ——— 13 0 0 „ „ „ „ „ „
Heads ——— 12 0 0 „ „ „ „ „ „
Quoins, Bullnose, ——— 17 0 0 „ „ „ „ „ „
and Flats ——— 17 0 0 „ „ „ „ „ „
Double Stretchers 19 0 0 „ „ „ „ „ „
Double Heads ——— 16 0 0 „ „ „ „ „ „
One Side and two ——— 19 0 0 „ „ „ „ „ „
Ends ——— 19 0 0 „ „ „ „ „ „
Two Sides and one ——— 20 0 0 „ „ „ „ „ „
End ——— 20 0 0 „ „ „ „ „ „
Splays, Chamfered, ——— 20 0 0 „ „ „ „ „ „
Squints ——— 20 0 0 „ „ „ „ „ „
Best Dipped Slat ——— 12 0 0 „ „ „ „ „ „
Glazed Stretchers ——— 12 0 0 „ „ „ „ „ „
Quoins, Bullnose, ——— 14 0 0 „ „ „ „ „ „
and Flats ——— 14 0 0 „ „ „ „ „ „
Double Stretchers 15 0 0 „ „ „ „ „ „
Double Heads ——— 14 0 0 „ „ „ „ „ „
One Side and two ——— 15 0 0 „ „ „ „ „ „
Ends ——— 15 0 0 „ „ „ „ „ „
Two Sides and one ——— 15 0 0 „ „ „ „ „ „
End ——— 15 0 0 „ „ „ „ „ „
Splays, Chamfered, ——— 14 0 0 „ „ „ „ „ „
Squints ——— 14 0 0 „ „ „ „ „ „
Seconds Quality
Whitened Dipped
Slat Glazed ——— 8 0 0 „ „ „ „ „ „ less than best.
Thames and Pit Sand ——— 7 0 per yard, delivered.
Thames Ballast ——— 6 0 „ „ „ „ „ „
Do, Dredged ——— 8 0 „ „ „ „ „ „ per ton, delivered.
Best Ground Blue Lias Lime ——— 21 0 „ „ „ „ „ „
NOTE.—The cement or lime is exclusive of the ordinary
charge for sacks.
Green Portland Cement ——— 10s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 27½, 6d. per ton at rly. opt.
STONE.
s. d.
Ancaster Block in blocks ——— 11 per ft. cube, deliv. rly. depot
Bath ——— 7 „ „ „ „ „ „
Fairleigh Down Bath ——— 8 „ „ „ „ „ „
Beer in blocks ——— 6 „ „ „ „ „ „
Grinshill ——— 10 „ „ „ „ „ „
Brown Portland in blocks 2 „ „ „ „ „ „
Do, Driven in blocks 2 „ „ „ „ „ „
Red Corshill ——— 4 „ „ „ „ „ „
Closeburn Red Freestone 2 „ „ „ „ „ „
Red Mansfield ——— 4 „ „ „ „ „ „
Yone Stone—*Price and Quality.*
Scrapped Portland blocks 2 10 „ „ „ „ „ „
6 in. sawn two sides land-
ings to sizes (under

PRICES CURRENT (Continued).			
STONE.			
6 in. Rubbed two sides			
Ditto, Ditto,	2	6 per ft. super del. rly. depot.	
3 in. Sawn two sides			
slabs (random sizes), . .	1 1/2	" "	
1 in. to 2 1/2 in. Sawn one			
side slabs (random			
sizes),	0 7/8	" "	
1 1/2 in. to 2 1/2 in. ditto, ditto	0	6 "	
BEST HARD YORK—			
Scrapped random sizes	3	0 per ft. cube	
6 in. sawn two sides			
landings/sizes (under			
40 ft. sup.),	2	8 per ft. super.	
6 in. Rubbed two sides			
Ditto,	2	" "	
3 in. sawn two sides			
slabs (random sizes), . .	2	" "	
2 in. self-faced random			
flags,	5	" "	
Hopton Wood (Hard Bed) in blocks	2	3 per ft. cube.	
		del. rly. depot.	
" " " 6 in. sawn both			
sides landings	2	7 per ft. super.	
" " " 3 in. do.	1	2 1/2 "	
SLATES.			
in. in.	1 1/2		
8x10 best blue Bangor, . .	5	6 per 1000 of 1200 atry. dep.	
8x10 best blue Bangor, . .	13	16 "	
10x10 best seconds	12	15 0 "	
10x12 " " " " " " " "	13	10 0 "	
16x8 best " " " " " "	7	0 0 "	
10x10 best blue Portmado	2	" "	
doc	12	5 0 "	
16x10 best blue Portmado	6	0 0 "	
8x10 best blue Turkeu	15	0 0 "	
fading green	15	0 0 "	
10x12 " " " " " " " "	16	10 0 "	
10x10 " " " " " " " "	11	10 0 "	
16x8 " " " " " " " "	8	7 6 "	
10x10 permanent green	10	10 0 "	
18x10 " " " " " " " "	9	10 0 "	
16x8 " " " " " " " "	6	5 0 "	
TILES.			
Best plain red roofing tiles, .	52	0 per 1,000, at rly. dep't.	
Best Hip valley tiles,	7	per doz.	
Do. Ornamental tiles,	53	6 "	
Do. Hip and valley tiles, . . .	4	0 per doz.	
Best Rainbow Red, brown or			
brindled Do. (Edwards)	57	6 per 1,000	
Do. ornamental Do.	60	0 "	
Hip tiles	4	0 per doz.	
Valley tiles	3	11 "	
Best Red or Mottled Staf-			
fordshire Do. (Peakes), . .	51	0 per 1,000	
Do. Ornamental Do.	54	54 "	
Hip tiles	4	1 per doz.	
Valley tiles	3	8 "	
Best "Rosemary" brand			
plain tiles	50	0 per 1,000	
Do. Ornamental Do.	50	0 "	
Hip tiles	4	0 per doz.	
Valley tiles	3	8 "	
WOOD.			
BUILDING WOOD.—YELLOW.		At per standard.	
Deals: best 3 in. by 12 in. and 4 in.		\$ s. d.	\$ s. d.
by 9 in. and 12 in.		10	0 16 0
Deals: best 3 by 9,		14	0 25 0
Battens: best 2 1/2 in. by 12 in. and 3 in.			
and 3 in. by 12 in.	11	10 0	22 0 0
Battens: best 2 1/2 by 6 and 3 by 6		0 10 0	less than
		7 in. and 8 in.	
Deals: seconds		1	0 0 less than
3 in. by 12 in. and 4 in. by 12 in.			
2 in. by 4 in. and 3 in. by 6 in.		9	0 0 9 10 0
2 in. by 4 1/2 in. and 2 in. by 5 in.		8	10 0 9 10 0
Foreign Sawn Boards—			
1 in. and 2 1/2 in. by 7 1/2 in.		0 10 0	more than
		battens,	
3 in.		1	0 0 0
Fir timber: Best middling Darning			
tion)		At per load of 50 ft.	
Seconds		4	10 0 5 0 0
Small timber (8 in. to 10 in.)		3	12 6 3 15 0
Small timber (6 in. to 8 in.)		2	10 0 3 10 0
Swedish balks		2	15 5 3 0
Pitch-pine timber (30 ft. average) . .		3	5 3 15 0
JOINTED WOOD.			
At per standard.			
White Sea: First yellow deals, .			
3 in. by 12 in. and 4 in. by 12 in.		23	0 0 24 0 0
Battens, 2 1/2 in. and 3 in. by 12 in.		27	0 0 22 10 0
Second yellow deals, 3 in. by 12 in.		17	0 0 18 0 0
Battens, 2 1/2 in. and 3 in. by 12 in.		37	10 0 19 0 0
Third yellow deals, 3 in. by 12 in.		13	10

CONTRACTS, COMPETITIONS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
Designs for University Buildings, Cape of Good Hope	Agnt.-Gen. for Cape of Good Hope	4000, 2000, 1000	Jan. 31
Extension of Town Hall	Hull Corporation	3000, 2000, and 1000	Mar. 31
New Free Library	Kettering U.D.C.	60, 40s., and 25s.	No date
New Public Offices	Pontypridd U.D.C.	Not stated.	do.

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
House, Blaengarw	.....	C. Davies, 20, Strand, Blaengarw, Wales.....	Dec. 23
Post Office, Limerick	.....	District Office of Public Works, Limerick	do.
Offices, Water-street, Liverpool	Messrs. Elder, Dempster & Co.....	Biggs & Co., Architects, 51, North John-street, Liverpool.....	do.
Alterations to Nos. 1 & 3, Promenade, Bridlington	Mr. W. H. Tiplady	J. Barnshaw, Architect, Carlton House, Bridlington	do.
Public Baths, Baltic-street	Glasgow Corporation	J. Lindsay, City Chambers, Glasgow	do.
Library Buildings, Anderson	do.	Stewart & Paterson, Architects, 143, West Regent-st., Glasgow	do.
Sewer, Oak Hill-road	Walthamstow U.D.C.	G. V. Holmes, Civil Engineer, Town Hall, Walthamstow	do.
Two Houses, Bessingham, near Whitehaven	Messrs. Bladon	A. Huddart, Architect, 22, Lowther-street, Whitehaven	Dec. 24
Additions to Business Premises, Hull	.....	B. S. Jacobs, Architect, Bowl-alley-lane, Hull	do.
Additions to Invercauld Arms Hotel, Braemar	Wigan Corporation	Jenkins & Marr, Civil Engineer, 10, Bridge-street, Aberdeen	do.
Twenty-five Cottages, Whelley	.....	H. Jevons, Municipal Offices, Wigan	do.
Fourteen Cottages, Killa-street, Whelley	.....	.....	do.
Twenty-five Houses, Pengan, Wales	.....	D. Williams, Board School, Pengan	Dec. 25
House and Shop, near Bynnaman, Wales	.....	Mr. Bartholomew, Architect, Greenwell House, Bynnaman	do.
Additions to School, Dunn-street, Jarrow	North Riding County Council	T. H. Spencer, School Board Offices, Bynnaman	Dec. 29
Police Station, Great Aytou	West Hartlepool Corporation	W. H. Brierley, Architect, 13, Lendal, York	do.
Street Works, Kimberley-street	Sale U.D.C.	J. W. Brown, Borough Engineer, West Hartlepool	Dec. 30
Street Works, Baxter-road	Swinefleet Parish Council	W. Holt, Engineer, Council Offices, Sale	do.
Mortuary Chapel, near Goolie	Hull Corporation	H. B. Thorp, Architect, Goolie	Dec. 31
Business Premises, Alexandra-road, Aberystwyth	West Sussex County Council	J. A. Jones, Architect, 7, Queen's-terrace, Aberystwyth, Wales	do.
Thirty-four Artisans' Dwellings, Kutenburgh-street	.....	W. B. Hirst, City Architect, Town Hall, Hull	do.
Road Materials, &c., Horsham	.....	W. B. Purser, Civil Engineer, 4, Worthing-road, Horsham	Jan. 1
Iron Fencing, Grantown, N.B.	.....	Donald Grant, Grantown, N.B.	do.
House, Gleadville, Co. Cork	Heworth (Durham) School Board	T. F. Hynds, Architect, 21, South Mall, Cork	do.
Schools	Strabane (Ireland) R.D.C.	H. Milner, Architect, Felling	Jan. 5
Cottages	Borough of Camberwell	J. B. Sharkey, Council Offices, Strabane	Jan. 6
Supply of Stores, Materials, &c.	.....	W. O'Leary, Borough Engineer, Town Hall, Camberwell, S.E.	do.
Additions to the Victoria Infirmary, Northwich	Acton District Council	J. A. Cowley, 38, Witton-street, Northwich	do.
Public Keeper's Lodge, &c.	Sheerness Economical Society, Ltd.	Surveyor to the Council, 242, High-street, Acton, W.	Jan. 7
Foundations of Chief Fire Station, Police Station, &c.	Manchester Corporation	Office of the Sheerness Economical Society, Ltd., Sheerness	do.
Modern Cooking Appliances	Down District Lunatic Asylum	City Treasurer, Town Hall, Manchester	Jan. 10
Road Works, Bridge-street	Dollar (N.B.) Town Council	Grasme, Watt & Tulloch, 77A, Victoria-street, Belfast	Jan. 13
Public Free Library	Ilkeston Corporation	Mr. Young, Town Hall, Dollar, N.B.	Jan. 16
Lunatic Asylum	York Asylum Visiting Committee	Hunter & Woodhouse, Architects, Belper	Jan. 18
New School at Selwyn-avenue, Hale End, &c.	Walthamstow School Board	A. Cross, Architect, Guildhall, York	Jan. 20
Artificial, &c., Paving Stone	Battersea Borough Council	Architect to the Board, School Board Offices, Walthamstow	do.
Erection of Head Offices, Liverpool	Messrs. Elder, Dempster & Co.	Borough Surveyor, Municipal Buildings, Lavender Hill, S.W.	do.
Excavation Works	Consett (Durham) Iron Co.	Briggs & Wootenholme, &c., Architects, 51, North John-st., Liverpool	do.
Concrete Works, Monastrie Bridge, Ballater, N.B.	Tollington (Lancs.) U.D.C.	J. Scott, Engineer, Iron Company Offices, Consett	do.
Street Works, Hill-street, &c.	Bangor School Board	J. Milne, Road Surveyor, Aboyne	do.
Additions to Schools, Glanadda	.....	L. Kenyon, Surveyor, Council Offices	do.
.....	.....	H. Hughes, Architect, Bangor	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
* Architectural Assistant	Borough of Southend-on-Sea	1200 per annum	Dec. 29
* Clerk of Works	Manchester Corporation	42. 4s. per week	Jan. 7
* Labour Superintendent	U.D.C. of Bromley	25. 10s. per week	do.

Those marked with an asterisk (*) are advertised in this Number. Competitions, iv. Contracts, pp. iv, vi, viii, & x. Public Appointments, xvii.

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following lists of tenders. Mr. T. J. Bailey is the Board's Architect:—

* Recommended for acceptance.

ALVERTON-STREET (B & G).—Providing glazed partition to divide classroom C, and reversing stepped flooring in one of these rooms for left light, including brick up fireplaces and providing open portable stoves and new flues and stack in connexion with same, for warming the redivided rooms in each case:—	
H. Lines, Schedule Prices (1902) + 1 per cent.	W. V. Goad..... £384
Maxwell Bros., Ltd., £495	Marsland & Sons
T. D. Leng..... 430	Akers & Co. 327
W. Downs..... 391	H. Groves..... 318
	G. Kemp..... 285

ANERLEY COTTAGE HOMES and LINDEN LODGE.—Providing and fixing sixty lockers:—

Spencer & Co..... each 19 1	Anerley
H. Bouncau..... 19 9	Linden
T. Crawley..... 19 2	Cottage
Hammer & Co., Ltd. 16 9	Lodge
London School Furniture Co.* .. 14 3	.....

GALLEY-WALL-ROAD (Special school).—Providing new offices for both departments, and altering the position of coal store in connexion with same; also providing oak fencing to form separate playgrounds:—

T. L. Green..... £347	J. Garrett & Son..... £401
W. Downs..... 458	Belcher & Co., Ltd. 385
J. Appleby..... 425	J. C. Chalkey..... 319
H. Groves..... 425	.....

GRANGE HILL-ROAD (New School).—Accommodation: Boys, 380; girls, 380; infants, 380; total, 1,140. Graded school on three stories. Halls: Boys, 57 ft. 3 in. by 30 ft.; girls, 58 ft. by 30 ft.; infants, 57 ft. 3 in. by 29 ft. 7 in. Class-rooms: Boys, 60, 48, 48, 48, 48, 40; girls, 60, 48, 48, 48, 48, 40; infants, 60, 50, 48, 48, 48, 40. Drawing classroom, 61 ft. 4 in. Science-room, 61 ft. 4 in. Heating by open fires and stoves:

Lathey Bros. £28,647	Garrett & Son £26,642
F. & H. F. Higgs .. 28,532	Wallis & Sons
J. Greenwood	Smith & Sons, Ltd. 26,707
Johnson & Co., Ltd. 27,992	Treasure & Sons
Lorden & Son	Marsland & Sons
L. H. & R. Roberts .. 27,812	J. C. Bwyer
Munday & Sons	Stimpson & Co. 25,440
W. Downs	J. & M. Patrick
Lawrance & Sons	London
McCormick & Sons .. 26,708	Rochester

NEW PARK-ROAD.—Enlargement. Boys, 100; girls, 100; infants, 100; total, 300. Classrooms—Boys, 60, 40; girls, 60, 40; infants, 60, 40. Providing new staircase for boys and cloakroom for each department, also re-dividing room B in each department:—

Leslie & Co., Ltd., £4,614	Bulled & Co. £4,261
Smith & Son	E. Triggs
Johnson & Co., Ltd. 4,480	J. Appleby
Marsland & Sons	Laibey Bros. 4,205
Garrett & Son	Mitchell & Son
F. & H. F. Higgs .. 4,366	Rice & Son
Martin, Wells, & Co., Ltd. 4,322	Johnson & Co.*

OLD CASTLE-STREET.—(Mixed).—Glazed partition to divide classroom R and constructing new fireplace in one of the divided rooms; also providing six ventilating skylights, viz., to classrooms I, K, M, N, P, Q.—

Unassigned..... £496	Johnson & Co..... £395
G. Barker	A. J. Sheffield

RENDLESHAM-ROAD.—Removing present lath and plaster partition, and providing two new sliding glazed partitions in order to divide classrooms B and C the middle room and constructing a brick flue in connexion with same, also providing a skylight for improving light of middle room:—

London School Furniture Co. £395 0	Shurman & Sons, Ltd. £279 0
Grover & Son	P. & F. J. Wood. 279 0
Barrett & Power..... 280 0	W. Martin
	Stevens Bros.*

Supply of GAS METERS, on a running contract:—

Contractors.	3-light.	5 light.	10-light.	20-light.	30-light.	50-light.	60-light.	80-light.
The Gas Meter Co., Ltd.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
G. Glover & Co., Ltd.	..... each	1 3 10	1 8 11	1 17 7	2 11 8	3 11 2	4 18 6	6 12 0
T. Glover & Co., Ltd.*								8 7 4
Parkinson & W. & B. Cowan, Ltd.								
J. Pinchbeck.....	1 3 10	1 8 11	1 17 7	2 11 8	3 11 2	4 18 6	6 12 0	8 7 4
Wiley & Co.	1 2 5	1 7 3	1 15 4	2 8 6	3 6 9	4 12 5	6 3 10	7 17 0
Hulet & Co., Ltd.....	1 2 0	1 5 0	1 12 6	2 8 0	3 3 0	4 11 0	5 13 0	7 5 0

Contractors.	100-light.	120-light.	140-light.	150-light.	180-light.	200-light.	250-light.	300-light.
The Gas Meter Co., Ltd.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
G. Glover & Co., Ltd.	..... each	10 15 6	11 17 0	—	14 19 0	—	19 19 1	22 15 6
T. Glover & Co., Ltd.*								27 2 3
Parkinson and W. & B. Cowan, Ltd.								
J. Pinchbeck.....	10 16 6	—	—	—	—	—	—	—
Wiley & Co.	10 3 1	11 2 4	—	14 0 8	—	18 14 7	21 7 6	25 8 11
Hulet & Co., Ltd.....	9 10 0	11 15 0	14 5 0	14 10 0	17 10 0	18 15 0	22 0 0	25 15 0

* Recommended for acceptance.

Supply of BLINDS (portion only), on a running contract:—

Articles.	Ashlin & Williams.	W. Garton & Son.	Jones & Son.*	G. F. Jones & Co.	Tidmarsh & Sons.	Wood & Gregory, Ltd.
Brown Holland or Striped Blinds fixed on Wood Rollers, complete as Item 1	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Do. do. on Wood Rollers, as Item 2	0 2 1/2	0 4 1/2	0 3	0 4 1/2	0 3 1/2	1 0 0
Do. do. on Tin Barrel Rollers, as Item 3, 2 1/2 in. in diameter	0 0 1/2	0 4 1/2	0 3 1/2	0 5 1/2	0 3 1/2	1 6 0
Do. do. on Tin Barrel Rollers, as Item 3, 3 in. in diameter	0 0 6	0 4 1/2	0 3 1/2	0 5 1/2	0 4	2 0 0
Do. do. on Tin Barrel Rollers, as Item 3, 3 1/2 in. in diameter	0 0 6	0 4 1/2	0 3 1/2	0 5 1/2	0 4	2 0 0
Do. do. on Spring Rollers, as Item 4, 2 1/2 in. in diameter	0 0 5 1/2	0 3 1/2	0 3 1/2	0 4 1/2	0 4 1/2	3 6 0
Do. do. on Spring Rollers, as Item 4, 3 in. in diameter	0 0 5 1/2	0 3 1/2	0 3 1/2	0 4 1/2	0 4 1/2	4 3 9

Supply of BRUSHES and CANE RODS (for drains and lavatories), on a running contract:—

Contractors.	Brushes.	Rods, 4 ft. 6 in.	Rods, 6 ft.	Rods, 7 ft. 6 in.
Nicholls & Clarke, Ltd..... per doz.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Mechanical Appliances Co., Ltd.* ..	2 12 0	1 6 0	1 13 0	2 6 0
	0 14 0	0 13 0	0 15 0	0 16 0

* Recommended for acceptance.

Supply of TIMBER (for use n repairs to furniture), on a running contract:—

Description of Timber.	R. Garrard & Co.	Ingram, Perkins & Co.	W. J. Latchford.	James Latham, Ltd.	London School Furniture Co.	W. Mallinson & Co.	S. Putney.*
Yellow deal (machine planed, all round)	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1 1/2 in. by 9 in., per foot run	0 3 1/2	0 4 1/2	0 4	0 6	0 6	—	0 3 1/2
2 1/2 in. by 9 in., ..	0 2 1/2	0 3 1/2	0 3 1/2	0 5	0 5	—	0 2 1/2
1 in. by 9 in., ..	0 2 1/2	0 2 1/2	0 2 1/2	0 4	0 3 1/2	—	0 2 1/2
1 1/2 in. by 7 in., ..	0 2	0 1 1/2	0 2	0 4 1/2	0 3	—	0 2 1/2
1 in. by 7 in., ..	0 1 1/2	0 1	0 1 1/2	0 3	0 2 1/2	—	0 2
Yellow Deal (from the saw)—							
3 in. by 3 in., per foot run	0 2 1/2	0 2	0 3	0 2 1/2	0 2 1/2	—	0 2 1/2
3 in. by 2 1/2 in., ..	0 1 1/2	0 1 1/2	0 2 1/2	0 2 1/2	0 2	—	0 1 1/2
Yellow Deal Matching—							
3 in. by 7 in., per square	13 0	12 6	14 0	14 6	15 0	—	13 6
Pitch Pine (machine planed, all round)—							
1 1/2 in. by 11 in., per foot run	0 7 1/2	0 4	0 7 1/2	0 5 1/2	0 6	0 6 1/2	0 5
2 in. by 11 in., ..	0 4	0 2 1/2	0 4 1/2	0 4	0 3 1/2	0 4 1/2	0 2 1/2
3 in. by 11 in., ..	0 4	0 2 1/2	0 3 1/2	0 2 1/2	0 2 1/2	0 2 1/2	0 2 1/2
1 1/2 in. by 9 in., ..	0 5 1/2	0 1 1/2	0 5	0 4	0 3 1/2	0 4	0 2 1/2
2 in. by 9 in., ..	0 2	0 1 1/2	0 3	0 1 1/2	0 2	0 3	0 1 1/2
1 in. by 7 in., ..	0 3	0 1 1/2	0 4	0 2 1/2	0 2 1/2	—	0 2 1/2
Yellow Pine (machine planed, all round)—							
1 in. by 11 in., per foot run	0 4 1/2	0 6 1/2	0 6	0 6	0 6	0 7	0 4 1/2
2 in. by 11 in., ..	0 3	0 4	0 4	0 3 1/2	0 3	0 4 1/2	0 3

THOMAS-STREET.—Providing one additional class room of fifty for girls' department, also new cloakroom:—
 Monday & Sons .. £4,126 0
 Wall & Co. 1,079 0
 Marchant & Hirst .. 1,072 0
 Treasure & Son... 4,062 0
 Greger & Son... 1,043 0
 Sharnur & Sons, Ltd. 999 0

CHURCH-STREET:—

J. F. Ford £310 0
 Rice & Son 305 0

Lorden & Son £255 15
 H. & G. Mallett*.. 253 5

COOK'S-GROND:—

General Builders, Ltd. £269 0
 Laithy Bros. 213 0
 C. H. Sealy 190 0
 Marchant & Hirst.. 193 0

E. Triggs..... £189 0
 W. R. & A. Hide ... 158 0
 W. Hammond..... 149 0

ELIZABETH-STREET:—

J. & M. Patrick .. £197 0
 G. Kemp 145 0

W. J. Howie £132 10
 W. Hayter & Son* 113 0

ELTRINGHAM-STREET:—

Green & Tuley .. £410 0
 R. S. Ronald..... 365 0
 W. Horroft 309 0
 E. Triggs 252 0

Martin, Wells, & Co., Ltd. £250 0
 Lorden & Son 244 15
 C. Gurling 228 0
 Garrett & Son* ... 219 0

The interiors of the following schools will be cleaned between December 13, 1902, and January 3, 1903.

1 The exterior painting in these cases will be executed between April 4 May 3, 1903.

BARING-ROAD:—

Leney & Co. £127 10
 T. D. Leng 115 0
 H. Groves 104 0

Hayter & Son .. £98 10
 W. Banks 95 6
 G. Kemp 80 0

DETMOLD-ROAD:—

McCormick & Sons .. £333 0
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Memorial Library, Dulwich College	Mr. E. T. Hall, F.R.I.B.A., Architect.
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Competition Design for Presbyterian Church, Muswell Hill	By Mr. A. C. Dickie and Mr. W. Curtis Green.
Memorial on the Hoe, Plymouth	Mr. F. W. Marks, A.R.I.B.A., Architect.

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The Ancient Fortress of Otranto.



HORACE WALPOLE is credited with having written one of the first mediæval romances in a modern sense—the "Castle of Otranto: A Gothic Story"—which was printed at

the famous Strawberry Hill press towards the end of the eighteenth century. This curious attempt to portray the life of the Middle Ages in a modern novel was the forerunner of the Waverley Novels and all the myriads of stories based upon that study of the old chronicles and the historical literature of mediæval Europe, which became such a very marked characteristic of the nineteenth century. The "Castle of Otranto" marks the beginning of a literary taste, as "Fonthill" in Wiltshire and "Strawberry Hill" in Middlesex are reckoned the first beginnings of that vast revolution in European art which still influences the world.

The scene of Horace Walpole's story is laid in a "Gothic" castle of the Strawberry Hill pattern; and, although it was easier for the talented author to describe Gothic architecture than to reproduce it in visible realisation in the country home of an eighteenth-century gentleman, the castle which he describes bears very little resemblance to the real Mediæval fortress which dominates the little cathedral town obscurely situated in the far south-eastern corner of Italy—on the heel of the boot-like peninsula. There is, indeed, nothing in the novel which suggests any real knowledge of the place on the part of Walpole. It would seem as if he had selected the name on account of its obscurity, for in his days Otranto must have been a place absolutely unimportant and almost unknown.

The fact of having read the "Castle of Otranto" as a child, and the dim recollections of its "romantic" descriptions of a

mediæval castle as understood in the days of "pigtails and patches," induced the present writer when passing through Brindisi on a recent occasion to make a detour through the singularly unknown and out-of-the-way district—the "Terra di Otranto," a district so little known, although close to one of those great modern highways of the world, that the natives declared they had not seen more than two other Englishmen in Otranto within the memory of man.

Otranto, which dates back sufficiently into a dim past to have a Greek name as Hydra, is one of those miniature provincial capitals which have always a certain importance as the chief towns of ancient geographical districts. In modern days this character is merely historical and traditional, the real capital of this out-of-the-way district of Italy being Lecce, with its churches, seminary, and palaces of the eighteenth century. The transference of importance from one town to the other would appear to have taken place about the period of great revolutions associated with the reign of the Emperor Charles V. (1550), who is credited with having strengthened the fortress of Otranto, and commenced the fortification of the more modern capital.

Otranto, notwithstanding, its absolute obscurity at the present day, and its insignificant proportions as a city, has probably passed through greater vicissitudes in past history than any other town in Western Europe.

In origin a Greek city, and in its earliest days sharing the position of Brindisi as the port of communication between Italy and the East, it eventually became the chief channel through which the Norman adventurers of the dark ages passed on their way to the conquest of those Levantine principalities of Athens, Sparta, Epirus, or the Ægean Islands, the memory of which lingers even at the present day in many a picturesque ruin amongst the hills of Greece. At a later date its position on a promontory dividing the Adriatic from the Mediterranean caused it to become a frontier post between the Venetians and the Spanish-Neapolitans.

In 1480 the unfortunate little city suffered a fate which has never befallen another town of the Italian peninsula. To quote an old MS. preserved in the cathedral sacristy, "At dawn on the 28th July, the fleet of the Turks appeared before the city. The bombardment continued for fifteen days without ceasing, and no succour arriving, the city was stormed, and 800 of its inhabitants were massacred." Some accounts state that 12,000 persons perished on this occasion. Thus for the first and only time in history the most dreaded of mediæval foes obtained a foothold on the shores of Italy, which they maintained for many months. The incapable King of Naples seems to have quietly submitted to the disgrace of such a humiliating menace. The Neapolitans do not seem to have made one effort to regain Otranto.

The Turkish advance, which thus met with an easy success at its outset, was possibly intended to pave the way for a much more important invasion. But within the same year the great Sultan Mohammed II., the conqueror of Constantinople, died, and the inevitable consequences attending the death of a Sultan induced the Pasha Achmet Aga, in command of the expedition, to depart suddenly in the following March. The whole Turkish force quickly melted away, leaving the ravaged and depopulated city to be reoccupied by the Neapolitans.

Since this memorable event, Otranto has gradually settled down into its present condition of complete decay and obscurity. Its harbour, abandoned for centuries, has silted up; its few inhabitants of modern times—mere peasants—make pathways through its grass-grown streets, and here and there a house partly pulled down marks the shrinkage of the population. Hardly an attempt has been made in modern times to disturb the interesting condition of the singularly picturesque fortifications, which mainly date from the period of the Turkish invasion. Only at one point a breach of a few yards in width has been pierced in the city wall for the purposes of a modern road towards the south, the

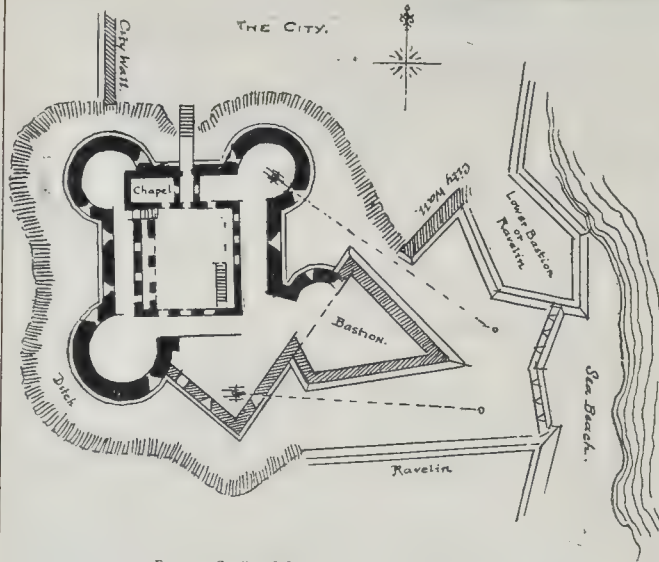


Fig. 1.—Castle of Otranto: Sketch Plan (no scale).



Fig. 3.—Castle of Otranto: Sea Front.

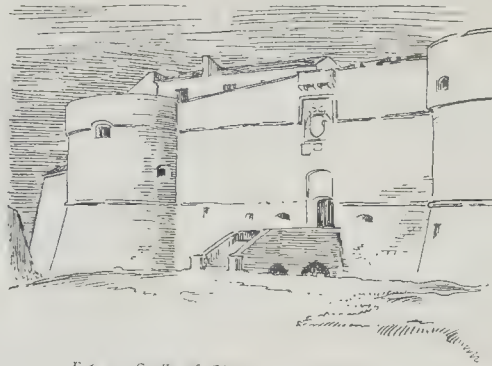


Fig. 4.—Castle of Otranto: Front towards City.

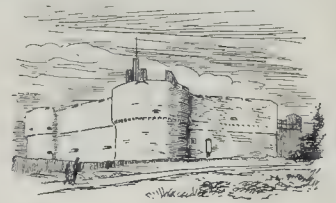


Fig. 2.—Castle of Otranto from S.W.

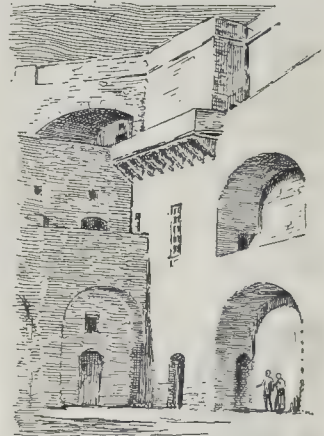


Fig. 5.—The Court of the Castle of Otranto.

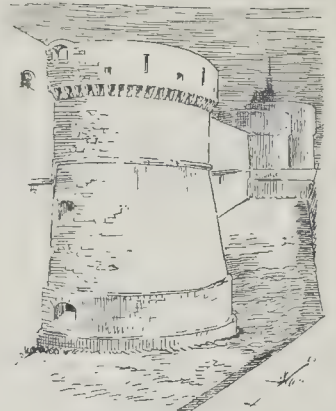


Fig. 6.—City Walls, Otranto.

only entrance within the fortified enclosure in former days being the strong gateway on the north side, which still remains intact.

Guicciardini, in his history of this period (Book XV., p. 266), states that the art of fortifying towns in the modern way, for and against the use of artillery, was learnt by the Italians from the Turks of the early sixteenth century. Many writers of about the year 1500 draw attention to the great advantages possessed by the Infidels over the Christians in all the improvements in the art of war and military architecture. The greatest spur to this development

was possibly the enormous army which the Turks were able to muster on several occasions when threatening Europe. To meet these hundreds of thousands of invaders the comparatively small forces of mediæval feudalism would have been powerless. Warfare had to be planned on a grander scale, and the particular splendour and importance of the career of the Emperor Charles V. are due to his leading the first great European armies against the dreaded Mohammedans.

As a consequence of this change in warfare, we naturally find the first developments

of military architecture in the borderland separating Christendom from Mohammedanism. The varying frontier between the Turkish Empire and the Venetian Republic—the battle-ground and borderland for centuries between the two faiths—is literally studded with fortresses which are invariably on a scale and of an architectural importance unknown in Western Europe at that period. Their picturesque outlines, harmonising with the romantic scenery of Greece or Dalmatia, delight the artist rambling over the former territories of the Serene Republic; and they attract serious attention as much from an



Fig. 7.—Distant View of Otranto from the North.

architectural as from a merely historical or military point of view; they are, in fact, works of monumental art.

As has been pointed out, to the Turks belongs the credit of inventing modern warfare with its enormous armies, but to the Italian genius for building is due the remarkable and often beautiful style of architectural fortress which succeeded to the picturesque castle of the Middle Ages.

The castle of Otranto—although but a small example—affords an interesting illustration of this transition stage in military architecture. The plan (fig. 1) shows that the older portion of the building consists of a square enclosure which originally had four circular towers at the angles. This portion dates from a period before the Turkish invasion. After that event—probably at the commencement of the sixteenth century—the walls of this portion were raised to the height of another story, and the great bastion of singularly acute form was added in place of the south-east tower on the seaward side. The sharp outlines of this bastion with its glacis have a singular effect seen from the sea shore (fig. 3), and contrast oddly with the view of the land side of the castle with its fifteenth-century walls and round towers (figs. 4 and 6).

The great bastion of Otranto belongs evidently to the earliest type and to a system by which the sides of a bastion were intended to be flanked by the fire from guns upon the curtain wall. This system was the reverse of that in general use at an earlier and a later period. At Otranto we may perhaps see an example of early efforts at a system of enfilading fire which was brought to perfection about the year 1520 by Michele Sammichele, the famous architect of the walls of Verona and the fortifications of Venice.

The little fortress of Otranto, which has passed through so many changes of ownership during the past 500 years, is still marvellously preserved. Its Spanish governor of the seventeenth century, whose monument decorates the castle chapel (now a hay store) would find little changed if he could revisit his ancient home, except the substitution of a stone arch for the drawbridge and the absence of all armament—the cannon have long since been melted down for other uses. The castle is now used partly as a coastguard station and partly as a country police station; but its chief claim for careful preservation in modern days is as a monument of the most stirring period of European history. Fortunately the Italian Government is well disposed towards the preservation of such monuments.

A curious souvenir of the Turkish invasion

remains in the form of immense quantities of stone cannon-balls lying about the town; their superfluity even decorates the little railway station. These balls were made by galley slaves when the galleys were laid up during the winter.

THE BURIAL-GROUNDS AT CHRIST HOSPITAL, LONDON.

HERE lies a Benefactor, Let no one Move his Bones." So runs the inscription on a marble tablet which was set up, with several others, against the outer wall of the South Cloister, a playground called "Giffs" or "Jiffs" by the boys of Christ Hospital. The passage lies at a level lower than that of the adjacent courts, and was lighted by six of the seven pointed arches, latterly shorn of their mouldings and filled partly with brickwork, which, together with the buttresses, formed the only remains existing above ground of the Franciscan convent of Grey Friars. The tablet commemorates, it is believed, James St. Amand (or Arnaud), who died in 1749. The admonition has proved, however, to be of no avail. The Council of Almoners notify their intention to remove in the course of next January all human remains from within the Hospital precincts for re-interment in some consecrated burial-ground. That operation will not be confined to the South Cloister. For a Parliamentary Return of 1834 upon the burials in the precincts until the previous year and a Report made by the Charity Commissioners show that before 1740 a vault in the north-western corner of the cloister quadrangle—known as "the Garden"—was commonly used for the burial of children on the foundation, and that, after the closing of that vault, another one in the north-eastern corner was made for that purpose. Less than forty years ago the interment of an officer of the staff took place in the vault. In his history of the Hospital, the Rev. W. Trollope records (1834) the burial in rows of children on the south side of the cloister. It is the case, moreover, that the great Hall, covering the site, in part, of the Friars' guest-hall, and opened in 1829, stands over what is considered to be a consecrated burial-ground. An Order in Council, promulgated in 1886, forbade the continuance of sepulture within the confines of Christ Hospital. The Disused Burial Grounds Act of 1884 applies to any such ground in the Metropolis in respect whereof an Order in Council has been made for the discontinuance of burials therein, in pursuance of the Acts 15-6 Vict., c. 85, and 16-7 Vict., c. 134, but its provisions are inoperative if the

ground has been sold or disposed of under the authority of any Act of Parliament. Under the Act of last year the Governors of St. Bartholomew's acquired 67,680 ft. superficial, or about three-tenths of the whole area of, say, five acres, in consideration of a sum of 238,781*l.*, payable to the Almoners, on the award of Lord Balfour of Burleigh, who was deputed to act as arbitrator.

We will now briefly advert to the additional testimony afforded by a highly-interesting set of nine hand-drawn plans which formerly belonged to the Stowe Collection, and were afterwards acquired by Frederick Crace. They consist of old copies of drawings and surveys, made in or about 1540, of the precincts of Grey Friars, the adjoining property of St. Bartholomew Hospital, and parts adjacent. Besides their extrinsic value as documentary evidence, the drawings present curious specimens of sixteenth-century cartography. One of them reminds us of the commonly forgotten fact that there was once a foot thoroughfare from the Stone Gate, on the north side of Newgate-street, nearly opposite Warwick-lane, leading along the West Cloister of Grey Friars to a postern-gate in the City Wall at the north-western corner of the cloister, and thence by "The Walke" to St. Bartholomew Hospital beyond the City Wall. The walk was closed to the public in 1818; a doorway giving access into the remoter hospital has since replaced the postern-gate in the City Wall. One drawing of the Grey Friars precincts plots two "churchyardes belonging to Christ Hospital," at either side of the thoroughfare just beyond the Wall and at the Town Ditch—the name of the "Ditch" was perpetuated in the Bluecoat School; another "churchyarde for the poore of the Hospitale,"—that is, of St. Bartholomew—is plotted on the south-western side of the Walk. Another drawing delineates the brewhouse of St. Bartholomew's, adjoining the Stone Gate in Newgate-street, and the bakehouse and millhouse yard, the brewhouse court, and the Little Cloister in the area that afterwards became the large, open ground, the boys' "Hall-play," as seen through the railings from Newgate-street.

Above the South Cloister walk and against its outer wall was erected in 1682 the Sir Robert Clayton wing, after designs by Wren, of which the porch and gateway, facing the opening of Christ Church-passage, were recently taken down to be re-erected against the south front of the great Hall at Horsham. The outer wall of the Clayton wing was raised upon the northern wall of the long nave of the Grey Friars Church as rebuilt in 1306-27 and dedicated to St. Francis of Assisi. The building overlooks the graveyard, behind Newgate-street, of Christ Church. The ground floor of that wing was used for the offices of the architect and surveyor to the Hospital and others; the upper story formed the Latin School. To Wren is attributed also the former Hall, which was erected in 1672 over the West Cloister walk and replaced, it is conjectured, the refectory. A good view of the old Hall, with the range of cloister arches beneath it, is preserved in the Fauntleroy copy of Pennant in the Soane Museum; it was removed in 1827 for a block of wards and dormitories designed by John Shaw the elder, who died in 1832. The Northern Cloister, where had stood the Franciscans

dormitory and, over it, Richard Whittington's library measuring 129 ft. by 31 ft. and finished in 1429, gave way to an open cloister, which, as well as the new range of dormitories over the Eastern Cloister, as rebuilt in 1705, was designed by Shaw and completed by his son, John Shaw the younger, in 1836.

In his large drawing of "Old Greyfriars and Newgate," published in our journal on April 21, 1894, Mr. H. W. Brewer depicts many of the conventual buildings cited above, together with the Church, the two Cloisters, the Outer Court, the City Wall as it bends around the northern and western sides of Grey Friars, the City Ditch, and Newgate. Mr. Brewer places the Friars' infirmary, with its cloister and chapel, erected by Peter de Helyland, in the north-east of the precincts. We may mention as well J. Storer's view (1805) of the Southern Cloister, with the arches, the boys' sweet-stuff shop built against the wall, and the old pump in the "Garden" of the foreground, H. Shaw's print (1825) of the old Hall, with the Whittington Library, and the Cloisters, and the two bird's-eye views of 1727-40.

NOTES.

So much has been heard of the Education Bill, "The Education Act, 1902," as it must now be called, that it is unnecessary to refer to it in detail. One point, however, must be noted. At the eleventh hour a clause has been inserted making the Local Authority liable for the fair wear and tear of Voluntary schools. This is an unfortunate clause, for it must necessarily cause much friction and expense both to the managers of Voluntary schools and to the Local Authority. It is impossible that there should not be a difference of opinion in regard to the term "fair wear and tear," and the Local Authority will be bound, in the interests of the ratepayers, to scrutinise claims very closely. Thus disputes are inevitable, and experience has shown that no differences are more difficult to settle than those which arise in regard to dilapidations. Every time also that a claim of the managers of a Voluntary school is cut down by the Local Authority, it will form a ground for attacks on the good faith of the managers. They will be accused of attempting to get the better of the ratepayers, and so forth. It is equally certain also that both managers and Local Authorities will require skilled advice in regard to the settlement of these claims, and thus this clause will add a substantial sum to the cost of education which would have been saved had the wear and tear clause not been inserted by the Bishops at the last moment. It would be in the interests of education if it were repealed next Session.

Hampstead Heath and the Railway.
THE railway on to or under Hampstead Heath is now (as we feared) inevitable, and the Hampstead Heath Protection Society are endeavouring to get the evil at least minimised by preserving the part near the proposed Tube railway station from being built over. They quote from the Hampstead Heath Act of 1871 the provision that "the Board" (the former Board of Works) "shall at all times preserve as far as may be the natural aspect and state of the Heath," a provision which is unquestionably obligatory

on the London County Council as the successors to the Board of Works. The East Heath, as they remark, near the Hampstead Heath Station, has now almost ceased to be a Heath as all owing to the amount of building by which it is hemmed in. The West Heath was saved from the same fate by the purchase of Golder's Hill; and now the North-West Heath, close to the intended railway station, is in the same danger. The Society urge that the County Council should purchase three fields which now abut on this portion of the Heath. The effect of this would be to prevent any line of houses being built skirting the Heath, which will infallibly be done unless some such means are taken to prevent it; the rural character of the North-west Heath will then also be irretrievably destroyed, and a line of semi-detached villas will take the place of the hedge. It is to be hoped that this suggestion will receive every consideration; the cost of the purchase cannot be relatively great, and it seems a public duty on the part of the County Council to take decisive steps to prevent, as far as may be, any further alteration of the rural character of the Heath. The mere fact of the railway, and the station there, will be bad enough in itself.

Railway Companies and Public Policy.

THE correspondence recently published between the Committee appointed by the stockholders of the London and North-Western Railway Co. and the Board of that Company raises questions of general public importance. The Committee is an influential one, including men of such experience and practical knowledge as Lord Brassey, Mr. Burdett-Coutts, and others whose recommendations must attract considerable attention, but the Board at present seems unable to adopt them to any large degree. The chief recommendations seem to be greater co-operation between the rival Companies, greater economy in handling goods traffic, both by means of combined action and larger waggons, a fuller system of statistics (dealing more especially with the mileage and load), and combined action in respect to the increase of public burdens, local taxation, &c. With regard to the first—co-operation—the Committee seem to have addressed themselves chiefly to the benefits to be gained in the goods traffic, but we submit that much could be gained in this direction by greater facilities being offered the travelling public in through communication over rival systems. The only co-operation at present exercised by the Railway Companies is a co-operation where two rival systems supply the same districts, and which is adverse to the public, viz., equality in fares and mutual agreements limiting the number and speed of trains, but it is common knowledge that through communication between two systems is made as difficult as possible, and the public has to sustain serious loss of time and inconvenience owing to an intentional failure of through communication. The sooner the railway companies realise that increased facilities of rapid transit throughout the country mean a largely-increased travelling public the better it will be for their shareholders. Seeing the serious depreciation in all railway securities, and the diminution in the dividends of many of the companies, it is somewhat surprising in the correspondence now published to find no reference to the

vexed question as to the apportionment of charges to income and capital. A large section of the community is strongly of opinion that the present unsatisfactory condition of these undertakings is solely due to the constant increase of capital to effect repairs which should properly have been executed out of income, and the views of the Committee on this question would have been read with the greatest interest. It is, however, a matter for congratulation that the stockholders are beginning to take measures calculated not only to improve their own securities, but to be of benefit to the public convenience and the trade of the community at large.

The Engineering Standards Committee.
SOME of the recommendations agreed upon by the Standardisation Committee will shortly be published, and there is no doubt that they will receive a warm welcome from those engaged in various industries involving the use of iron and steel. The astonishing diversity at present existing in the dimensions of manufactured forms of iron and steel is largely due to the reluctance of manufacturers to take counsel together upon matters which really ought to be regarded as of common interest, and it is probably the result, in some degree, of arbitrary specifications prepared by Government officials and by a certain class of consulting engineers. One important benefit that may be expected to follow standardisation will be a very considerable saving in the expenditure of Government departments, and another of still greater value will be to enable British engineers and manufacturers to compete on more level terms with Germany, Belgium, and the United States. We learn that the sub-committee dealing with structural steel has reported that only twenty-three standard sections of channels should in future be rolled, instead of sixty-three as previously. Even then the number will be three in excess of the German, and nine in excess of the American numerical limit. Again, in angles of unequal sides, 30 standard sections are recommended in place of 59 as formerly, the Germans having 14, and the Americans 18 standard sections. In I-beams, 30 standard sections are proposed instead of 49, the Germans rolling 33, and the Americans only 17 sections. No less than seventy-one different sections of tramway rails, with merely trivial differences, are now rolled, and it is proposed by the committee that five only should be produced, ranging from 90 lb. to 110 lb. It has been estimated that the standardisation of such rolled sections will enable makers to save at least 5s. per ton, representing a total annual saving of something like 750,000l. per annum, while capital will not be wastefully expended in future upon special rolls and tools for the production of odd sizes such as are at present demanded. As the general committee includes representatives of all the leading engineering societies in Great Britain, as well as members of Government departments, there is every reason for believing that the recommendations will be regarded as authoritative by all connected with the iron and steel industries.

The Taff Vale Case.
THE action brought by the Taff Vale Railway against the Amalgamated Society of Railway Servants and some of its officials has

ended, as was almost certain to be the case, in favour of the plaintiffs. From the moment that the House of Lords decided that a Trade Union could be responsible in its corporate capacity for the action of individual members, the result of which this case is an example was sure to follow. If individual workmen unlawfully broke their contracts with their masters, they have hitherto been the only persons responsible; but when they are incited to do this by officials of the trade-unions, it follows, from the decision of the House of Lords, that the Union itself becomes ultimately responsible. All, therefore, that has to be done in order to fix responsibility on a Union is to establish some unlawful act on the part of a workman and a connexion between this Act and a Union. No change in the law can be now effected except by Act of Parliament, and we doubt whether the House of Commons is at present prepared to repeal the existing law. One result of the present state of it is that the practical irresponsibility of the workmen for unlawful acts occurring in a strike is now removed, since the Union, a substantial body, of which he forms a member, is collectively responsible. For the present, therefore, strikes will have to be conducted on strictly legal lines if trade-unions are not to pay heavy damages.

Underground Railway Ventilation. THE views now expressed by Mr. James Keith, one of the experts who gave evidence before the Board of Trade Committee, on the ventilation of underground railways, are not reassuring either to the promoters or shareholders in these undertakings or to the travelling public. The condition of the air in the electric "tube" railways seems to be very bad and growing worse, and the means advocated by Mr. Keith for the ventilation of deep tubes, viz., the erection of air shafts equidistant between every two stations and rising to a greater height than the roofs of the neighbouring houses will hardly commend itself to Londoners, and will make them anxiously regard the largely proposed increase in such railway undertakings. London has never countenanced the disfiguring overhead railway, but if the breathing apparatus of the numerous proposed underground railways is thus likely to extend above ground, it may become a question how far they are less obnoxious than the trans-Atlantic system, which certainly offers some compensating advantages to those who use them as a means of conveyance.

Fire in Factories Let in Flats. THE facts of the case *Toller v. Spiers and Pond* (reported in our last issue) disclose a serious deficiency in the provisions of that new statute, the *Factory and Workshop Act, 1901*, in its application to modern developments. The City Mills is a very long narrow building occupied as follows:—Messrs. Spiers and Pond occupy the building from the basement to the fourth floor as a factory, with the exception of the second floor, which is not a factory at all, or within the *Factory Act*. The rest of the building above the fourth floor is occupied as a factory by Messrs. Farwig & Co. The County Council, being dissatisfied with the means of escape in case of fire, served a notice on the owner of the whole building, in accordance with the *Act* then in force, and subsequently an arbitration was

held under Section 14, Sub-Section (3) of the present *Act*, and in consequence the erection of a staircase from the third floor to the top of the building was recommended, and the owner became liable under the *Act* to daily fines in the event of non-compliance with the order of the Council embodying the result of the award in the arbitration, and the present action was brought by the owner of the factory against Messrs. Spiers & Pond to compel them to allow him to enter on the premises to do the work required by the order. The only provision in the *Act* conferring rights on the owner of a factory as against the occupier to carry out such works are contained in Section 14, Sub-Section (2), and the Court has now held that these powers do not intend to enable an owner of one factory to enter on those premises to do work necessary for another factory, or common to the two. In this case the Judge held these to constitute two separate factories, although one building, and that they could not be deemed tenement factories under Section 149, as each factory used its own mechanical power, and there was no "supply" of mechanical power within that section. It is true the Court points out that the order of the Council treating the building as one factory was bad, but it seems exceedingly hard that the owner of a factory who has been subjected to proceedings, on the face of them legal, should, in his loyal endeavour to carry out the order of a superior authority so obtained, have to incur serious and expensive litigation. Moreover, it is surprising to find an *Act* placed on the Statute-book which fails to afford protection from fire in circumstances which are now the rule and not the exception.

Proceedings to Acquire Land Compulsorily. THOSE persons who have houses or land acquired from them under compulsory powers, an extremely large class at the present time, will do well to note the decision of the High Court in the matter of an arbitration between the London County Council and Burgess and Cross. The County Council for the purposes of the new street from Holborn to the Strand were acquiring a house in Bow-street. In accordance with the provisions of the *Land Clauses Acts* they had made a sealed offer to the owners or occupiers, but the claimants proceeded to arbitration, and only when the jury had given part of their verdict finding the premises insanitary, expressed their desire to accept the sealed offer, and the High Bailiff thereupon stopped the proceedings. The Council now applied for a fresh jury to continue the arbitration, and the Court granted the application. The effect of the sealed offer is in the event of the jury awarding any sum not in excess of the offer to render the claimant liable to pay half the costs of the arbitration, and it seems obviously improper for the claimant to delay his acceptance of the offer until he is in a position to judge what the result of the arbitration is likely to be, making the whole transaction one of "heads I win and tails you lose."

New Method of Dam Construction. WHEN discussing an alternative route for the Nicaragua Canal, before the American Society of Civil Engineers, Mr. Le Baron made a novel suggestion as to the form of dam which he recommends for use either at

Panama or Nicaragua. He believes that a masonry or monolithic dam would be objectionable at either place, owing to the injury that might result from earthquake, and which might necessitate the closing of the canal during repairs. His proposal, which is certainly worthy of careful examination, is to construct a loose-rock dam, enclosed in a heavy chain cable net, the dam to have a base of 360 ft., a crest of 10 ft., an up-stream slope of 1 to 1, and a down-stream slope of 4 to 1. The chain forming the net, he suggests, should be of 1-in. ship's cable worked into meshes of 3 ft. square. These meshes would be crossed by two ½-in. cable chains, making four meshes of 18 in. square, all to be linked together by shackles at the crossings. In the first place the net would be laid flat on the river bed from shore to shore, and extended up the banks to the top of the dam, as well as for a sufficient distance up and down stream above and below the dam, so that the ends of the net could afterwards be drawn up and fastened on the top of the dam. A chain net would also be continued as an apron up and down stream of the dam, and covered with 2 ft. or 3 ft. of rock. This chain net would accommodate itself to the inequalities of the bottom, filling any holes caused by scouring. As the dam settles from this cause, the author proposes that stone should be added on top until a condition of stable equilibrium is secured. This method of construction seems to present no difficulties, and under conditions such as those prevailing in Central America it appears to promise advantages not offered by solid masonry construction.

Removing a Factory Chimney. It is not every day that a large chimney shaft has to be levelled in the midst of a busy city, and the method recently adopted for such an operation in Washington (U.S.A.) is worth notice. The structure in question was 153 ft. high by 15 ft. square at the base with walls nearly 3 ft. thick tapering to 14 in. thick at the top, and it contained some 250,000 bricks. The shaft was situated close to the principal thoroughfare of the capital, one row of buildings being only 90 ft. away, and other buildings within 200 ft. in a different direction. The district authorities stipulated that the stack must first be lowered 60 ft. by hand, and they then permitted the remaining part to be razed by undermining and by the aid of dynamite. Accordingly, the upper portion was removed, and two corners of the base were undermined. Holes were then drilled in the walls between the corners, and into them were inserted a series of dynamite sticks. At a given signal the explosive was fired by electricity, and, after a momentary pause, the shaft began to fall across the open space exactly as intended. In falling, the shaft broke into several parts, evidently owing to the resistance presented by the inertia of the upper parts to the movement first exhibited at the base. The debris was confined to a comparatively small area. None of the material was projected with any force by the explosion, and the bricks were deposited in a fairly regular wedge-shaped pile, comparatively few of them being broken. Nearly all those from the upper part of the shaft were completely separated, while the thick lower walls were left mainly in masses. In consequence of the pre-

cautions taken not the slightest damage was caused to the adjoining property.

SOME remarkable exhibits were shown in the lecture hall of the Society of Arts last week, when Professor Lewes delivered the last of the course of lectures upon "The Future of Coal Gas and Allied Illuminants." A small incandescent mantle, heated by acetylene supplied to the burner under a pressure of ten inches of water, and at a rate of one cubic foot per hour, emitted light of 146 candle-power. This efficiency is about seven times greater than that given by an incandescent mantle heated by coal gas under ordinary pressure, or about five times greater than that emitted by a mantle heated by coal gas under the high-pressure system. In connexion with his remarks upon the lighting of cars by acetylene, Professor Lewes exhibited some small cylinders charged with porous inert material (such as kieselguhr) impregnated with acetone, and then charged with acetylene under a pressure not exceeding 150 lb. per square inch. Acetylene in this form has been subjected to many severe tests, and it has been found that it may be used with such perfect safety that a special Order of the Secretary of State has been issued permitting the use of acetylene compressed in this manner. The lecturer proceeded to explain why the recent attempt to light London omnibuses by acetylene generated within the lamp did not prove successful, and expressed the opinion that, if an attempt were made to use gas stored in cylinders, lighting by acetylene would prove perfectly successful. The cost of lighting by acetylene would probably exceed that of lighting by oil by 2d. or 3d. per omnibus per week, but the acetylene would yield light so greatly superior to the miserable glimmer emitted by the oil lamps that the travelling public would at once appreciate the innovation. Another exhibit which attracted great attention was an oxy-acetylene blowpipe. The oxy-acetylene flame has a much higher temperature than that of the oxy-hydrogen flame, and when allowed to impinge upon a steel plate of considerable thickness it bored a hole through the plate in a few seconds.

At Messrs. Dowdeswell's Mr. Jungmann's Exhibition, Gallery is a collection of pictures and portraits by Mr. Nico. W. Jungmann, the artist who first came into notice as a translator of Dutch peasant life into decorative pictures. The present collection contains some works in the old manner, but is diversified by a certain number of full-length portraits of English ladies, on a small scale (about quarter-size), which are in a totally different style, and seem to imply a wish on the part of the artist to take a position as a portrait-painter in this country. The results are not very happy; the ladies are immensely tall in proportion (ten heads high most of them) the necks in some cases too long, and the hands stiffly and conventionally drawn. Among the paintings of Dutch rustic types perhaps the best is "Watching Father," two thickly proportioned but pleasant-looking young women seated on the bank watching "Father's" boat, which does not enter into the composition. But the really interesting

works are those of figures with faces of considerable beauty, clad in rich costumes which are drawn and painted with the most minute elaboration, treated in a flat decorative manner which is entirely conventional, but which nevertheless realises a great deal of beauty in a pictorial way. One of the best of these is "The Honey-moon," half length of two lovers seen in profile, covered with embroidery and lace, while a background is formed by an equally straight and flat representation of oyster pools and their workers, all, gazing at the passing couple. There is real beauty of a kind in this; also in the series of half-lengths called "Part of a Procession," and in the larger work "A Lady in Lace"; a half-length in profile, apparently worked out of a crimson-mottled surface (it is not easy to say what) by cutting away the surface for the head and painting in the features. Everything is as flat and sharply cut as possible, and the luxuriant brown hair, delineated with great brilliancy, is partly brought out by fine lines indented with a sharp-pointed tool. It is an eccentric method of execution, hardly perhaps legitimate painting; but it is certainly effective in its way.

THE ARCHITECTURAL ASSOCIATION

AN ordinary general meeting of this Association was held on the 19th inst. in the Meeting-room of the Royal Institute of British Architects, No. 9, Conduit-street, Mr. H. T. Hare, President, in the chair.

The minutes having been read and confirmed, and some nominations read, the following gentlemen were elected:—Messrs. K. W. Booth, R. T. E. Neeves, and W. H. L. Keay. The following gentlemen were, on the motion of the Chairman, elected by acclamation:—Sir John Taylor, K.C.B., Mr. Ernest Newton, and Mr. H. H. Wigglesworth.

Mr. H. P. G. Maule, Hon. Secretary, announced the following donations to the library:—"The Architecture of Greece and Rome," by W. J. Anderson and R. Phené Spiers, presented by Mr. B. T. Batsford; "Modern School Buildings," by Felix Clay, presented by Mr. B. T. Batsford; Post Office London Directory, 1903, presented by Mr. W. G. B. Lewis. A vote of thanks having been passed to the donors, Mr. Maule announced the following lectures, commencing: January 1—"Drainage and Water Supply," lecturer, Mr. Max Clarke. January 5—"Elementary Construction," lecturer, Mr. C. E. Varndell. January 6—"Elementary Physics," lecturer, Mr. H. B. Ransom.

The Study and Delineation of Old Buildings. Mr. W. H. Bidlake then read the following paper on "The Study and Delineation of Old Buildings":—

The intimate association, in the title of this paper, of the study of old buildings and their delineation, might suggest that there was an inseparable connexion between them. Such, however, is far from the truth.

The study of old buildings does not necessarily involve their delineation, or the delineation of them inevitably imply their study. This statement seems self-evident—perhaps too self-evident to attract attention. A student is, as a consequence, advised to sketch and to measure old work without any qualifying advice as to what to study or how to study. Growth is not helped by unsuitable food badly digested. Measuring up bad examples, and making drawings of them in a mechanical spirit, will neither develop a student's taste nor his knowledge. Perhaps it did not occur to him that either his taste or his knowledge required developing. "Then," you ask him, "why make any measured drawings at all?" "Well, I thought it might be a good thing to get them published in one of the building journals," or, "One must have a set of show drawings to take round the offices to get a berth."

More likely still, they were made to compete for one of the Institute or Association prizes, or for the A.R.I.B.A. examination, or to play their part in a deeply-laid scheme, worthy of an American company-promoter.

For, if a student has made his finished drawings at a school of art, he will first send them in for a local prize. Having won this, they will appear at the National Competition, perhaps with a gold or silver medal award. They will then be passed on for the Institute Silver Medal, and the next year they will once more reappear, supported by sketches for the Pugin. They will by this time have been published in the building papers and the "Architectural Association Sketch Book," and will also have won for their author a seat in the office of some prominent London architect. And, finally, they will serve as testimonies of study for the Institute examination, if, indeed, they do not eventually once more re-assert themselves in the garb of a monograph.

And all this with the same set of drawings! Well, if measured drawing has not advanced the student's taste, it has at least helped to stimulate his commercial instinct.

But where does the study of old work come in?

It would be interesting to learn how our wide-awake student came to select his subject. His principle is, the greatest effect for the least labour. Sound commercial doctrine. It must look costly, but be cheap. This man might verily have made his fortune if he had not elected to be an architect.

He selected the portion of the building which he measured up because it was easy to get at, and would make a telling set of drawings.

Another student would select his subject "because it had not been done before, or because it was one of the subjects recommended by the Institute."

This desire to make the drawings rather than study the building naturally influences the method of work.

When at length he has arrived face to face with the subject of his choice, the student sets about drawing and measuring, and having taken all the leading dimensions, and made more or less freehand drawings of the mouldings, and taken any further notes necessary to complete certain elevations or sections he has decided to illustrate, he buys, or himself takes photographs of ornamental detail sufficient to enable him to elaborate the drawings at home. Perhaps, a month after his return, and a hundred miles away from his building, he will commence plotting out his measurements. Some will not work out, and there is no chance of correcting them. He assumed the walls were at right angles, and that the whole of the work was set out with the rigid accuracy of his tee-square and set-square, and as, in common with most old work, it was not, his measurements were thrown out. An examination of the photograph is then substituted for the study of the building, and a draughtsman's skill covers a multitude of inaccuracies. The drawings win the prize; that is sufficient.

Such measured work is not study; indeed, I would go further and say such measured work prevents study, by substituting the counterfeit for the genuine.

I lay stress on this distinction, or you will say, "Thou didst come to be blessed measured drawings, and lo! thou hast cursed them altogether." What, then, shall we say of the student who has substituted study by photography, for measured work and sketching.

It would be absurd to deny the value of photography to an architect, or the delights of its pursuit; but to take photographs of a building is not the way to study it. Here is a fine parish church. Suddenly the amateur architectural photographic enthusiast appears. He manoeuvres for a good point of view; sets down his camera; focuses; draws the dark slide; turns his back to the building; removes the cap, and studies his watch; claps the cap on again; packs up, and rushes for the station.

The enthusiast objects that this description is a caricature. Very well. Photograph at leisure, and with great care; still, how can you judge the proportion of a facade when you see it standing on its head. "Do you know such or such a church," asks one. "Oh yes, rather. I took at least a dozen snap-shots of it last summer. I haven't developed them yet, but I hope they will come out all right."

The amateur photographer objects with increased resentment. "It is absurd to suppose that you can spend some time about a building, without forming a very good idea of it." Yes, but he forms his idea of it when he is walking round and thinking about it, just the precise part of his stay when he is not photographing it.

Clearly if he is taking a dark interior which requires an hour and a half's exposure, he must be doing something meanwhile. So that we may grant that one of the ways in which photography is an aid to the student is that it compels him to wander round and about a building, and observe it more in detail than he otherwise would do, whilst the cap is off his lens; that is, unless he avails himself of the opportunity to go off to the inn and get lunch.

Happily, those students whose ideal it is to obtain as many prizes as possible with one set of drawings, or the minimum of study, as well as those who regard photography as an efficient substitute for pen and pencil, are in the minority, but it is as well to recognise wrong methods whilst we are in search of right ones.

Our aim, then, shall be to study the buildings themselves, and only to make drawings of them as a means to that end. If, as supplementary to this study, our drawings have been made with that artistic finish which is peculiar rather to the draughtsman than the student, so that they are awarded a medal or a studentship, so much the better. For no kind of study is assisted by slovenliness of expression, and therefore the careful study of a building should be embodied in the most painstaking description, both with pen and pencil. Herein lies the true connexion between the study of old buildings and their delineation.

By this study we seek to increase our knowledge and sharpen our æsthetic taste. This is our aim, and our subject will be selected accordingly.

It will certainly be a subject with which we feel in sympathy, one which we feel drawn to by excellences of one kind or another, which excite our enthusiasm and our desire to emulate them.

At the same time, let us cultivate catholicity, remembering that want of sympathy is often due to ignorance, and that, whilst sympathy may stimulate study, study in turn may awaken sympathy.

If, however, we feel that a building is bad in design, and that we shall learn nothing from it, we will not make measured drawings of it because no one else has, as yet, made them, or for any other reason equally foolish.

But how shall we study our building, or such part of it as we may have selected? By measured drawing and sketching? What, are these the only means of study? They are certainly the most frequently recognised means with architectural students, and, perhaps, there are some who think them all-sufficient.

I believe there are occasions when a pipe will serve us better than a 2-ft. rule. A pipe makes one contemplative, and to walk round an old building in a contemplative mood, is to have put oneself in train for studying it; for catching the spirit and romance of it. Under its kindly influence, the imagination will conjure up from the stores of one's historical and archaeological learning—if it is there to conjure up—the conditions of society and of the craft guilds, the observance and the ritual of the church, and the quaint superstitious customs of the country folk, at the time when the stones of the building were put together, and which find expression in its arrangement and decoration. And falling thus into a sympathetic reverie, the eye wanders over the building noting this or that point of interest, whether of design or construction. Then, leading our thoughts back to modern times and the conditions of to-day, comparing and criticising, and drawing conclusions, let us take out our notebook and write down our impressions whilst they are still warm, whilst the glow of feeling unseals our powers of expression, whether by descriptive note, or pencil sketch.

Very likely the building will live in your memory through all your future life. For we remember most what we feel most.

It is particularly important to make a general study of the whole, before making a particular study of a part, so that the relationship and proportion of one to the other may be adequately perceived.

One may sometimes see a student fasten on some detail which attracted him on his first approach, and devote his time so exclusively to it, that he leaves without any idea of its setting, or the part it played in the whole design.

Do not, therefore, study details without making a key sketch sufficient to show their position and relative value to their surroundings.

Do not accept a design because it is old: it may be old and bad. Always keep the critical

faculty on the alert. This habit is of the very essence of an architect's study of old buildings. You will not regard Salisbury as a model west front because it was built in the thirteenth century. Standing in front of it, you will question yourself: Is it good? Could it be improved? What are its defects? Perhaps, it will remind you of a comparison you have made between the west fronts of Siena and Orvieto cathedrals, or your thoughts will turn from the confusion and irresolution of Salisbury, to the commanding lines of Notre Dame.

Then take out your note book and try your hand at it; take the west front as it is, and with as little alteration as possible, pull it into shape.

If you have a companion with you on your excursion, let him do the same, and then compare notes and discuss it together.

A companion of the right sort, that is one who is equally bent on study, is a great gain on a sketching tour. Of course, he can hold the tape, but he can be of much greater service than that. He can come up and ask you what you think of such a building. This compels you to give an answer. If you reply merely "Oh! very good," you are depriving yourself of an opinion more than you are depriving him—your own opinion, which you have not taken the trouble to form. If you are wise, you will treat his question seriously. You will look at the building well, and in a critical frame of mind. Not only will the process of so doing lead you to notice many points which you would otherwise have passed over, but you will have subjected yourself to the healthy exercise of making up your mind. It will not only reveal the building to you, but you to yourself. Your companion will probably have formed some opinion of his own before asking yours, and he will differ from you in some points. This will lead to a more careful scrutiny of the building in search of evidence in favour either of your view or his, and in the end you will both have gained in knowledge, and in the formation of a critical taste. I know hardly any advantage in the study of old work greater than the discussion of it with a fellow student who is thoughtful and well informed.

If you are alone, do not on that account fail to come to a conclusion as to whether you like or dislike any building worth attention, and why you like it. Keep a notebook for the purpose of writing down a critical description of such buildings. On first commencing such a practice, you will be astonished to find how vague your impressions are.

I am not here referring to those aggressively dogmatic opinions which characterise the very young student, who always regards the work of contemporary architects as beneath contempt. Such opinions are not the result of thought, nor are they founded on knowledge, they are simply a little preliminary crowing, necessary in personal development, and remind one of Dr. Jewett's remark to his students, "For we are none of us infallible, not even the youngest." Every student has a right to the belief in his own infallibility, until life disillusion him; it is the man who has no opinion of himself, and is unable to form one of anything else, that is beyond hope.

As time goes on, the judgment, well practised by such method, is likely to become more sound and more self-reliant, for the mind will have laid up an ever-increasing store of knowledge for comparison and co-relation. Thus, the study of this building is amplified by a previous study of a similar one, and the points of difference are noted, and the reasons for them investigated. Perhaps it is that the building material is different, or that, being rather later in date, certain decorative forms show signs of change. In a third building, of still later date, these signs are amplified, and the student comparing this with that, begins to detect in the various examples which at first seemed isolated and apart, a law of common development, a law of life. He now begins to generalise, timidly at first, but, as new observations confirm or modify his previous conclusions, ever with greater boldness and wider range of view. He will then be in a position and have a right to theorise, and will, from the habits of mind he has acquired, always bring his theories to the test of his facts. Now, compare the position of a student who has adopted this method of study—although, content with thumbnail sketches and notes, he may never have made a measured drawing—with the one who made one set of drawings, and swept all the prizes away within reach. The world, judging by tangible and visible

results, proclaims the latter the coming man. So he is at first, the other's day comes later but lasts longer.

How many Prizes there are for drawings; how few for critical study! Is it not possible, that at some future time, either at the Institute or the Association, more awards will be given for thinking, and especially for thinking and drawing combined? I think the essay prize is one of the most useful that the Institute offers, but the subject set is often one which the student can only illustrate by copying prints from books or photographs, and stimulates his reading rather than his critical faculties.

What I think is wanted is a prize for an original and critical study of some particular class of buildings, or parts of buildings, easily accessible in this country, to be illustrated by sketches and measured drawings made by the student from the buildings themselves.

In the study which we are considering, it will be very necessary to supplement work on the spot by also studying the subject in books, so as to furnish ourselves, not only with the conclusions to which others have arrived on any particular subject, but to acquire that general historical knowledge which, with the help of our own imagination, will enable us to set the designing and construction of the buildings within the social and historical environment of the time.

How can one study Stokesay Castle or Haddon Hall, and understand the arrangement of their plans, without knowing something of the social and domestic life of the times. Looking at the buildings will not teach us this, however cleverly we may guess at the purposes of this or that. We must go to Hallam and to Green.

Again, we must learn about the conditions of labourer and craftsman, of the prevalence and organisation of guilds, of the position of the designer, the magister, of the force and direction of tradition, of the tools in use at the time, and of the methods of working materials and incorporating them in the building.

We must not forget also, to study the traditions, the ritual, and the history of the Church so far as they affect ecclesiastical building; this will also involve some knowledge of the distinctive requirements of the various religious orders.

In the same way, some knowledge of the methods of attack and defence of the period will help us to understand military architecture.

All this means systematic reading, which perhaps, the everyday student does not feel disposed to undertake. Well is it for him, that the Institute examination compels him to acquire some knowledge on these points in spite of himself.

Vitruvius considered in his day that an architect should be a man of many accomplishments, and now as then, an architect's culture will inevitably find expression in his buildings.

In addition to this more general study, we must further investigate the circumstances of the particular building we are examining.

To do this, we must find out what we can of its history, and the part it has played, and was intended to play in the past.

We must especially inquire into the properties of the local materials of which it is built, and of any traditions of working them which still survive.

Old buildings are apt to seem impersonal to us. The colours with which Nature has decorated them, as if eager to deceive us that they are her work and not man's, give them the air of being the product of the land around them, like rock and tree, and the human life that has thronged them since that far-away time when they were built, confuses the vague glimpses we may catch of their founders like a veil drawn before a face. But we must not forget that human nature was then as it is now, and that these buildings were designed by men so similar to ourselves, that if one of them were to return to earth he would probably drop into our modern ways in a week; and we may therefore look at their work as we should that of a living architect, and try to read what was in the mind of the designer of this building or that, and ask ourselves, "What were his aims?" No doubt he was hedged in by limitations similar to those of to-day. Even in the days of the Great Pyramid men could not build without cost, and they have not succeeded in doing so since. The whims of the client must at all times have stolen an architect's sleep. I think Magister Mutius probably found Pliny a very exacting client.

The limitations of site must have influenced all but the Romans, who thought nothing of excavating the hill for the level Forum of Trajan, or of levelling up the ground on a gigantic concrete platform for the Thermæ of Caracalla.

The adaptation of a building to its site should engage the most earnest study. An unusual site, whether of shape or level, is the doom of the incompetent architect, the triumph of the skillful one.

From the Athenian Propylæa and Erechtheion to the rock of Mont St. Michel, architectural history presents one long array of buildings, whose architects have presented them to the world as monuments of their genius.

Next notice the limitation of material, and its influence on constructive and decorative forms.

Ascertain the kind of stone procurable, whether in blocks or slabs, and their available size, and note how this has influenced the character of the building, and given an individual stamp to the buildings of a particular locality. The monolithic window-jambs of a Yorkshire cottage might be compared with the jointed jambs of a Cotswold one, and the influence of the use of flint in the Eastern counties might similarly be noted. Examples of the influence of material on design are to be found everywhere, however, to the seeing eye, and it is not within the scope of this paper to attempt to enumerate them. The point to be emphasised, is the extreme importance of the subject to the student of old buildings. The particular tools in use have also played their part in the shaping and decorating of buildings, as in the dressing of stone or the adzing of timber. The use respectively of the chisel or drill in Roman acanthus sculpture, and of the adze or chisel in Norman carving, gives a very distinctive appearance to the work.

Doubtless, there are many other limitations which have helped to determine the character of buildings, and which the student will detect in the particular building under study.

In narrowing our attention to any particular building we shall first of all examine the plan. Study of plan is of supreme importance. Within the plan somewhere, somehow, lies the soul of the building; if else is but the embodiment of it.

See how the various rooms are grouped together to suit the needs of the time, and note particularly the entrance, the hall, and the staircase; also the position of the plan with regard to aspect and points of approach; how the levels work out with regard to the site, and how the house sets with the garden.

In ecclesiastical and other work the plan in the same way is the key to the building, and merits our first attention.

Having examined the building from within, next see how the plan, with which you will now be familiar, finds external expression.

And first of all, note the way in which it is roofed, and the manner in which the various parts are grouped together. These are matters of great importance in architectural design, and must always have been so, and must have been considered by the architect when he was engaged in the arrangement of his plan.

How frequently nowadays are they not left to take their chance.

It is the more important that the student should give his attention to these matters of massing and grouping, because by this means he is led to study buildings in the solid, and an antidote is, in a measure, found against the tendency to façade and elevation designing, inseparable to the working out of a building on paper.

How much may be learnt from the design of old chimneys, and the manner in which they contribute to the conception as a whole; how well was their value recognised by their builders. On the other hand, one may ask, how often does an architect nowadays consider the disposition of his fireplaces in the plan, so that the chimneys rising from the roof may group well together from the more important points of view.

Connected with this subject of roofing and chimneys, as well as with that of gables and turrets, and cathedral towers, is that of skyline. Study it at the time of sunset—I will not be so impracticable as to say sunrise—when the purple outline is silhouetted against the sky. And, in like manner, learn the value of simple masses in twilight and moonlight, when the disturbing details are suppressed. From the study of these more general features you come to that of details, or it may be that in any particular building, it is some detail alone that

is worth attention. Every building must, of course, be studied for the features of excellence it possesses, as a bee draws honey only from those flowers which produce nectar, and that critical sense, to which I have already referred, will prevent us from thinking that we recognise them where they do not exist.

There are one or two ways by which, I think, we may make our visits to old buildings more valuable to us, which I may refer to in passing.

And one is to set ourselves to plan and design some building of the same kind that we propose to study. To fully realise the difficulties of an achievement, so as to observe how they have been solved by others, one must make a similar attempt; this will reveal to us what those points are about which we need the help of other minds.

And another excellent method of study is to take up some particular subject, such as, for instance, the design of chancel screens, and make a comparative study of it, just as if one were preparing an essay or a monograph on the subject.

I have, hitherto, considered the study of old buildings from observation and examination, with the aid of the note book only, we must now ask how this may be supplemented by their delineation.

I say supplemented, because I think we should not regard old buildings as dead and lifeless forms to be dissected piecemeal. They are organic creations still instinct with antique life, and we must learn to know them before we portray them; we must examine the building as a whole before we begin to devote our especial attention to a part. We must be biologists as well as anatomists.

Now in considering this delineation of old work, there are two factors to take note of: our subject and ourself, and we must be dutiful and just to both.

We must not run away from the original, for the sake of a flourish of the pencil, on the one hand, nor need we, on the other hand, suppress any distinctive style of draughtsmanship which we have made our own, and which is rightly the expression of our own feeling, and our own individuality.

An ideal measured drawing or sketch is one which truthfully represents the building, but which is at the same time executed with all the verve and character of the draughtsman. There are some buildings which would be barely interesting, as represented by measured drawings, did not the force of draughtsmanship fairly rivet our attention.

Indeed, some of the finest buildings, which are fine because of their uninterrupted surfaces of wall and their bold projecting masses, are, if tamely represented by measured drawings, reduced to a few thin ink lines straggling over an expanse of the whitest Whatman paper.

On the other hand, measured drawings must be line drawings, and it would be absurd to shade them up to give a suggestion of projecting surfaces in a picturesque fashion, although the reliefs might be systematically indicated by colour washes, after the French manner, by cast shadows.

I think myself, however, it is best to leave the shadows alone. Measured drawings are for architects only—the public do not understand them, and are not interested in them—and architects would at once perceive the relative value of the surface of elevation from the accompanying plans.

It is here that the value of sketching comes in, for it enables us to judge the building as a solid. And here, too, in an especial degree the draughtsman is justified in making his drawing or sketch expressive of himself as well as representing his building. Affection and trickiness are to be severely deprecated, and there is enough of both in the draughtsmanship of the day.

We do not need to picture an innocent old manor house as a snow building relieved in aggressive outline against the blackness of an inferno. The method we shall adopt in representing any particular work will depend upon the character of the work and what it is of which we wish to keep a record.

If it is a façade, we may make a measured drawing to a small scale; if a decorated sedilia, then one to a large scale; and in either case the drawings will be accompanied by a sketch plan, showing the position of the part which is illustrated; and the mouldings and details will be drawn out full size. All this will be done fully and thoroughly on the spot.

If, on the other hand, it is the grouping of chimney and gable, the play of surface, the

picturesqueness of setting, and a hundred other reasons, we shall find a sketch the most serviceable.

If, again, we wish to remember the charm of colour due to the use of various materials, or some definite scheme of painted decoration, a water-colour sketch, or a tinted pencil drawing will serve us best. Or, if the skyline of some building, seen against the evening sky, attracts us, some brown paper and a piece of white chalk will be useful.

Our object is to catch and fix some particular point or feature which interested us, some beauty which excited our enthusiasm, and we may seize the means readiest at hand, or best for our purpose, as the case may be, our only care being that we possess ourselves of our aim whatever the medium. If we have any artistic power, we shall find it will also lend itself to our self-expression.

Whilst we may well need our colour-boxes for the purposes I have described, we shall not, as architects, require to make water-colour studies of buildings whose charm lies in the tints of old age, the setting of foliage, or the accidental colouring of sunset. Of course, as artists, we may indulge in such, but it forms no part of the study of old buildings.

But whatever we do, let us keep clear and active that critical faculty of which I have spoken earlier, so that, whether we are making measured drawing or sketch, we should remain conscious of the weak points of our subject, and not lose ourselves in the glamour of its old-world charm.

To this end, let us write down in our notebook what our thoughts and impressions are at the time we are making our drawings, giving little marginal sketches illustrative of the manner we, at the time, considered the work might have been improved.

As regards the actual *modus operandi*, it would, I know, be impossible to say anything with which you were not already well acquainted.

For sketching a block 16 in. by 10 in. is a very convenient size. Some prefer cartridge and some Whatman, whilst others would use sketch-books made of metallic paper. A miniature tee-square is sometimes valuable for use with the sketch block, for setting up one or two guiding lines, but not to unduly assert itself. If, moreover, the tee-square has a scale marked on it, it is useful for plotting out a plan or measured sketch. Some find cross-ruled paper convenient for this purpose. Pencils should be of good quality, and there is more than one way of sharpening and using them. It is impossible to give any character to a sketch, if the pencils are too hard or too sharp, and if the lead is brought to an edge rather than a point, one can get a greater latitude of stroke by using either the edge or the broad side.

A sketch is not an elaborately-finished pencil drawing; it is an abstract, embodying just those features in the original it is desirable to portray. Certain parts will, therefore, be more or less finished in detail, while the rest are merely indicated by a few expressive lines. The lead pencil must be spared, as if it were precious, except at those points of telling shade or accent, where it may be rich and black.

A few colour washes, or strokes of coloured chalk, may sometimes be useful to record the local colouring of material. Some have done excellent work with graphite, treated like a neutral colour wash, for indicating light and shade, but it is not a very sympathetic medium. A few dimensions on a sketch, with one or two sketch details in the margin, will make it more useful.

It is, of course, unnecessary to insist here on the value of a complete knowledge of perspective. All measured work should be plotted and drawn out to scale on the spot. Capitals and other curved work may be merely indicated in these drawings, and numbered, and large freehand studies in soft pencil, crayon, or charcoal made, and distinguished by corresponding numbers, which will enable one to finish up the scale drawing afterwards, if necessary.

Do not assume that everything is set out with rigid accuracy, that the plan is always rectangular, that two halves are alike, or that flowing tracery can be set out from centres. If we cannot perceive the absence of the mechanical in old work, we shall be blind to one of its great charms.

Always show the stone jointing of the more important and decorative parts, and of the tracery of windows, and clearly indicate the treatment of wall surfaces. In the same way

show the jointing and framing of carpentry, and do not hesitate to add explanatory notes to the drawing.

Mouldings should always be drawn out full size and carefully measured. Strips of lead and such contrivances for obtaining their contour are worse than useless.

Place the arch mould over the jamb mould, and show the outline of the caps, and as a rule, make all your full-size details as you would if you were sending them to some mason or carpenter to be executed. They should have a business air about them, not a show-drawing look.

If, however, you are proposing to send them in for a prize, arrange them carefully on sheets of uniform size mounted on cardboard, and do not think you are making them look more artistic by some ridiculous and fantastic printing.

The joys, and the sorrows, of a sketching tour might well claim an essay to themselves, but it might be of service to indicate some of the items of equipment.

Of course, pencils, brushes, instruments, scales, colour box, water bottle, sketch books and sketch blocks, tape, plumb line, and level must be included.

A 2-ft. rule in your pocket is indispensable; so, too, is a *5/* note. Plenty of drawing pins, but do not leave them about on cathedral chairs. A sketching stool—a collapsible one—but not while you are sitting on it.

A double elephant is naturally too heavy to carry about, but half a double-elephant board, and a roll of paper to correspond, is a useful size. The tee square will, of course, be made to suit, and if the board is accurate and square, a set square may be dispensed with; it is only one more thing to forget and leave behind.

Callipers will be needed to take the diameters of shafts and mouldings, and a stout piece of copper wire serves as a calliper for larger shafts. A *5/* ft. or a 10 ft. jointed rod is also necessary.

By a little ingenuity an American leather satchel can be contrived the size of the drawing board, with pockets of various sizes, and the whole strapped together with a handle-strap, the sketching stool, rod, and tee square being threaded through the back, and a leather label attached in case you should leave it all in the train. With all this equipment, and a few week's stay in a good architectural district, you will no doubt enrich your sketch book, and what is of still more importance, you will increase your knowledge and educate your taste, which will be reflected in those buildings which you may yourself have to design. And, recognising their charm, whose great-grandparents are not yet born, will measure up your work, now mellowed with age and Nature's tints, and speak sympathetically of those dear old architects of King Edward's reign, who knew so well how to express their soul in their work.

Mr. W. J. N. Millard, in proposing a vote of thanks to Mr. Bidlake, said they had heard a lot of very valuable advice. Those who were just starting their careers, as well as those who had gone through some experience, must be grateful to Mr. Bidlake for his remarks. He had been thinking that they should go back to the beginning of the whole matter, and ask why they studied and delineated old buildings. He suggested that the only reason worth considering was that they wanted to know something about those buildings. One would think that was self-evident, but there were drawings not uncommonly to be seen of old work which made one doubt whether the draughtsman had any desire to know anything about the buildings he drew. However far such drawings might carry a man as a draughtsman they could take him very little way indeed as an architect. He would suggest that if a man was to be an architect he must know what he studied and delineated—know all he could get to know about it, not only how it looked, "but how it is." There were two sorts of drawings required: the perspective drawing, showing how the building looked, and the geometrical drawing, which "shows how it is." Even when they had drawn a building they had not got to the bottom of it. The great aim of the study of a building was to know the whole life-history of it, or as much as they could of it—how it came into its present shape, and what influences were at work upon the minds of the men who fashioned it and thought and

carried it out. That involved the study of history, and it came to this, that a serious student of architecture, of existing old or modern work, was a student of history, though he might not know it. Architecture was a branch of history, or it could be treated as such in the study of it. He thought we were apt to think that it was enough to draw a building to know all about it, but it was not. And in drawing it, as Mr. Bidlake said, the plan was the root of the whole matter; and if it was an old building in this country, especially an old church, they would find that, in ninety-nine cases out of a hundred, its plan was not all one design, and that it was not all designed or built at one time, and they would realise in time that the whole thing was a growth and was not a complete design—that it was the result of a number of men working upon the work of one another; and when they got to that stage of their investigations they wondered which man did this work, and which that, and which was done before the other, until at last they arrived at something like a life-history of the building: how it began, how it went on, and finally how it is. If they were content merely to draw it and to think it was always like that, they had not learnt all about it; that certainly applied to about nine-tenths of the old churches of this country. It was possible to imagine that the student's horizon would widen as he went on. Methods of drawing were interesting and a man must have his own method just as he had his own handwriting; it might be very bad, and, if so, he wanted training, for a man could improve himself by basing his methods on the methods of those who were successful. But, after all, the methods were only the means to an end, and if a man was going to be an architect and produce work of his own, he did not want to have his ambition turned in the direction of being merely a capable black-and-white draughtsman, and to think that by that means he was going to be an architect. He would forgive a man for rude and crude sketches, if only they showed that there was something in their subjects that the student wanted, and that he had gone to work as directly as he could to get it. He did not care how rough the notes were if in the time available the student had got what he wanted. The wanting to know was the great thing.

Mr. Arnold Mitchell seconded the vote of thanks. He said that Mr. Millard's ideas were those which those who had known him for a good many years knew that he put into practice, and if one were to be at all critical of the beautiful show of drawings there that evening, it was because they had excluded some of Mr. Millard's own most interesting and valuable sketch-books. The literary and polished paper they had heard that evening was one which, greatly as they had enjoyed it, they would not say still more when they came to read it, for there was so much in it. As to photography, the Association had a Camera Club, and in the presence of several of its most distinguished members it would be rank heresy to say anything antagonistic to photography; but though he did not want to say that the Camera Club was wrong, or to abuse the photographer, he thought that most architects would agree with him that the moment a man began to photograph he was lost as a sketcher, and when a man ceased to be a sketcher what an enormous amount of pleasure he lost in his work, and what an enormous amount of information he passed by! They had heard about the hour-and-a-half exposure and the pipe; no doubt the theory was sound that the long exposure gave ample time for contemplation, but generally he thought too much attention had to be given to the development to make it possible to properly study the building. By all means go in for photography later on in life, but first do the hard work. He had been greatly interested in one remark, *i.e.*, that the critical faculty should be cultivated. By all means; but did they not cultivate it? Most of them at some time or another had attended the delightful Saturday Architectural Association excursions, and if there was one thing more noticeable than another on these occasions it was the wealth of strong language and forcible expression used by members to criticise and "pitch" into one another's work, he did not think it was necessary to offer members of the Association advice on the art of criticism. As to drawings and sketches, Mr. Bidlake's modesty had prevented him exhibiting his own

drawings, which would have been an interesting illustration of his paper, for he could not recall a finer delineation of old work than Mr. Bidlake's measured drawings, which won the Pugin studentship nearly twenty years ago, of that delightful little chapel at Ely—Prior Crauden's Chapel. The drawings had been published, and he (the speaker) suggested them as models of what measured drawings should be. Vitruvius spoke about the accomplishments which the architect should acquire—which he needed. He could not help thinking that the accomplishments which brought success, at all events at the present day, were outside purely architectural practice: had they not all heard of architects who "danced" into practice. There was another point which it might be well to emphasise, *i.e.*, the desirability—the great desirability many of them who had worked hard in the delineation of old buildings would say—of finishing drawings on the spot and not touching them afterwards. Of course, in measured drawings it was almost impossible to produce highly-finished drawings without further work upon them at home; but sketches and the slighter sort of measured work should not be touched after the sketcher had left the building. If the thing was incomplete, let it be so; they ought to have got out of it the good they wanted and their object was not to turn out acres of finished drawings; they wanted to get the value that the study of the thing would give them. If they had got that value they could tear the drawings up, for what did it matter? They would in the course of time finish many drawings, and they would get piles and piles until they had got more than enough. Instead of touching up these unfinished drawings they should study something else. As to the difficulties of measuring, those difficulties were sometimes overcome in an extraordinary way. A story was told of Burges how that he was desirous of finding out the height of the interior of Beauvais Cathedral, which was, of course, difficult to get. It was said that Burges got a ball of string and, climbing up into the groining, let the string out with his keys attached and afterwards measured the exact length of the string. In that way Burges got a dimension which was no doubt as accurate as any in the standard works published. There were many men who said they did not sketch, and that they could not do so, although they had tried. That was all nonsense. They could not run before they walked, and they had, of course, to learn to sketch: they had to go through the mill. All sketchers could recall the disappointing hours spent patiently trying to work out something satisfactory. The thing was to keep on until they succeeded. They would have several most unsatisfactory weeks at the start, but satisfaction would come if they would but stick to it. They should sit down to a big-scale drawing, and keep at it until they had made something of it, using their indiarubber again and again. He never met a student who was able to make satisfactory sketches without persevering with his preliminary work. The young student should not be discouraged; if he persevered, the result would be success.

Mr. G. Lucas said that it seemed to him that sketching was a modern accomplishment of the architect. Would Mr. Bidlake give some hints as to how the old architects managed to produce such beautiful work without the process of elaborate sketching? He (the speaker) most strongly advocated plotting to scale on a sketch book, but actual hard studies on a drawing-board in a building. What Mr. Millard said was most fascinating as to the history to be read in a building. Take a fifteenth-century church: if they studied it carefully they would realise that it contained the whole history of the parish, and that its plan and form, in later days, arrived at through a series of extensions and alterations, were largely influenced by the early shape of the church.

Mr. A. T. Bolton said he thought the best thing for the student to do was not so much to start sketching at once as to measure, for this reason: the result of the sketching was unlikely at the beginning to be satisfactory, and of course represented nothing of any solid value to the student. If, on the other hand, the absolute beginner started with measuring, he would have done something solid by the end of the day: increased his information in regard to the building, and would have learnt something about the materials and construction and

a little about the plan. In that way he would be preparing himself for the more fascinating art of sketching. Men who had been successful as sketchers had begun by measuring, and had done more than those who worked on the inverted order. The principal point of the paper was this: Mr. Bidlake told them, and told them correctly, to study the old buildings, and not to bother too much about the appearance of their drawings. But a student who acted on that advice, and who came home after a tour, and whose drawings were hung on a wall in a gallery with the work of other students, would find that people (even people who gave advice not to think so much about the drawings) would cluster about the delightful water colour and other pretty drawings, and would neglect one's serious and solid studies. That was the human nature of the thing; we all know what is good for us and what we like. What he would say to the student was: "Make up your minds, if you accept the excellent advice of Mr. Bidlake, not to be disappointed if, when your work is exhibited, your friends do not recognise in it the value which your work has for you." A student should try and get certain conclusions in this matter, and should realise what he intends to do, and then, as Mr. Millard said, he was likely to do it. He thought there was nothing of more value to the young student than to learn the good methods of older students, for the amount of misinformed labour a student went through for want of advice was often lamentable. A man went on a tour and saw things which he admired and enjoyed, but often in a month after he had returned he had forgotten all he had seen, for he had not realised the way he ought to work in order fully to avail himself of his opportunity so that it might not be a lost opportunity. He knew students who had been abroad for as long as a year and a half and who, three or four years afterwards, had had to express their sorrow that they had wasted such a splendid opportunity because they did not know how to make use of it.

The Chairman, in putting the vote of thanks to the meeting, said that the most essential point in the sketching and studying of old buildings was that during the whole time the student was drawing he should be thinking of what he was doing. One of the greatest mistakes was merely to draw a thing in a mechanical way without understanding and appreciating what one was drawing. It was also very essential to analyse the component parts of a thing and their relation and proportion one to another all the time one was working. One of the points Mr. Bidlake referred to was a certain trickiness in drawing—tricks which were adopted by a number of clever draughtsmen to produce pleasing pictorial effects. Those tricks should be avoided: they induced one to think more of the pictorial effect than the result one was aiming at, which was to acquire a certain amount of knowledge as to the building itself. Really the most valuable kind of sketching was not of a pictorial nature at all, but rather of the nature of notes on the various details and features of the building being studied. As to photography, what Mr. Mitchell had said was in some respects unjust, for photography had a value in many ways. One of the ways was that by the aid of it one was saved from the temptation of sitting down and making a pretty sketch of a building when there was no time for that. A photograph could be studied at leisure, moreover. He thought the vote of thanks should include the gentlemen who had lent the beautiful drawings there that evening and which had added to the interest of Mr. Bidlake's valuable paper.

The vote of thanks having been heartily agreed to,

Mr. Bidlake, in reply, said that Mr. Millard had pointed out that the plan in old work was very much more than the plan in modern work. Usually the plan in modern work had all been worked out at one time, and was the product of one mind; but in the plan of old work they were usually faced to face with an archaeological problem; and if they went to a building simply with the idea of making a drawing of it, and if they ignored all the little indications in it of its history, they were acting in the most foolish way. The building was, so to speak, wanting to tell them the secrets of its existence, and if they turned away their attention and were content with a sketch of the profile of one detail or other, they were neglecting an opportunity. In the study of a plan of an old building, the student was, if he was an intelligent person, at once led to the history of

that building, and also to the social life of the time and many other things. The study of an old building, if rightly carried out, involved the study of history and social conditions of the time. As to whether a student ought to begin to make drawings only after he had studied a building, he did not think the making of a drawing excluded contemporary study of a building. It was quite true that a student who was just feeling his way would have to give a great deal of attention to his draughtsmanship. If he did not, he would never make much progress, for draughtsmanship took a lot of time at the start; but if he got into the habit of thinking that draughtsmanship was everything, and concentrated all his attention on his drawings and did not from the first also consider the building he was drawing, it was probable he would not do so later on, for he would not get into the habit of doing so. As to perseverance, that was a quality Mr. Mitchell had a right to speak about, for he remembered how Mr. Mitchell made six drawings of a cast at South Kensington before he got his drawing right; the sixth drawing was very different from the first. As to whether the old architects sketched buildings, he must answer distinctly in the affirmative. There was Vasari's independent description of the journey of Velasquez and Donatello to Rome. They were dumbfounded with astonishment when they saw the buildings there, and they became so enthusiastic that they measured up right and left and made most elaborate drawings. Of course, Palladio and Peruzzi made drawings, and there was the sketch-book of Honecourt. There was internal evidence that they made drawings in the days of Augustus Caesar, and Vitruvius gave rules of proportions of all kinds. When one saw a system like that reduced to writing, it probably meant that at some previous period the buildings themselves were studied and the laws of proportion of the buildings arrived at. That seemed to involve the measuring up of columns in order to arrive at the heights and proportions of the buildings of what Vitruvius called the "ancients." It was almost necessary, if any one was going to design in any recognised traditional style, to study what had gone before.

The Chairman announced that the next meeting would be held on January 9, when Mr. Andrew Oliver will read a paper on "Old London: being Notes on Whitehall and the Strand," illustrated by old engravings and lantern slides.

The meeting then terminated.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

At the fourth sessional meeting, held at the Association rooms in Great Marlborough-street on Wednesday, the 10th inst.—Mr. Geo. H. Smith, Chairman of the Section, presiding—Mr. J. Sylvester Blunt read an interesting paper on "Crosses, Pagan and Christian," illustrated with a number of diagrams prepared by himself, and with a collection of lantern-slides. Treating first with the history of the Pagan cross, the author dealt with the forms found among the Egyptians, Assyrians, Etruscans, Tartars, Mexicans, Scandinavians, Indians, Chinese, and other Pagan nations, as well as with the Greek "Stauros."

Next, regarding the legendary history of the Christian Cross, the author traced the Eastern and Western forms of this through the Greek form (probably the most ancient), the Latin (known as the *crux capitata* or *immifia*—the form adopted in our own symbolism as referring to the Passion of our Lord), next the *crux ansata* or *commifia*, the well-known Tau cross. The legend of the discovery of the true cross by Helena, the mother of Constantine, A.D. 326, together with references from St. Cyril, St. Ambrose, Rufinus, and others, was next given at length.

In the next section of the paper, the Early Christian Symbolism, the author gave some good examples of Christian work in early times, embodying the cross, as at Westminster Abbey, where an example, apparently dating from the end of the third century, was found in recent times; another from Frampton, Dorsetshire, where there is a Romano-British pavement, from Chedworth, in Gloucestershire, and from Harpole, in Northants.

The Chi-Rho monogram was then carefully explained, together with the various modifications that occurred in later times. This was

adopted by Constantine in 312 A.D., and was generally used in Gaul and other countries until 493, as indicated by pillar stones and others with inscriptions. But remaining English examples, as at Jarrow, indicate that here its use was more extended, nearly into the eighth century, being most prevalent from the fourth to the sixth centuries.

The large group of Celtic monuments was carefully analysed, and dealt with under two main heads, (a) the rude pillar stones, mostly rough unhewn monoliths, and (b) the sculptured stones, which were more carefully worked. The former were all undated, and were incised with crosses, being devoid of all other ornament. About thirty examples remain. Of the class with crosses, but without inscriptions, the late Mr. Rolt Brash thought these were Pagan stones used afterwards by the Christians when the new religion had begun to spread over the land. The sculptured stones, unlike the rude pillar stones, were carefully worked and shaped, most finely dressed and elaborately carved, and generally authentic as to date. The remarkable collection at Clonmacnois was quoted, eighty-one of which have been dated, and found to range from 628 A.D. to 1273 A.D. Other similar ones in Northumbria were described, as the ones at Bewcastle, Collingham, and Ruthwell (of the seventh centuries), Hackness (of the mid-eighth century) the Isle of Man crosses, 888 A.D. to 1226 A.D. (during the period of the Scandinavian occupation), and many others were presented.

Of the various forms of crosses Mr. Blunt then gave a series of lantern slides, chiefly from the Celtic sources, but including the Latin, Maltese, and other forms; the memorial crosses, as those to the memory of Queen Eleanor, 1291 to 1294, and the Percy Cross, to commemorate the Battle of Hedgeley Moor 1464; the churchyard crosses; preaching crosses; gable and altar, and processional forms; and, finally, the market crosses.

Mr. F. C. Eden opened the discussion that followed, and moved a hearty vote of thanks to Mr. Blunt, which was warmly supported by the succeeding speakers on the subject—Messrs. Geoffrey Lucas, N. F. Barwell, C. Tucker (visitor), H. G. Collins, J. A. Bond, E. J. Prest (visitor), and the Chairman, Mr. G. H. Smith. The vote was carried by an acclamation, and Mr. Blunt briefly replied. The Special Visitor for the evening, Mr. E. Swinfen Harris, was unfortunately prevented from being present by illness, but a letter was read by the honorary secretary explaining and apologising for his absence.

The arrangements for the joint meeting of the Discussion Section with the Architectural Association Camera and Cycling Club, on the 17th inst., were announced, when Mr. Francis Bond, M.A., promised to read a paper, illustrated with the lantern, on "English Medieval Capitals." On January 7, 1903, Mr. J. H. Pearson will read a paper on "Some Points in Ancient Light Practice."

THE ROYAL ARCHITECTURAL MUSEUM:

TRANSFER TO THE ARCHITECTURAL ASSOCIATION.

An extraordinary general meeting of the Royal Architectural Museum and Westminster School of Art was held on Friday last week at the Museum, Tufon-street, Westminster, to carry into legal effect the arrangement agreed upon between the Museum authorities and the Architectural Association for the transfer to the Association of the leases of the Museum buildings and the collection of architectural examples stored therein. The chair was taken by Sir William Emerson, President.

The notice convening the meeting and the minutes of the last meeting having been read, Mr. Winckworth read the agreement which had been entered into relative to the transfer.

The Chairman briefly explained the motives by which they had been actuated in handing over the Museum to the Architectural Association, in the hope that, in the first place they would thus best secure the perpetuity of the museum and its valuable collection to be freely open to the public as heretofore; and, in the second, would bring the museum into closer connexion with the architectural profession, and especially students of their noble art, and thus greatly enhance its usefulness. Their only regret was that, as a necessity incident to the change, they would displace the Westminster School of Art, which had attained a high and

deserved reputation, the accommodation which the premises afforded being required for the work of the Association and its architectural classes. Sir William then formally moved that the common seal of the Royal Architectural Museum and Westminster School of Art be affixed to the agreement which had been read by the honorary solicitor.

Mr. Seth-Smith seconded the resolution, which was carried unanimously.

The Chairman then moved that the Royal Architectural Museum and Westminster School of Art be wound-up voluntarily, and that Mr. Wm. Pain be appointed liquidator for the purpose of such winding-up.

Mr. Aston Webb seconded the resolution, which was also carried unanimously, and it was decided that the meeting for confirming this resolution should be held on January 10 next, in conformance with the statute.

The President said that, having transacted the formal business of the meeting, they had a pleasurable duty to perform in recognition of the services rendered to the Museum through a long series of years by Mr. J. P. Seddon and Mr. Maurice B. Adams in their capacity as honorary secretaries. Mr. Aston Webb had been mainly instrumental in connexion with the matter, and he therefore called on him to make the presentations.

A pair of silver bowls, with appropriate inscriptions, were here placed upon the table, and Mr. Aston Webb, in response to the President, referred to the constant and valuable services of their old friend, Mr. Seddon, extending over half a century, and of Mr. Adams, who had acted as hon. Secretary, first in conjunction with Mr. Seddon, and in later years by himself for a period of twenty-six years, and to him was chiefly due the scheme of transferring the museum to the Architectural Association, which now approached consummation. He did not recollect any matter of importance which had been carried through with such complete unanimity. He thought, however, that it would be more fitting that the presentations should be made by Sir William Emerson, as their President, and begged him to undertake that pleasant duty.

The President then, in complimentary terms, gave expression to the pleasure which it afforded them to make this slight acknowledgement of long and valued service, and having read the inscriptions on the bowls, handed them to Mr. Seddon and Mr. Adams, on behalf of the subscribers.

THE DETECTION AND PREVENTION OF UNDERGROUND POLLUTION.*

THIS subject has been before the Association on several occasions, particularly in the paper contributed by our Past-President, Mr. Matthews, at the winter meeting of 1900. The ground was also partly covered by Mr. Watts in his paper presented at the Birkenhead meeting last year. Mr. Watts, however, confined his remarks to supplies derived from moorland gathering grounds, and concluded with a request that some other member would take up the subject of the pollution of springs and well supplies. The author has in the present paper attempted to comply with this suggestion.

As the primary source of all water supplies is the rainfall, it can hardly be said that there is any essential difference between "surface" and "subterranean" water. Rain, when it falls upon the earth, pursues, under the action of gravity, the easiest route from the point where it fell to the sea (from which it was originally derived), or other natural outlet, and there is, therefore, at all times a large quantity of water travelling underground as well as upon the surface. The former may appear at some spring, or may be intercepted by a well, just as certainly as a stream may be intercepted above ground. The laws which govern the yield of wells and springs are fairly well understood by waterworks engineers; but even so, it is always necessary to examine the nature of the strata and the depth of the water line below the surface before deciding upon the diameter or depth of the well or borehole, and even with this knowledge, difficulties of observation, and consequent ignorance of facts as to the underground watershed, often make it an impossibility to forecast the yield of any given well.

A similar uncertainty exists in regard to the pollution of underground water. In water supplies furnished by streams or rivers which drain impervious gathering grounds, the whole course of such streams is open to the light of day, all sewers or drains from farmyards, &c., or any sheep-washing, or other acts likely to pollute the water can be observed, and it is only by some wilful or careless act that a stream can be polluted. On pervious soils, more especially in the neighbourhood of large towns, such safeguards do not exist, and we are startled every now and then by some epidemic of typhoid being traced to some source of water supply which a few weeks previously had been "like Caesar's wife—above suspicion."

Underground water, mainly owing to its more intimate contact with the various mineral substances which form the earth's crust, generally contains a much larger amount of dissolved mineral substances than river or upland waters. These impurities, chiefly lime and magnesia, and sometimes iron, unless in excess, are rarely considered detrimental to the use of the water for domestic purposes, although for washing and manufacturing purposes they prove somewhat objectionable; but processes exist, mainly modifications of that discovered by the late Professor Clark, which remove to a great extent the hardening matters in solution.

In some districts, more especially near the sea, deep wells yield salt or brackish water. This may arise from two causes: the first, as in some New Red Sandstone districts where there are beds of salt in the formation, or in flat alluvial-covered districts where the sea has covered the surface in comparatively recent times; in the other case, wells sunk in the first instance to intercept water flowing towards the sea have been pumped too heavily, with the result that the direction of the flow has been reversed. As regards the first case, it is waste of labour to attempt to obtain water fit for domestic purposes from salt-bearing beds. In some parts of Lincolnshire the best water lies on the top of the chalk, the water below being more or less brackish, while in the Fen district many wells which when first sunk yielded salt water, have, by persistent pumping, come to yield a fairly fresh water in ordinary seasons, such supplies falling off in quantity and turning brackish in seasons of drought. The engineer who uses sea sand for filtering purposes will have some idea of the persistency with which a certain amount of salt is retained in the filter-bed for weeks at a time. In one district whose supply contained on an average 70 grains per gallon of common salt some twenty-five years ago, the amount is to-day less than one-third of this quantity, although the author is informed by residents that the water tastes of salt more strongly after a heavy rainfall. In the second case the water when first struck is generally at a somewhat higher level than the mean sea level, and where the works are situated on high ground and the friction caused by the closeness of the strata very great, the water is quite fresh, although the yield of the well may be small. Where, however, a long stretch of level land lies between the gathering ground and the sea the "hydraulic gradient" is flat, and in many cases the rise and fall of the tide produces a corresponding rise and fall of the water-level in the wells. A well which intercepts a large volume of water flowing from the gathering ground to the sea would, no doubt, yield fresh water, but if the gathering ground was small, and in seasons of drought such a well might easily be too heavily pumped, with the result that the direction of the flow might be either permanently or intermittently reversed, and salt or brackish water obtained. Moreover, when once sea-water has made its way into a well, it is almost hopeless to prevent future percolation from this source, and the plan of pumping from a higher level and reducing the quantity drawn from the well is then the only course to take. Even this, however, is not always effective. Although most wells affected in this manner are situated near the sea or on a tidal stream, cases have been known to occur as far as seventeen miles distant from the sea.

Underground waters are, however, generally free from detritus and mineral matter in suspension, although in the neighbourhood of "swallow holes," or where a bed of gravel adjacent to a stream is pumped from, the water will possibly become turbid after heavy rain. The systematic manner in which the French

"engineers of bridges and roads" have dealt with the springs in the watershed of the Eure, which have been utilised for the supply of Paris, forms a capital object-lesson for water engineers in this country.

But if underground water is usually more exempt from matters in suspension, and also from vegetable organic impurity as compared with surface supplies, it is much more liable to unseen pollution, direct or indirect. In the case of surface (lake or river) water, pollution can only take place by the direct discharge of sewage into them, the manuring of land within the drainage area, and the storage of manufacturing and domestic refuse, all of which can easily be seen, and— with ordinary care—prevented. With underground water, cesspools, leaky sewers, and even sewage farms are sources of danger which may exist for years unnoticed, and very often when the danger is pointed out the man who sounds the note of warning is called a faddist—or something worse—and nothing is done until an epidemic occurs. Then, of course, an inquiry is held by the superior powers, and a great outcry is raised; but surely this is locking the stable door after the horse is gone. The writer has known cases where a well has been sunk to procure clean water, and afterwards a cesspool has been constructed to get rid of the dirty water in such a position that as soon as the cesspool filled up, the contents immediately found their way into the well, and the water naturally became impregnated with organic impurities of the most dangerous character. In another case the position of the cesspool being unknown, a well was sunk within 3 ft. of it. In a third case, an old well was used for the water supply of some new cottages, situated some little distance away, and the water was conveyed through a pipe to the pump, which was fixed in a convenient position near the cottages. Some years afterwards, in order to keep the well water from contamination by surface drainage, a gutter was constructed to drain the surface water away from the cottages. It was afterwards ascertained that this soaked into the ground almost directly above the well the gutter was formed to protect. In all three cases it was not until serious illness had occurred in the houses that an analysis of the water was made and an inquiry was ordered, which revealed the actual state of affairs. In another case, the suburbs of a town situated on the New Red Sandstone was supplied, until the erection of waterworks, entirely from private wells. The Corporation then, however, sunk a well from which the supply of the whole neighbourhood was obtained, with the result that the water level was permanently lowered and the private wells emptied. Water being then laid on from the Corporation mains, and there being no system of drainage, the owners very naturally converted their wells into cesspools, from which the sewage found its way into the waterworks wells and was believed to have caused a serious epidemic. This well, having also affected the yield of another well belonging to the same Corporation some three miles distant, was temporarily closed, and on pumping being resumed some months afterwards, the water level in the well was not allowed to fall below that in the neighbouring wells, and a complete system of sewerage was carried out at the same time.

Even when sewers are made with the greatest care they are not always watertight, and in some cases large quantities of spring water find their way into them, and there is no reason to doubt that, were a fall in the underground water level to take place (from exhaustive pumping or otherwise), the direction of the flow might be reversed from the sewer to the subsoil. Water will also undoubtedly travel along the side of a sewer for long distances. Some thirty years ago a main sewer in a district south of the Thames was constructed by the late Metropolitan Board of Works some two yards from a well from which 1½ million gallons per day were being pumped. Periodical analysis of this water showed a gradual increase of chlorine due, no doubt, to percolation from the sewer, and as a result the well had to be abandoned and the engines and boilers removed. Mr. C. E. De Rance, in a paper read at our Nottingham meeting, instanced a case where a sewage farm was laid out in permeable strata close to a waterworks well. The pollution in all these cases revealed itself in the analysis by an increase of the organic matter in solution.

* A paper read by Mr. John Shaw at the recent London meeting of the British Association of Waterworks Engineers as mentioned in our issue for December 13.



"Norwood," Huddersfield. Plan.

The obvious remedy for such an unsatisfactory condition of affairs as has been instanced by the examples above quoted is to rigorously exclude every possible source of pollution, to insist on the closing of all cesspools in the neighbourhood of the source of supply, and to see that all shallow wells are constructed on the principles advocated by Mr. J. Dewhirst in his paper read at the 1901 meeting of the Sanitary Institute. The chief precautions to be observed are: buying a "protective area" round pumping-stations; lining deep wells with iron tubing for a considerable depth below the surface; boreholes should have their upper portions securely lined, and where they start from the bottom of wells, concrete floors should be constructed, so as to make a watertight joint round the upper bore-tubes, and thus prevent any surface water gaining access to the boring or well. The variations of the water level in wells and boreholes due to either natural causes or to pumping should be carefully noted, as well as the quantity of water drawn in each case, and observations should be carefully recorded showing the effect of such pumping on any springs and wells in the neighbourhood. Analyses of the water should be taken at frequent intervals, especially when heavy rainfall follows a long drought and causes a rise of the water level.

One word, in conclusion, on another important point. Deep-well water may be organically pure in consequence of its having been slowly filtered through deep-seated rocks, which have oxidised the impurities it contained when it passed through the surface of the earth, and, generally speaking, underground water is free from the innumerable micro-organisms which infest all surface water; but it must be remembered that the relative danger or value of these germ is still a disputed point with scientists, although there can be no doubt that certain groups are typical, and possibly productive of typhoid fever and other zymotic diseases. We are also assured that such organisms exhibit a more marked vitality in

sterile deep-well water than in surface water of more doubtful purity. The waterworks engineer, aided by some simple chemical tests, can do a great deal in the direction the author has indicated, but he is utterly powerless to deal with organisms so minute that many millions may exist in a space of three-eighths of an inch cube, and of which 25,000 placed in a line would only represent 1 in. in length. Here the aid of the bacteriologist must be invoked, but at the same time the engineer should at least take reasonable precautions to preserve the well or boring from contamination, such as may often arise from the clothing, and especially the boots, of workmen employed in them. The author also considers it essential that on no account should water from deep wells be exposed to light or air until it is drawn from the consumers' taps. He is also inclined to advocate the filtration of all water supplies, whether derived from the surface, the subsoil, or deeper seated sources, but in this no doubt his views may not be shared by all at present, as there is a difference of opinion as to whether even surface waters all require filtering; and, in advocating the filtration of bright clear water drawn from the chalk, or the New Red Sandstone, he is conscious that he will be considered somewhat in advance of his times.

BUSINESS PREMISES, NEWCASTLE-ON-TYNE.—New buildings for Messrs. W. Glendenning & Sons have been erected in Blackett-street, Newcastle. There are seven stories in the building, and an electric lift will convey people up to any floor. The first floor will be occupied by the firm, and the other parts utilised as offices. Messrs. Marshall & Tweedy are the architects. The building operations were carried out by Mr. T. Lumsden, contractor, Jarrow, and the fitting up of the premises has been done by Messrs. Robson & Sons, Newcastle.

MISSION HALL, SOUTH SHIELDS.—A new mission hall, built to accommodate 600 people, was opened recently at the corner of Alice-street and Bertram-street, South Shields. Mr. H. Grieves was the architect, and the building work was carried out by Mr. James Young.

Illustrations.

THE ANGEL APPEARING TO THE SHEPHERDS.

THIS is a reproduction of a cartoon by Mr. N. H. J. Westlake for a panel which forms a portion of a triptych in St. Paul's, Wilton-place, Knightsbridge. It illustrates the sentence, "Behold, I bring you good tidings of great joy."

The centre compartment of the same triptych was illustrated in the *Builder* of May 30, 1891.

ORLEY FARM SCHOOL, HARROW.

This is a preparatory school for small boys, and has been planned and arranged specially for this purpose. The conditions are somewhat different from the ordinary school buildings, the supervision being greater and the staffing upon a more considerable scale. Future extension accounts in some measure for the unsymmetrical arrangement. The building, which is of red brick and tile, has only recently been opened—the school having removed, under the head-mastership of Mr. S. B. Innes Hopkins, from Antony Trollope's old house, Orley Farm, which is close by. The contractors were Messrs. Jas. Smith & Sons; and the architect, Mr. Arnold Mitchell.

THE MATTISON-ROAD SCHOOLS, HARRINGAY.

This design was placed first by Mr. E. R. Robson in the recent competition, and the school is now well under weigh, with practically no variation from the competition design. The materials are red brick and red terracotta, with tile roofs. The buildings provide accommodation for a very large number of children, and there are five separate blocks, one block being a higher elementary school to serve the whole district. Cookery school, manual instruction-room, laundry, and swimming-bath form a very useful technical block. Messrs. McCormick & Son are the contractors, and the joint architects are Mr. Arnold Mitchell and Mr. Alfred Butler.

MEMORIAL LIBRARY, DULWICH COLLEGE.

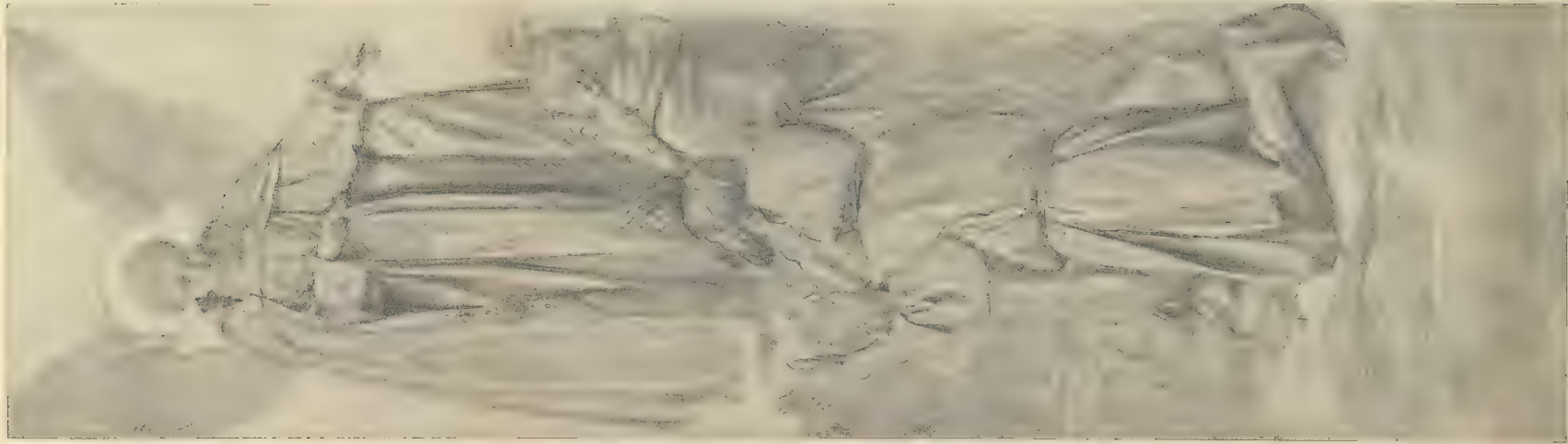
This building is in course of erection in the grounds of Dulwich College as a memorial to Old Boys who fell in the recent South African war. It has been subscribed for principally by Old Alleynians and other friends, the College Governors, and Alleyn Club, having given substantial donations.

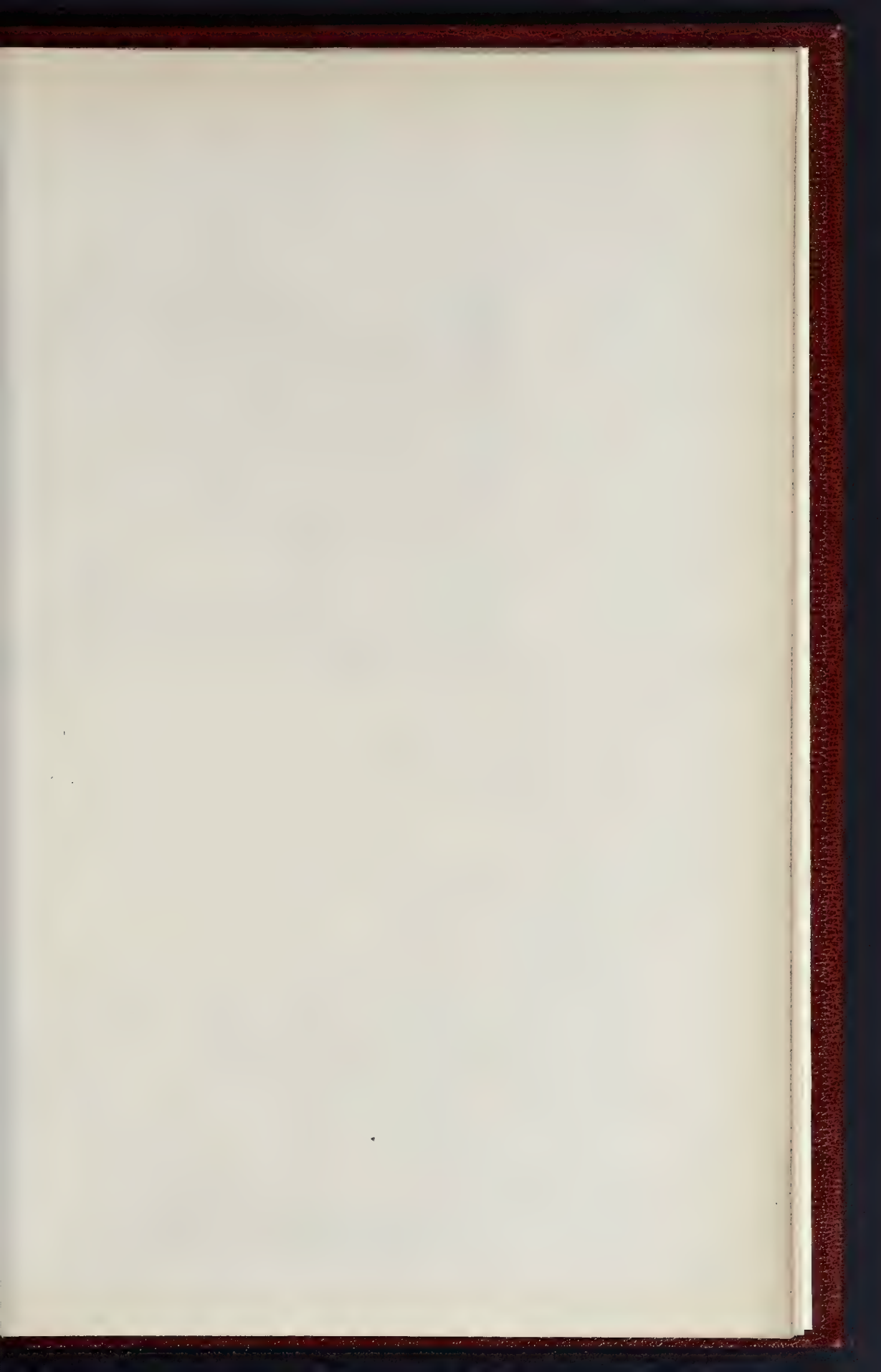
The library is divided into two parts, the larger for the use of the boys generally, the other for the prefects and senior boys of the College. The main hall has a barrel vaulted ceiling, groined over the windows, with ribs at each principal; the smaller room is covered with a dome surmounted by a small lantern. The window sills are about 7 ft. 6 in. above the floor, and beneath the side walls are covered with bookcases, the end walls being panelled to receive memorial brasses. The entrance porch is also domed.

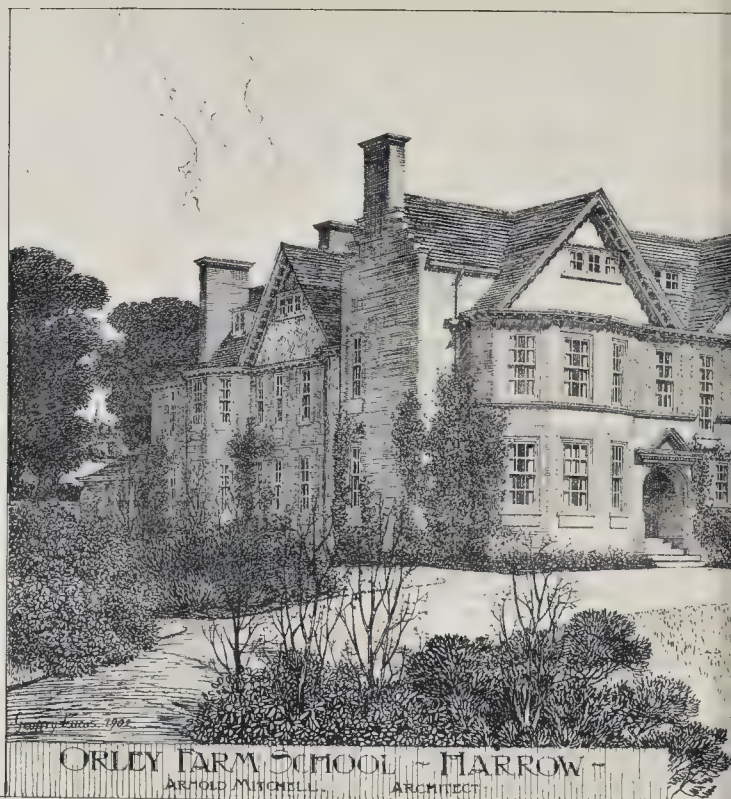
The building is externally of red bricks and Portland stone. There will be sculptural figures on each side of the north gable, and over each angle buttress of the south apsidal end. The domes, which are covered with lead, will be terminated by metal statues. The *fiche* is of oak, with lead roof. The floors are of polished teak; the doors, bookcases, and panelling of fumigated oak. The walls and ceilings are of plaster, and it is hoped that parts will be decorated with frescoes by some of the eminent painters who are old Alleynians. The contractors are Messrs. Holliday & Greenwood, and the architect is Mr. Edwin T. Hall.

"NORWOOD," HUDDERSFIELD.

The house occupies a very fine position on high ground in a well timbered park, and has been erected for Mr. J. H. Kaye. The exterior is faced with York stone, the roofs are faced with Broseley tiling. The hall is panelled to a height of 10 ft. with oak, with a carved mantel and overmantel, the ceiling being divided into panels by oak beams carried by fluted pilasters. The dining-room is also oak panelled with oak mantelpiece, the ceiling







: MATTISON ROAD SCHOOLS :
 : FOR THE MORNSEY SCHOOL BOARD :
 : ARTHUR MITCHELL :
 : ALFRED BUTLER : } JOINT ARCHITECTS.



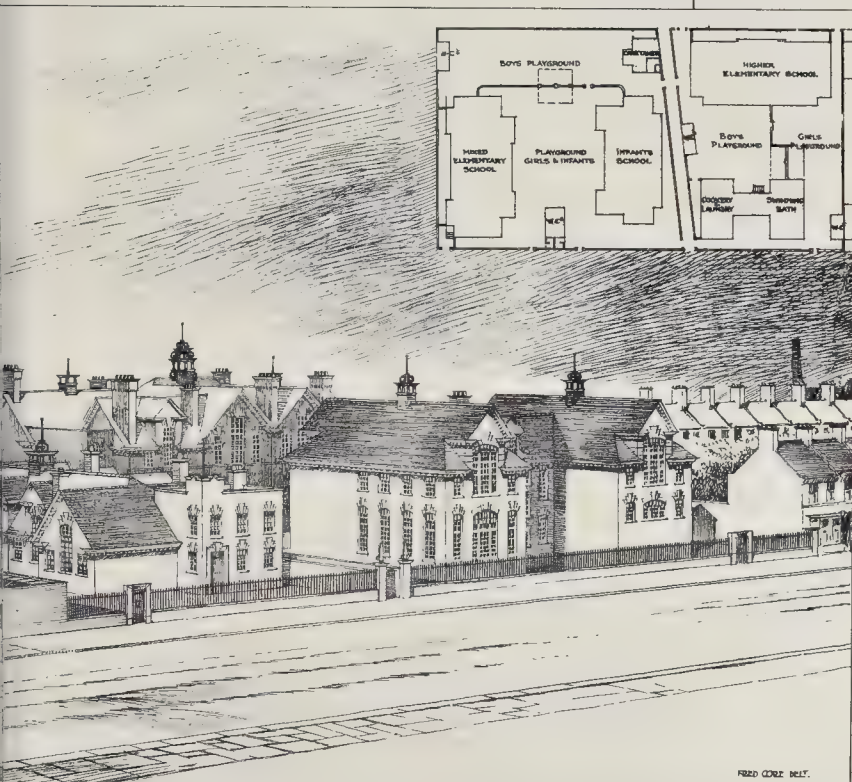
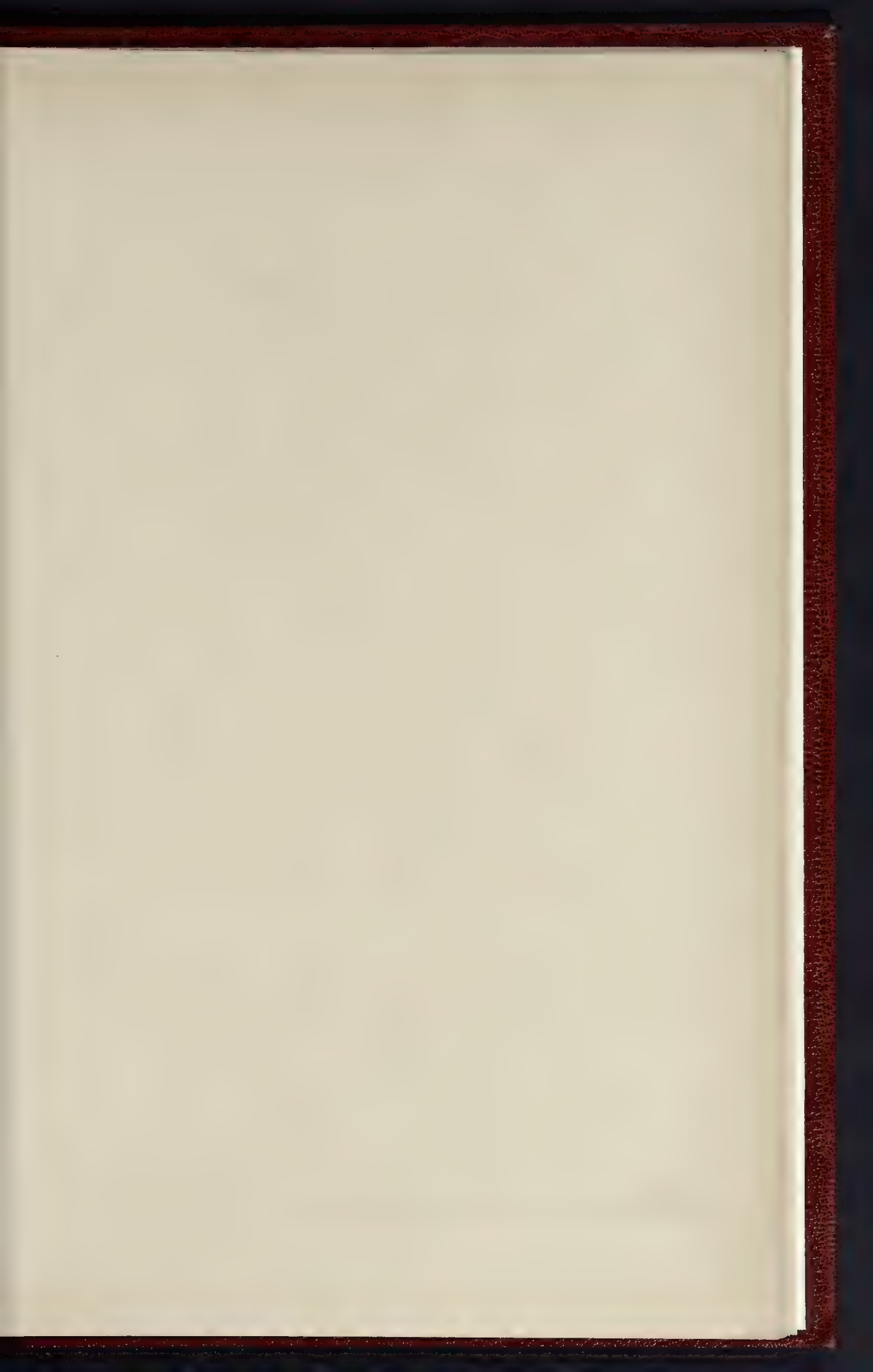


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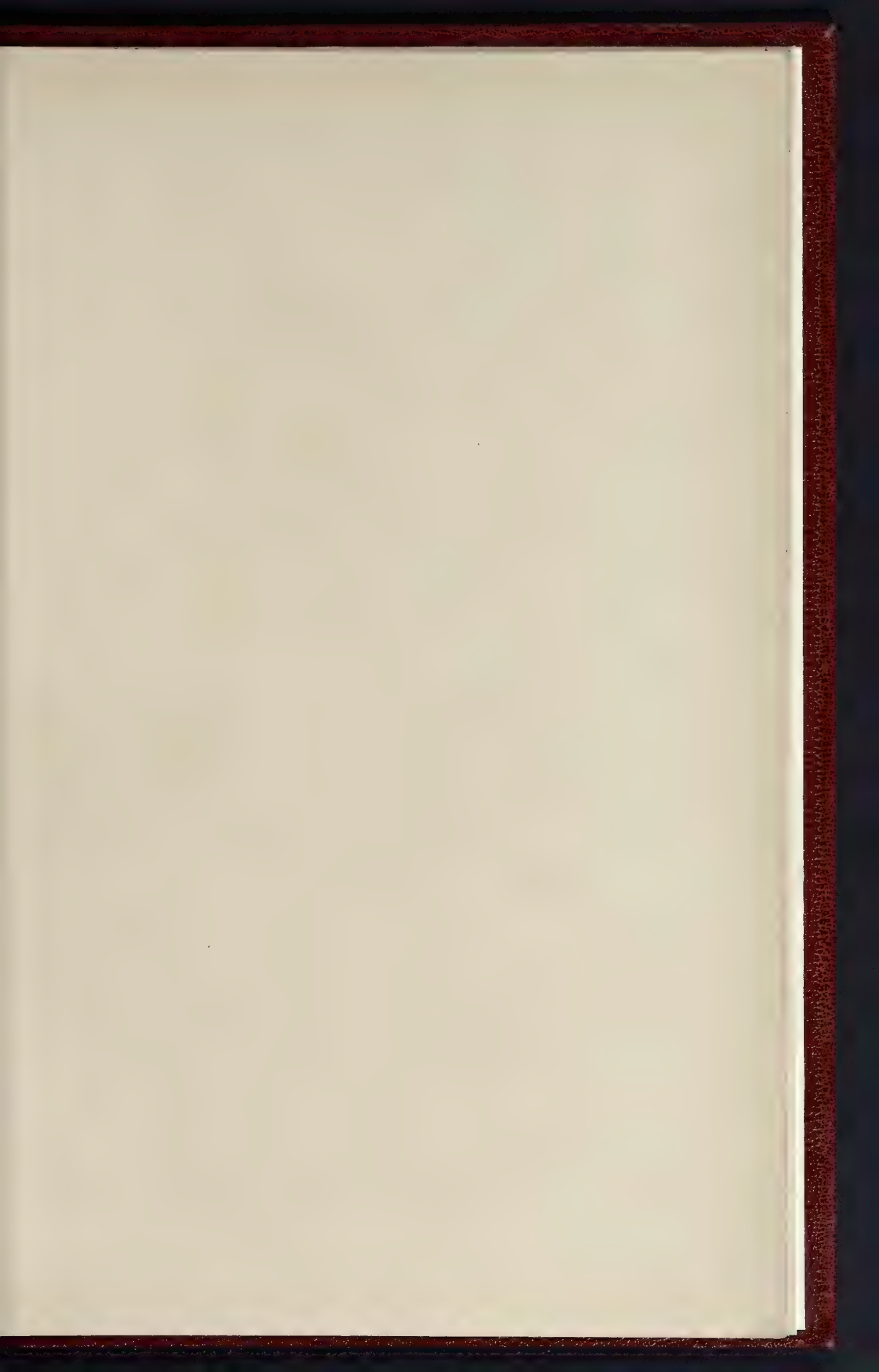


MUSWELL HILL, PRESBYTERIAN CHURCH COMPETITION



NE PHOTOGRAPH, EAST END, EASTWARD, STREET VIEW, A.D. 1902

COMPETITION DESIGN FOR PRESBYTERIAN CHURCH, MUSWELL HILL—By MR ARCH C DICKIE & MR W CURTIS GREEN



THE BUILDER DECEMBER 27, 1902



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"NORWOOD," HUDDERSFIELD.—MR. J. HATCHARD SMITH, F.R.I.B.A., ARCHITECT.



INK PHOTOGRAPH BY J. C. L. 4 & 5 EAST HARDING STREET FETTER LANE E.C.

MEMORIAL ON THE HOE, PLYMOUTH—MR. F. W. MARKS, A.R.I.B.A., ARCHITECT

of fibrous plaster with projecting oak beams. The morning-room has mahogany dado screen and bookcases and mantelpiece, with plain ceiling and enriched cornice.

All the woodwork to drawing-room is finished with white enamel, the inglenook, ceiling, and decorative work being in fibrous plaster, all finished white. The whole of the woodwork in billiard-room, including screen and mantelpiece, is of fumigated oak; the ceiling, which is arched, is of fibrous plaster divided into panels by oak ribs carried on brackets. The staircase is of oak. Mrs. Kaye's bedroom has specially-designed fittings, all in inlaid mahogany. The floors of all reception-rooms and hall are of solid oak parquet. The vestibule, loggia, and conservatory have marble mosaic paving. The whole of the walling, including entrance lodge, was carried out by Messrs. Mallinson & Sons and Mr. Bottomley, the carpenter's work being done by the estate workmen. Messrs. Burt & Potts supplied the iron casements. The whole of the work was designed and carried out under the superintendence of Mr. J. Hatchard Smith, architect, of London. The grounds were laid out by Messrs. Milner & Sons.

DESIGN FOR PRESBYTERIAN CHURCH, MUSWELL HILL.

THIS was an unsuccessful competition design for a Presbyterian church, but we are glad to publish it for the pleasing and picturesque treatment which it shows. It may be admitted, perhaps, that the upper portion of the tower hardly suggests a Presbyterian church; it has too Oriental a feeling for that.

The design is by Messrs. A. C. Dickie and W. Curtis Green.

WAR MEMORIAL ON THE HOE, PLYMOUTH.

THIS memorial, of which the foundation-stone was laid by Lady Butler on August 4, is erected to the memory of Prince Christian Victor and of the officers and men of the Somersetshire, Gloucestershire, and Devonshire Regiments who fell during the Boer War.

The monument, which is of granite, is 41 ft. high. The steps and enclosing pillars are of gray granite. The canopied base, 8 ft. high, of green granite, contains a bronze commemorative panel about 4 ft. 6 in. by 3 ft. 6 in. on each face. The one to the Prince is the work of Mr. Emil Fuchs. The others represent memorable battle scenes, and with the inscription are all by Mr. Onslow Whiting. The shaft is of red granite.

The general design is by Mr. Fred. W. Marks, architect, of London. The contractors for the work are Messrs. Fenning & Co. (London).

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION. —Mr. Thomas W. Aldwinckle, London, delivered a lecture on the 17th inst. to the members of the Edinburgh Architectural Association on the erection of isolation hospitals in times of emergency. Mr. A. Hunter Crawford presided. The lecture was for the most part a description, illustrated by plans, of the hospitals erected in connexion with recent epidemics in London. In the course of some general introductory remarks, the lecturer described the general methods of building a hospital under pressure of an epidemic such as the Metropolitan Asylums Board had to contend with this year. In order to build a properly equipped infectious hospital in a few weeks, the ordinary procedure, he said, would be quite out of the question. There was no time for elaborate plans, for bills of quantities, or for inviting tenders by advertisement. The architect selected should be thoroughly conversant by previous experience with this class of work, and it was equally important to have an expert and trustworthy builder. As there was no time to enter into a contract for a fixed sum, the amount to be paid to the builder must be based upon a schedule or left for valuation. There was one important question which arose in connexion with these emergency hospitals about which there was considerable difference of opinion—whether the buildings should be made of as permanent a character as possible, consistently with speed of erection, or be "knocked up," so as to last a short time, and be afterwards pulled down. Much depended on the circumstances

of the case. The cheaper method of building was considered advisable by some on the grounds, firstly, of economy, and, secondly, on the ground that the sooner an infectious building was destroyed, the better. As to the latter, there were now no difficulties in the way of thoroughly disinfecting a building; as to the former, he doubted whether it was a true economy. Personally, he was strongly of opinion that the truest economy was to erect those emergency hospitals in as permanent a way as would be consistent with a high rate of speed. It might be taken for granted that if the isolation hospital was wanted at the present time, it would be wanted in the future, and if such be the case the permanent construction was the truest economy. It should also be borne in mind that the whole of the sanitary arrangements must be good, and consequently expensive, and that all these would be practically wasted in a merely temporary building. Referring to the details of construction, he advocated a good platform of cement for the whole building; the walls and partitions of fir quartering, with the outer walls covered with diagonal boarding, felt, and corrugated iron. The roof, which should be of the ordinary timber construction, should also be covered with diagonal boarding, felt, and corrugated iron. The internal fittings were also described in detail. He did not, he said, admit the principle of a second quality in sanitary work. The patients were just as ill in a temporary as in a permanent hospital, and required the same advantages of perfect sanitation. The same remark applied to warming and ventilation. It was preferable to warm by means of open fireplaces, supplemented by low-pressure hot-water or steam apparatus. It took some time to build brick fireplaces, and sometimes this was not practicable, but a great effort should be made to provide these, as an open fireplace was, after all, about the best exhaust ventilator that could be found. It was of vital importance that, as emergency hospitals were somewhat more inflammable than an ordinary permanent hospital, very complete and adequate fire-extinguishing appliances should be provided, as also a complete system of fire alarms. In concluding, Mr. Aldwinckle gave particulars of an emergency hospital of 612 beds he had erected this year for the Metropolitan Asylums Board, together with its administrative staff quarters and administrative buildings at Gore Farm, near Dartford. His firm was instructed on January 9. It was arranged (in case of fresh developments of smallpox) that the new hospital should be opened in stages as completed, so that no time should be lost. The boiler-house, laundry, and kitchen were ready on February 22, the temporary ward pavilions a week later, the administrative block on April 7, the six staff homes and eleven ward pavilions on April 21, and the remainder of the hospital on May 3. The number of men employed was 2,600; 6,000l. was spent in providing sleeping huts for some 1,100 men, and about 1,200l. in having them vaccinated, and in other incidental expenses, the new hospital being close to one that was full of smallpox patients. The erection of isolation hospitals in times of emergency was very costly. That such emergencies should occur demonstrated the extreme difficulty of accurately estimating the margin to be allowed in the provision for infectious diseases, and more especially in the case of smallpox, the course of which was most erratic.

This applied alike to large and small communities, and as these emergencies were not only possible, but probable, it would always be useful to understand the best methods by which to grapple with them, and thus prevent an outbreak from developing into an epidemic, a result which the Metropolitan Asylums Board had fortunately been able to achieve in connexion with the visitation of smallpox in London during the present year.—In the course of the evening the services of Mr. Thomas Fairbairn, who had been hon. secretary for twenty years, were acknowledged by a presentation, which was made to him, by Mr. Thomas Ross, on behalf of the Association.

A NEW THEATRE IN THE STRAND DISTRICT.—It is stated that Mr. W. G. R. Sprague has been appointed architect by Mr. Murray Carson for a new theatre which the latter intends to build upon a site near the new Gaiety Theatre and Restaurant, which are now being erected in the Strand at the south-east corner of Catherine-street.

ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—At the meeting of this Institution, held at the Westminster Palace Hotel on December 12, the chairman, Mr. Kenneth Gray, presiding, the paper read was on "A New Automatic Railway Coupling Compared with the Existing System upon the British Railways," by Mr. A. T. Swaine, A.M.I.Mech.E., Member. After referring to the Royal Commission Report of 1900 (Prevention of Accidents to Railway Servants), which stated that at the date of issue there was apparently no coupling available suitable for general adoption upon British Railways. The author drew a comparison between the risk of death and injury to shunters with that to a soldier in time of war, showing that the former were 74 times more likely to meet with death or accidents as were the latter from all causes in the late South African War. A short account of the development of the present system followed, and a criticism of its working under various conditions, more especially in the case of the long American type of Bogie waggon, which the author considered were not likely to become generally adopted, unless with a central buffing and drawing gear, as is in use in so many other parts of the world; which should also be automatic to meet the demand of efficiency. The requirements of an efficient automatic system were cited in detail, and reference made to the competition thrown open to the world by the Congress of Representatives of Russian Railways, which is offering prizes for the three best automatic couplings suitable for Russian railways. The new automatic buffer coupler was then described. Called for convenience by its initial letters the A. B. C. system, it was shown to be an exceedingly simple and ingenious piece of mechanism consisting of three parts only, which were precisely alike on both ends of the waggon. To ensure economy in manufacture, it had been designed with the special object of rendering machining practically unnecessary, and was capable of working with the existing side-buffer system during the transition stage; coupling to existing stock was readily effected by means of the pole. The present design of waggon frame was very suitable for the adoption of the new type of coupler with a continuous draw-gear, which would ensure longer life for the waggon and less cost for repairs. The author showed that the conversion could be effected without a large demand upon capital, and estimated that on account of the reduced weight of the new gear and other reasons the advantages of its adoption on British railways would represent about 7½ millions sterling per annum.

COMPETITIONS.

GREENWICH LIBRARY.—In the open competition for the Greenwich Library, Mr. Belcher, the assessor, placed first the design of Mr. Sidney R. J. Smith, of York-buildings, Adelphi, W.C.; and second that by Mr. N. Dinwiddy.

PARK, ST. HELENS.—The first premiated design in the competition for laying out Park, St. Helens, was by Mr. E. Thomas, horticultural designer, Aughton, Lancs.; and the second by Mr. G. Gensel, 184, Bondaries-road, Balham, London, S.W.

LONDON BUILDING ACT, 1894:

IMPORTANT POINT UNDER SECT. 41.

THE Tribunal of Appeal under the London Building Act, 1894, sat at the Surveyors' Institution, Great George-street, Westminster, on Friday last, to hear an appeal by Mr. Harold Walduck, under Section 41 of the Act, against the following resolution of the London County Council, passed on December 3:—"That the Council, in the exercise of the powers under Part V. of the London Building Act, 1894, do not allow a modification of the provisions of that part of the Act with regard to the proposed erection of a building to be known as Nos. 83, 85, and 87, Southampton-row, Holborn, with an irregular open space at the rear and portions of the building to extend above the diagonal line directed by Section 41 of the Act to be drawn, as shown upon the plans submitted with the application of Mr. C. F. Doll, on behalf of Mr. H. Walduck."

The members of the Tribunal sitting were Messrs. J. W. Penfold, A. A. Hudson, and E. A. Gruning. The case for the appellants was conducted by Mr. W. F. Crates, barrister, and the London County Council was represented by Mr. Andrews. On the plans being submitted to the District

Surveyor the appellant was informed that without special permission from the Council the building as shown would, under Section 41, be irregular. The appellant therefore made application to the Council for permission to carry out the work, claiming, in the first place, exemption from Section 41, as principally not applying to public buildings, to which class the present building would belong. In the second place the appellant claimed that the garden ground at the rear might reasonably be regarded as a secured open space. Thirdly, he claimed that the equivalent cubic space for light and air described in Section 41, sub-section 1 (3) was, in fact, provided. Fourthly, the appellant offered to bring his building into conformity with the Act if at any time the open space at the rear should be in any way treated so as to render it no longer available for light and air to this building.

The terms of the application to the Council were that, as the building would, if carried out, extend beyond the diagonal line described in Section 41, permission was asked to vary on the following grounds:—The building contained over 250,000 cubic feet, and was a public building, and was not, therefore, subject to Section 41, which referred to domestic buildings, defined in Section 6, sub-Section 26, as "any building not being a public building or of the warehouse class." The garden ground at the rear was the property of the Duke of Bedford, and had lately been laid out by him as a permanent garden, and although his Grace did not covenant that the space would be maintained as an open space for ever yet that was his present intention, and even if at any time the freeholder thought it desirable to build upon the garden ground, it was competent to form a new roadway, and the site would be suitable for a very small block such as studios, &c. Moreover, an open cubic space of air would be provided at the rear equivalent to the open cubic space which would have been provided if the diagonal line had been drawn from the ground level in the manner provided under Sub-section (3) of this Section, and if no part of such building (except as permitted in the preceding provision of the Section) had extended above such diagonal line. The appellant expressed his willingness to covenant with the Council for himself and his heirs, and assigns on notice from the Council to take down forthwith at his or their own expense and without notice at the termination of the present lease—if not renewed—such portions of the building as might project beyond the diagonal line drawn from a point at the rear boundary 10 ft. above the pavement level if at any time the open space at the rear was treated in such manner as should invalidate it from being considered an open space available for purposes of light and air to the building in question.

Mr. Andrews, for the respondents, contended that the open space required by Section 41 must be in the rear of the building and extend the whole width of the site, and that the proviso of Sub-section 2, of Section 41, dealing with the equivalent open cubic space to be provided at the rear of such building meant a space at the rear of the building. Therefore, in arriving at what was an equivalent space, that at the side of the building must be ignored. The two spaces, or side courts, in the case before the Tribunal could not, he insisted, be taken into consideration in arriving at the equivalent space provided at the rear. He laid stress upon the fact that the section under the Metropolitan Management Act, 1855, dealing with open spaces permitted spaces at the rear or on the side of the building. This section, however, had been repealed, and the provisions of Section 41 of the London Building Act clearly contemplated only the provision of an open space at the rear of a building. He drew attention to the fact that when spaces for lighting were dealt with under Part V they were called courts within a building, and in Section 40 of the Act, which provides for the lighting and ventilation of habitable basements, a special provision was put in that the open space for lighting such basements, notwithstanding anything thereinafter contained, need not necessarily adjoin the rear boundary of the premises. He also dwelt upon the irregularity in the lighting of certain rooms opening into the internal court, and the fact that the portion of the building at the rear had been erected above the 16 ft. level of the pavement. The County Council, he remarked, considered the question of the provision of air-space at the rear was so very important that, in the event of the Tribunal finding that air-space provided at the side of a building was equivalent to air-space provided at the rear, he thought the Council would probably wish to appeal.

After hearing evidence, the Tribunal intimated that they would consider their decision.

CRYSTAL PALACE ENGINEERING SCHOOL.—The "Wilson Premium" for the best Paper read before the Crystal Palace Engineering Society during the present session has been awarded by the Council to C. S. Dowell for his paper on "Torpedoes and Torpedo Craft." Other papers read during the session were "Coal Mining" by A. Colman, and "Motor Cars," by E. Blanco. The premium was presented to Mr. Dowell by Mr. W. H. Maw, M. Inst. C.E., President of the Institution of Mechanical Engineers, on the occasion of the ninth distribution of certificates at the above school, on December 18.

Books.

Egypt Exploration Fund; Archaeological Report for 1901-1902. Edited by F. L. GRIFFITH, M.A. London: Offices of the Egypt Exploration Fund; also Kegan Paul, Trench, Trübner, & Co.; Bernard Quaritch; and Henry Frowde. 1902.

THIS is a summary of the work of the Egypt Exploration Fund and the progress of Egyptology during the year 1901-1902, with the addition of a map of the delta of the Nile, with ancient and modern names distinguished by special type. It will be of interest to all Egyptologists as giving an all-round record of the subjects at present foremost in Egyptology; but there is not much that directly bears on our subjects, the Report dealing mainly with general history and archaeology. We notice, however, one curious memorandum in regard to Imhotep, who is shown by a German critic, Herr Sethe, to have been only regarded as a divinity in later times, while in earlier documents he is referred to as a deceased philosopher, and is proved to have been traditionally the architect and chief magician of King Zeser of the third dynasty, the builder of the pyramid at Sakkareh. "There seems no particular reason," says the editor, "to doubt the truth of this tradition; and Imhotep's tomb may reasonably be looked for at, or near, the centre of his cult at Serapeum." This identification of architect and magician in the same person, and his subsequent elevation to the rank of a divinity, is quite in keeping with what we may imagine as to the mystical element in ancient architectural design.

Building Construction and Drawing. By CHARLES F. MITCHELL. First Stage, or Elementary Course. Sixth edition, thoroughly revised and enlarged. London: B. T. Batsford. 1902.

THIS is another of those books awedly compiled to "assist students" in preparing for various examinations by various Boards. Consequently, if any exception be taken to the treatment of the subject, blame should really attach to the character of the papers set. Mr. Mitchell gives us in an appendix to the volume before us a fair example of such papers. The perusal of them would surely satisfy anybody or anything—but a Board—that they are merely suitable (if suitable at all) to lads engaged in the building trades, and not in the profession of architecture. The tone of the advanced course is just the same—the epithet "advanced" being merely synonymous with "more detailed"—but still narrow—never broad. The book before us typifies the system; and it has had a wide vogue. When we look at the old books of construction, we find ourselves face to face, not only with a mass of information concerning bond in brick and masonry, &c., &c., but with detailed descriptions, "according to the author's devising," of the best and most approved methods of constructing domes, spires, roofs of every description, vaults, and what not. In fact, our forefathers learned how to construct the structure, and left good joiners and plumbers to prepare the place for human habitation. No modern architect will deny the necessity of intimate acquaintance with the various trades whose labours he has got largely to superintend. Nevertheless, he must draw the line somewhere; and, furthermore, he has the right to complain if minor details of the subsidiary building trades force their way into text-books on the science of building, to the exclusion of the larger scientific devices which, sooner or later, should be known to the student, and which it should be his care and delight to improve upon.

In the book before us (with a title suggesting the treatment of the *elements* of the subject) there are numerous plates showing locks and keys, door furniture, tools of every description, down to delicate perspective drawings of the common saw. But ask the student learned in Mr. Mitchell's book how to construct scientifically and charmingly a lantern over a stable or hall, and he is done! As for domes (of simple design) and steeples, no guide is given him.

The chapter on roofs ignores the existence of any with curved braces; and the nature of the hammer-beam roof is not made plain; in fact, it is not dealt with. Now, as a matter of

practice, the exact forms of nuts, screws, water pipe joints, common saws, &c., can be gathered from the piles of building material stacked upon the site of any work in progress. Or it is open to the curious to pursue a course of study on these points in books written upon the special trades involved. Moreover, the precise names of every part of a given piece of fixing and the slang names for every conceivable tool (which form a conspicuous feature in Mr. Mitchell's new edition) can be picked up during those hours of intercourse with labouring hands which every young member of the profession or trade looks forward to as an instructive part of his life. But he ought to be able to find every imaginable way of constructing roofs scientifically and finely (according to the best examples) in his "Building Construction Treatise," where, too, he should learn how to build towers, bridges, vaults, and spires. Many a man never gets a chance of learning these things, either on account of the limited nature of his principal's practice, or because merely draughtsman drudgery is his portion during the most receptive years of his intellectual life.

When we said that the nature of the examinations was largely to blame for this state of things, we spoke truly; but matters are made worse by the fact that certain Educational Boards put on as examiners the very men who write trade text-books, so that the subject is perpetually narrowed by the limitations of both tuition and examination—the whole course of study being, as far as the middle-class architectural student is concerned, controlled by the same or a similar agent.

The particular edition before us is considerably enlarged, but not, we think, to very much real advantage. It is almost a cram-book for the building-trade apprentice, and we cannot honestly recommend it as a scientific book with a wide range (as it should have), to serious students of architecture.

The Modern Carpenter, Joiner, and Cabinet-Maker. A Complete Guide to Current Practice. Prepared under the Editorship of G. LISTER SUTCLIFFE. London: The Gresham Publishing Co. 1902.

THIS is a work upon which it is impossible to pronounce any definite opinion until the publication of the remaining volumes. The two which are already issued contain three out of the proposed sixteen sections, of which the first, by Mr. G. Lister Sutcliffe, deals with "Architectural Styles"; the second, by Mr. Frank Tiffany, with "Woods: Their Characteristics and Uses," and the third, by Mr. A. Macintosh, with "Wood-Working Tools and Machinery"; whilst the two next will be upon drawing and practical geometry. It will thus be seen that the philosophical method has been observed of treating the preliminary subjects in their natural order before proceeding to those which give their title to the work. It is greatly to be regretted that this method was not explained and commented upon by the editor in a good preface.

The importance of the above-mentioned subsidiary subjects to the wood-worker is, of course, sufficiently obvious, except in the case of architecture; but the value of this section—the relationship in which architecture stands to the lesser arts of joinery and cabinet-making—should certainly have been pointed out, if not in a preface, then in the text of the section itself, which seems, however, to have been written merely as though for an independent text-book. It should have been pointed out that the value of some architectural knowledge to the wood-worker is not, as is generally supposed, to enable him to imitate with unintelligent servility Classic and Gothic mouldings, or other architectural details, in an alien material or otherwise unsuitable application; but that it consists rather in some indefinable, but no less salutary, influence on the character of the man and his work, analogous to that of a classical education on literary or professional men. As these, we have been told, require to know "the best that has been thought and said," so does the handicraftsman require to know the best that has been thought and done in times prior, or by genius superior, to his own; not that he may imitate, but that he may understand. Regarding the subject from this point of view, nothing could be more valuable than the brief, but admirable, indication of the subtleties of the Parthenon, on page 8, given, as the author observes, "to show the immense

amount of thought which Greek architects bestowed on their designs, and the great care which the workmen exercised in carrying out the work."

In the two following sections the work is of curiously unequal merit. A glance at the tables of contents, or at the numerous excellent illustrations, would lead one to suppose that the work was of an exhaustive character, but this is by no means the case. What is original, for instance, in the descriptions and rules for identification of the various timbers compares very unfavourably with the admirable key to North American woods published by the United States Department of Agriculture, and here reprinted by permission. The section on tools and machinery would seem to be much the weakest, but that it has yet to be supplemented by those sections which describe their use; for which reason we forbear further comment until the publication of the remaining volumes.

The Woodworker. Vol. I. London: Dawbarn & Ward. 1901-2.

IN illustrated journals of this class there are certain methods of instructing the amateur or professional craftsman which are valuable and legitimate enough; and there are certain others which are illegitimate and absurd. It is an admirable and usually a legitimate method to give illustrated descriptions of work by the best masters, modern or antique, such as is to be seen in our various exhibitions and museums; and in the twelfth number of the *Woodworker* we are glad to see the first of a series of articles on specimens of furniture at the South Kensington Museum. It is a legitimate enterprise, though by no means an easy one, to provide good articles on the elements or technical details of construction in joinery and the allied crafts. It is quite legitimate, and for the amateur it may perhaps be useful, to give directions and working drawings for the construction of such articles as rabbit hutches, bee-hives, or kitchen tables—of articles, that is to say, which are obviously intended to be useful rather than ornamental. But to go further than this—to provide a large number of enthusiastic and often ignorant amateurs with professedly original designs for articles of furniture which are professedly ornamental, the said designs being for the most part anonymous—is a practice which is illegitimate and absurd.

In the first issue of the *Woodworker* is an anonymous and original design for a piece of furniture which is nothing if it is not beautiful—a bedroom overmantel. Whether in itself the design is good or bad is beside the question, though it may be noticed in passing that, since the ornament of this design consists of no less than eight exactly similar parts, it would seem to be adapted rather for the steam-factory than for the amateur's workshop. The point to be noticed is that this design will be accepted as "scripture," and possibly reproduced by a large number of ardent amateurs; and this is a responsibility which should only be undertaken by an acknowledged authority in design, and one who is willing to avow his authorship. But this is not the worst. For this and other such designs, illustrated as they usually are, from photographs of the finished article, it may be argued that, having been produced in the first place for the artist's own purposes, and therefore to the best of his ability, they are not without a certain degree of merit. But it appears further that any reader of the *Woodworker* may obtain, merely for the asking, an original design for any article of furniture that he wishes to make, prepared specially for himself, and published in the correspondence columns of the journal. The incident of the hat and umbrella stand in the April number is a truly comical example of this system, calculated, we fear, to vitiate the nascent taste of the deluded inquirer.

R's Method: Perspective at Sight. London: G. H. Tyndall, and Reeves & Sons. 1902. 2s. 6d.

THIS is a new and ingenious device, the real author of which is a Fellow of the Institute of Architects, for enabling sketchers to draw in perspective without knowing anything of the theory of it, and to some extent to learn perspective by putting it in practice. The materials are very simple; a sketch-book made of bank-note paper, which is sufficiently transparent for the intended purpose and at the same time offers a good surface for pencil drawing; and a few

sh. sheets of paper of the same size (contained in a pocket at the end of the book), ruled with strong black lines, which will show through the paper, to two vanishing points. One of these is placed under a leaf of the sketch book, the sketcher taking a standpoint which will give the building or other object at the same angle (as near as can be judged by the eye) as is shown by the guiding lines on the paper, and draws it following the vanishing lines laid down on the paper, and traceable through the page. The diagrams are arranged for several different points of view, with the plan of the angle given above; and there is also a table showing at about what comparative distance the sketcher should stand from the object for each diagram—a distance relative, that is to say, to the height or size of the object and the scale on which he wishes to draw it.

This all sounds very empirical no doubt; a kind of "perspective made easy"; but as a practical method of initiating a beginner into perspective there is really a great deal to be said for it; those who use it will, in the using, come to perceive, in a natural and easy manner, what perspective really is, and put practice before theory, just as children learn to talk before they understand grammar.

It may be added that by a system of figured measurements at the margins of the diagrams, a plan and elevation to scale can be put into perspective with approximate correctness, without any preliminary construction lines. The thing is very ingenious and may be practically very useful.

A Treatise on Shoring and Underpinning. By C. HADEN STOCK. Third edition, revised by F. R. FARROW. London: B. T. Batsford. 1902.

WHEN the late Mr. Stock's book on "Shoring and Underpinning" first appeared we noticed it as a thoroughly satisfactory book on the subject, giving all that was required and no more. It has since then been the one book of reference on the subject for students.

In his preface to the third edition Mr. Farrow admits that little was necessary in the way of alteration, and that it would have been impossible to rewrite any considerable portion without sacrificing something of that clearness and conciseness which give it much of its value. Extracts from the London Building Act of 1854 have been introduced in the place of those from the Act of 1855, in force when the first and second editions were published; but otherwise little revision has been required.

The Care and Management of Stationary Steam Engines. By CHARLES HURST. London: Crosby Lockwood & Son. 1902.

ALTHOUGH written for men in charge of engines, and especially of mine engines, this little book contains many practical hints that ought to be generally serviceable to steam users. Some remarks upon the presence of water in main steam pipes and the precautions to be taken in opening any steam valve discharging into a long range of pipes, are worthy of perusal even by those who do not propose to become responsible for the management of steam engines. The author makes no attempt to be profound, and the chief merit of his work is its essentially practical nature.

"The Practical Engineer"—Pocket Book for 1903. Manchester: Technical Publishing Co.

IN the present edition of this notebook there are several useful additions relating to the flow of water through pipes, tests of steam turbines, liquid fuel, the production of very low temperatures, and metrical equivalents of feet and inches. Some sections still require revision, and notably those dealings with beams and columns. Very little space is accorded to centrifugal pumps, and the turbine pump does not appear to be mentioned at all. It is a great pity that the index is hidden away among, and printed upon, advertisement pages, and also that it appears to be regarded as subservient to the two indexes to advertisers.

"The Practical Engineer"—Electrical Pocket Book and Diary for 1903. Manchester: Technical Publishing Co.

THE fourth annual edition of this useful and valuable pocket-book contains several impor-

tant additions, notably articles on conduit systems of wiring and on the comparative cost of the working of hydraulic and electric lifts. There are one or two minor points that might be altered with advantage. We come across "frustrum, trigon, tetragon, elonagon (?)" instead of frustum, equilateral triangle, square, and icosagon—if, indeed, a word is wanted for a regular twenty-sided plane figure. In defining a litre (page 276) it is stated that it is the volume of "a cylindrical brass vessel, which at the temperature of 0 deg. Cent., when full, contains one kilogram of distilled water at the temperature of 4 deg. Cent." If this is a correct translation, the Bureau International are not to be congratulated on having evolved a physically impossible definition.

BOOKS RECEIVED.

BENT IRON-WORK. Edited by Paul N. Hasluck (Cassell & Co. 1s.)

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

26.—THE CHEMICAL EXAMINATION OF PAINTS AND PIGMENTS.

IT is impossible to describe in these columns analytical processes for all the pigments, but a description of the methods by which some of the commonest paints and pigments may be analysed, or examined for adulterants, will serve to indicate the lines upon which the examination of paints and pigments generally may be conducted.

Analysis of White Lead Paint or Paste.

Estimation of Turpentine Spirit.—If the paint contain turpentine spirit the proportion of spirit present may be approximately estimated by heating 100 c.c. or 100 grammes of the fluid paint in a small distillation flask to a temperature of 180 deg. C., and collecting the distillate in a graduated cylinder. About 97 per cent. of the turpentine may be collected in this manner, but the remainder undergoes oxidation and will not distil over. An alternate method of estimating the turpentine spirit is to pass steam through a known volume of the paint heated to about 100 deg. C., and to collect the distillate of water and turpentine spirit in a graduated cylinder. The condensed turpentine spirit floats upon the water.

Estimation of Fixed Oil.—Weigh 5 grammes of the sample in a small beaker, add sufficient benzoline (free from any impurity, which will remain as a residue when the benzoline is allowed to evaporate) to completely cover the paint, stir with glass rod, and allow to stand for at least an hour. Decant liquid on to filter-paper. To insoluble residue in beaker add another small quantity of benzoline, allow to stand for some time, and then filter through same paper as before. Continue to add small quantities of benzoline in this way until it is found that a few drops of the filtrate passing through the paper, when collected on a watch-glass and allowed to evaporate, leave no oily residue. Transfer the pigment still remaining in the beaker to the filter-paper and dry it. The oil may be separated from the benzoline in which it is dissolved by distilling off the benzoline by means of steam heat. The oil remains alone as a residue in the distilling flask, and should be dried at 100 deg. C., and weighed when cold. It should be remembered that benzoline is highly inflammable, and must therefore be kept away from the neighbourhood of flames.

Analysis of the Pigment.—Weigh 2 grammes of the dry white pigment from which the oil has been removed, and treat with excess of dilute nitric acid. White lead, chalk, or barium carbonate will dissolve in the nitric acid, but any barium sulphate or white clay which may be present will remain insoluble. Filter, wash, ignite, and weigh insoluble matter, if any be present. To filtrate, add twice its volume of methylated spirit and an excess of dilute sulphuric acid. The lead will be precipitated as lead sulphate. If calcium or barium carbonate were present in the original pigment, the lead must first be separated by precipitation as lead sulphide, as described below. Collect the lead sulphate on filter, wash with water acidulated with sulphuric acid, and finally with alcohol. Find weight of lead sulphate, as

directed in Chapter 24. Multiply weight of $PbSO_4$ obtained by 0.8525 to find weight of white lead ($2PbCO_3 + PbH_2O_2$).

A sample of stiff white lead paste examined in this way gave:—

Oil.....	63 per cent.
Insoluble matter ...	Trace "
$PbSO_4$	109.2 " = 93.09 per cent. white lead.

If carbonate of lime or barium be present as an adulterant in the white lead, these would dissolve in the nitric acid together with the white lead, and calcium or barium sulphate would be precipitated with the lead sulphate upon the addition of sulphuric acid. If, therefore, either of these carbonates have been found, by qualitative analysis, to be present, the nitric acid solution must be evaporated nearly to dryness to remove the excess of nitric acid, two or three drops of hydrochloric acid be then added, and finally about 150 c.c. of distilled water. Sulphuretted hydrogen should then be passed through the solution until all the lead has been precipitated. The barium or calcium will remain in solution.

Collect the lead sulphide on filter paper and wash with water containing sulphuretted hydrogen. The lead sulphide may then be transferred to a clean beaker, dissolved in strong nitric acid, and after dilution treated with alcohol and an excess of dilute sulphuric acid. The precipitated lead sulphate may then be collected and weighed.

To the filtrate from the lead sulphide add excess of ammonium hydrate and ammonium sulphide. Iron or zinc, if present, will be precipitated. Filter, if necessary, and to filtrate add ammonium carbonate. Barium or calcium, if present, will be precipitated as barium or calcium carbonate.

The CO_2 in white lead may be estimated, after removal of any oil which may be present, by means of Schrotter's CO_2 apparatus as described in Chapter 23.

Red Lead may be analysed in the same manner as white lead, but when dissolving the powder, free from oil, in dilute nitric acid, it is necessary to add a lump of sugar, or some other suitable oxygen-extracting substance in order to convert the PbO_2 into PbO ; for PbO_2 is insoluble in nitric acid. To find weight of PbO_2 (red lead) from the weight of $PbSO_4$ obtained, multiply by the factor 0.7535.

Any red brick-dust which may be present will remain insoluble in the dilute nitric acid, while if any oxide of iron be present it will dissolve in the nitric acid and impart a yellow colour to the solution. The iron will not be precipitated with the lead upon the addition of sulphuric acid, and may be estimated in the filtrate from the lead sulphate by boiling the filtrate with a slight excess of ammonium hydrate. The iron will be precipitated as ferric hydrate, and may be ignited and weighed as Fe_2O_3 .

Red Oxide of Iron.—Boil 2 grammes of the dry pigment for half an hour with concentrated hydrochloric acid, and then dilute with water. The oxide of iron will dissolve, leaving sand, red brick dust, or barium sulphate undissolved. Filter, if necessary, and to filtrate add slight excess of ammonium hydrate to precipitate the iron together with any alumina which may be present. The iron may be separated from the alumina and estimated as described in chapter 23.

Zinc White.—Boil 2 grammes with excess of moderately strong hydrochloric acid. The zinc white will dissolve, leaving undissolved any barium sulphate which may be present. Dilute, filter, and pass sulphuretted hydrogen through filtrate. The zinc will remain in solution, but any lead which may be present will be precipitated. Filter, if necessary, and to filtrate add ammonium hydrate and ammonium sulphide to precipitate the zinc as white zinc sulphide. Filter, and to filtrate add ammonium carbonate to precipitate calcium or barium, if present.

Dissolve the zinc sulphide in dilute nitric acid, then add excess of sodium carbonate. Collect the precipitated zinc carbonate, and wash until free from sodium carbonate. Then ignite the zinc carbonate at bright red heat until it has been entirely converted into zinc oxide. Weigh the pure zinc white (ZnO) thus obtained.

Zinc Sulphide.—Estimate the zinc as zinc oxide, as in preceding analysis, and from weight of ZnO obtained calculate the corresponding weight of ZnS . When dissolving the zinc sulphide in hydrochloric acid, note

that bubbles of gaseous sulphuretted hydrogen (which may readily be recognised by its odour) are evolved.

Barytes.—Barium sulphate is not dissolved to any appreciable extent by cold or hot dilute nitric, hydrochloric, or sulphuric acid. If a few grains of barium sulphate be heated with about half an ounce of strong sulphuric acid, the barium sulphate will be dissolved, but if this acid solution of barium sulphate be then allowed to fall, drop by drop, into a beaker nearly filled with distilled water, the barium sulphate will again become insoluble, and appear as a white precipitate in the water. Barium sulphate is the cheapest of the heavy pigments, and is therefore never adulterated; but it is very largely used as an adulterant.

China Clay is not soluble in dilute acids. It may be analysed by the process for the analysis of clays described in Chapter 24.

Whiting.—Whiting and all other forms of carbonate of lime are readily soluble in dilute hydrochloric acid, and may be analysed by the process for the analysis of limestones described in Chapter 23.

Gypsum.—Sulphate of lime is readily soluble in dilute hydrochloric acid. The solution of gypsum in hydrochloric acid may be divided into two portions. In one portion the sulphur may be estimated by boiling with excess of barium chloride solution, and collecting, igniting, and weighing the $BaSO_4$ precipitated from the solution. The second portion may be treated with excess of ammonium chloride, and ammonium hydrate, and then with ammonium oxalate. The calcium will be precipitated as calcium oxalate, which may be ignited and weighed as CaO in the usual manner.

Prussian Blue is insoluble in dilute acids. When boiled with strong sulphuric acid it is decomposed into sulphate of iron and hydrocyanic acid, the latter, which is intensely poisonous, being evolved as a gas. Prussian blue is readily soluble in oxalic acid. When boiled with caustic soda, Prussian blue is decomposed and brown ferric hydrate is formed. If the ferric hydrate be filtered off, and excess of hydrochloric acid be added to the filtrate, and then a few drops of ferrous sulphate solution, a blue precipitate will be produced.

Chrome Yellow.—Chrome yellow consisting entirely of lead chromate will dissolve completely in strong boiling hydrochloric acid, and produce a clear, green solution; but as the solution cools, white crystals of lead chloride will be deposited. When boiled with caustic soda, chrome yellow changes to red, and then dissolves; barium sulphate, if present, would remain insoluble.

Aniline Colours.—Aniline colours and organic colour extracts, when heated to bright redness in a platinum dish, burn away and leave no residue. Sometimes insoluble organic colouring matters are made into soluble paste with the aid of sulphuric acid and soda; in such cases a white ash consisting of sodium sulphate will remain after ignition.

Lamp Black.—Ignite 2 grammes in platinum dish at bright red heat until the whole of the carbon has been burnt off, and the ash remains constant in weight. The ash should not exceed 3 per cent. in common lamp black, nor 0.5 per cent. in vegetable black. In genuine bone black and ivory black the ash may amount to 75 or 80 per cent.

Copper in pigments may be detected by boiling the pigment with dilute hydrochloric acid, removing by filtration any insoluble matter, and then diluting the filtrate and passing sulphuretted hydrogen through it. If copper be present, a black precipitate of copper sulphide will be produced, and this may be collected on filter and then transferred to a beaker and dissolved by boiling with dilute nitric acid. Upon the addition of an excess of caustic soda solution to the boiling solution of nitrate of copper, the copper will be precipitated as black copper oxide, which may be collected on filter, ignited, and weighed.

Arsenic in pigments may be detected by Marsh's test, which depends upon the fact that arsenic enters into combination with nascent hydrogen to form gaseous arseniuretted hydrogen (AsH_3). Antimony reacts with nascent hydrogen in a similar manner, but antimonyuretted hydrogen may readily be distinguished from arseniuretted hydrogen by the test described below.

Marsh's test may be applied in the following manner: Fit a small flask with a gas-tight cork through which passes a thistle-headed funnel, by which acid may be introduced, and also a glass tube bent at right angles for con-

veying the gas from the flask. To the education tube connect a tube containing calcium chloride to dry the gas, and then to the outlet of the drying tube connect a piece of hard glass tube drawn out to a jet at the end most remote from the drying tube. Place some pure zinc in the flask, cover it with water, and then introduce some dilute sulphuric acid. When hydrogen is being continuously generated and all the air has been driven out of the apparatus, the gas may be ignited at the jet. Now hold a piece of cold porcelain in the flame in such a manner that the flame spreads over the surface of the porcelain. If any stain be produced upon the porcelain either the zinc or the acid employed is impure and must be rejected for this test; but if no stain be produced, the flame may be extinguished and a small quantity of the pigment introduced into the generating flask. Again ignite the gas issuing from the jet, and depress the cold porcelain into the flame. If the pigment contained arsenic a brownish-black stain (arsenic) possessing a metallic lustre will be formed upon the porcelain.

If the pigment contained antimony, but not arsenic, a deep dull black stain (metallic antimony) will be formed upon the porcelain.

The arsenic stain may readily be distinguished from the antimony stain by placing upon the stained porcelain a few drops of bleaching powder solution; the stain will disappear if due to arsenic, but not be appreciably affected if due to antimony. If only a portion of the stain be soluble, it is probable that the pigment examined contained both arsenic and antimony.

If the arseniuretted or antimonyuretted hydrogen flame be extinguished and the hard glass tube be heated near the middle by a Bunsen flame, a lustrous mirror of metallic antimony or arsenic will be produced in the colder portion of the tube. Arseniuretted hydrogen has a garlic odour, and is intensely poisonous.

The generating flask used for Marsh's test should be small, in order that all the air may be speedily displaced by hydrogen. Accidents sometimes occur owing to an explosion being produced by the ignition of a mixture of hydrogen and air.

Marsh's test will show the presence of very minute quantities of arsenic. When a pigment containing a large proportion of arsenic, such as Scheele's green, has to be examined, a known weight of the pigment may be boiled with hydrochloric acid. Then dilute with water and filter off any insoluble matter. Through filtrate pass sulphuretted hydrogen until the whole of the copper has been precipitated as copper sulphide, and the arsenic as arsenic sulphide. Filter, and then boil the mixed sulphides with dilute caustic soda solution. The arsenic sulphide will dissolve; but the copper sulphide will remain insoluble and may be removed by filtration. If to filtrate an excess of hydrochloric acid be added, the arsenic will be again precipitated as yellow sulphide of arsenic (As_2S_3) which may be collected on weighed filter paper, washed, dried at 100 deg. C. and weighed.

DIARIES AND ALMANACS.

MESSRS. HUDSON & KEARNS (83, Southwark street, S.E.) have sent us samples of their well-known diaries. The "Architect's Diary" is issued in two sizes (Nos. 12 and 13), No. 13 having two days to a page and No. 12 one; but apart from this the diaries are apparently the same. In addition to the information usually to be found in such publications, they contain lists of Metropolitan surveyors (with official and private addresses); architectural, surveying, and engineering institutions, with the names of their Presidents, &c.; cases of interest to the profession decided in the Superior Courts of Justice during the legal year; and professional practice and charges of architects, &c. The "Builder's Diary," No. 11, has half a page to a day, but it contains useful tables and other information suitable for builders. No. 9 is also a useful diary, similar to No. 11, but with none of the tables and much less information. These diaries, the excellence of which we have often referred to, are ruled and printed in order to suit professional men, and it does not seem possible to improve upon them.

Messrs. Hudson & Kearns have also sent several of their special diary blotting-pads. They are ingeniously arranged, and are not only useful as writing and blotting pads, but also comprise a blotting pad diary and a daily date remembrancer. From long experience

we can speak highly of these pads, especially No. 8a and the bankers' pad.

Messrs. Waterlow Brothers & Layton (24 and 25, Birchinn-lane, E.C.) have again issued their useful and well-arranged "Architects' and Surveyors' Diary." It contains the information usually to be found in a work of the kind, and, in addition, lists of Fellows and Associates of the Royal Institute of British Architects, Surveyors' Institution, Institution of Civil Engineers, &c.; papers on "Redemption of Land Tax," "Commutation of Tithes and Tithe-Rent Charge," "Poor Rates and Assessments," and "Law Relating to Actionable Nuisances," the London Building Act, 1894; Law of Distress Amendment Act, 1895; a Digest of the Principal Acts Relating to Building, &c.; Conditions and Contract on taking Building Land; General Conditions for Building Contracts; Professional Practice and Charges of Architects; Practical Table and Calculations for Estimating and Making Valuations; and other useful information. The diary, of which the issue for 1903 is the twenty-second yearly issue, is published at 3s. 6d. and 6s.

The City Diary for 1903 (W. H. & L. Collingridge, Aldersgate-street, E.C.), is the fortieth edition of a very useful and well-arranged little work, which is published at 1s. The work is a diary in the general acceptance of the term, but, in addition, it comprises a guide to the various municipal, parochial, and social organisations of the City of London. In particular, it devotes especial attention to the Corporation, the City Companies, the London County Council, the Metropolitan Asylums Board, the School Board, and the other rating authorities; and the numerous institutions which represent civic life in its varied aspects. The diary proper has three days to a page, and is interleaved with blotting paper.

"The Railway Diary and Officials' Directory for 1903" (McCorquodale & Co., Ltd.) contains much useful information, especially to those interested in railways. A valuable feature of the publication is the Railway Directors' and Officials' Directory, Traffic Returns, Accounts and Dividends. With the diary, which is published at 1s., is issued a large sheet almanac.

"The Gloucester Diary for 1903" (F. G. Brooke, for the Gloucester Railway Carriage and Wagon Co., Ltd., Gloucester) contains several useful features, including a list of the stations and junctions attended by the Company's wagon repairers.

Messrs. J. Weeks & Co., Ltd., horticultural builders and hot-water engineers (King's-road, Chelsea, S.W.), have published through Messrs. Waterlow & Sons, Ltd. (London-wall) a pocket book and diary for 1903.

The Monthly Diary for 1903 (published at 1s. by Messrs. Bemrose & Sons, Ltd., Snow Hill, E.C.), consists of twelve neat parts, a page to a day, without the usual postal and other information. Each part can be carried in a waistcoat pocket, and put on one side at the end of the month. The Daily Tear-off Calendars for 1903, published by the same firm at 1s. each, are well known and appreciated. They are made to hang on a wall or to stand on a table. The quotations on each tear-off of some of these calendars are often well selected.

Messrs. Ashwell & Nesbit, Ltd., warming, ventilating, and sanitary engineers, London and Leicester, have published a neat Shakespearean tear-off calendar. The date is printed in bold type.

OBITUARY.

MR. CRONK.—We have to announce the death, on the 11th inst., at his residence, No. 4, Mount Ephraim-road, Tunbridge Wells, of Mr. Henry Hickman Cronk, in his sixty-fourth year. Mr. Cronk was the senior partner of the firm of Messrs. H. H. & E. Cronk, of Mount Ephraim-road, Tunbridge Wells, architects. He was employed as architect for the alteration of and additions comprising a new tower, a new south aisle, and an enlarged vestry and south transept to St. John's Church, Tunbridge Wells, increasing the accommodation by 200 sittings, 1896; the Great Hall; the extension of the General Hospital in Grosvenor-road, Tunbridge Wells, first established in 1858, and almost entirely rebuilt, for fifty-four beds, in 1869-70; and, we gather, for the enlargement and alteration, together with decorative and sanitary works, &c., at Claridge House, near Sevenoaks, about ten years ago. His firm prepared the plans and designs for the Byng Hall, Institute, and Baths for the parish and church of St. John, Tunbridge Wells; the Crabb Memorial Institute,

in Victoria-road, of which the foundation-stone was laid on February 21, 1901; and of many private houses, parish-rooms, and similar buildings in the town and its vicinity, including school buildings at High Brooms, Southborough. Mr. Cronk took a prominent share in the conduct of municipal affairs; he was an Alderman of the Council, and served as Mayor in 1893-4.

MR. FORD.—We have also to record the death, on the 10th inst., at his residence in Sidmouth-avenue, Newcastle-under-Lyme, of Mr. George Beadmore Ford, in his seventieth year. Mr. Ford was the senior partner of the firm of Messrs. Ford & Slater, practising as architects and surveyors at Overhouse-chambers, Burslem. Mr. Ford was a son of the late William Ford, of Burslem, builder; after having served his articles to John Ward, an architect at Hanley, he started in business at Burslem, and as his practice increased took Mr. W. F. Slater into partnership. Of the chief architectural work carried out by him and his partner we may instance the Primitive Methodist Institute and Sunday School buildings at Burslem, and the new Wesleyan Schools and Chapel at Basford, near Burslem, for which Mr. W. F. Slater's designs won the first premium in an open competition; the entire scheme comprises the schools, a minister's house, and church, at a total estimated cost exceeding 7,000l. Mr. Ford made the plans and designs for an enlargement of the Wedgwood Memorial Institute, established in honour of Josiah Wedgwood in his native town, of which the late W. E. Gladstone laid the first stone, and which was opened on April 21, 1860, the late R. Edgar being the architect; he was also architect of many school buildings, churches, chapels, and houses in the county of Stafford. Mr. Ford served as Surveyor to the Walsall R.D. Council; having filled the office of Mayor of Burslem in the interval 1883-5, he was elected an Alderman of the Council, and occupied that post until his retirement about two years ago.

GENERAL BUILDING NEWS.

RESTORATION OF ST. CUTHBERT'S CHURCH, THETFORD.—The reopening service of St. Cuthbert's Church, Thetford, was held recently, the work of repair being almost complete. The committee decided to build a new north aisle bordering quite close to the footpath in King-street, but, the space being irregular and limited, considerable care had to be exercised in planning the aisle. It was also decided to remove the old roof and flat plaster ceiling over the nave, which, when carried out, revealed the fact that the rafters were in an utterly rotten condition. The state was so bad that during the progress of the removal some of the beams fell, and demolished what remained of the east gable. The new north aisle is built in similar character to the south aisle, and is divided from the nave by an arcade of four bays, with stone shafts, bases, caps, and arches. There are four new clerestory windows in the north wall of the nave over the arcade. Every fragment of old stone work has been refixed. The old windows have been used, and some old carved stones refixed. The roof of the new aisle has been carried out in pitch pine, covered with boarding and lead. Over the nave a new wagon-headed pitched roof has been constructed, divided into four bays, with moulded principals, and having bosses at the intersections of the panel mouldings. The jamba of what should have been the chancel arch, which were of very poor modern plaster work, have been replaced by new stone jamba, and a moulded stone arch has been constructed so that the piers were of a north aisle and nave have been laid with block pitch-pine flooring. The contract for the north aisle was placed in the hands of Mr. R. Chapman, of Hanworth. The nave roof and other work in the nave were executed by Mr. S. Holden, of Thetford. The stone work for the new aisle and chancel arch was executed by Messrs. R. Hordley, Son, of Thetford, the glazing being executed by Mr. T. Horth, of Norwich, and the plastering by Mr. W. G. Crotch of Norwich. The hot water heating on the low pressure system has been carried out by Messrs. Barnes & Pye of Norwich. The furnace for the heating apparatus is fixed under the vestry, which was built a few years ago, under the supervision of Mr. A. J. Lacey. The gas arrangements were fixed by Mr. J. Hardy, under the supervision of Mr. C. Seelling of the Gas Works. Incandescent lights are used, with Kern burners and Bartlett lighters regulated from the meter. The architect was Mr. A. J. Lacey of Norwich.

NEW BUILDINGS IN ABERDEEN.—The Plans Committee of the Aberdeen Town Council have sanctioned plans of the following:—Dwelling-house on the north side of Anderson-drive, for Mr. Thomas Walker, manufacturer, per Mr. R. G. Wilson, architect; dwelling-house on the east side of Holburn-street, for Mr. John Mitchell, carpenter, per Mr. George J. Milne, architect; two dwelling-houses on the north side of Howburn-place, for Messrs. Cameron & Watt, architects; two dwelling-houses on the north side of Howburn-place, for Mr. William Murray, house proprietor, per Messrs. Cameron & Watt, architects; dwelling-house on the east side of King-street, for Mr. George Stalker, granite merchant, per Messrs. Sutherland & Firie, architects; recon-

struction of business premises at Nos. 37-39, Queen-street, for Messrs. John Bisot & Co., merchants, per Messrs. Cameron & Watt, architects; two dwelling-houses on the west side of Cornhill-road, for Mr. James Davidson, saddler, per Messrs. Brown & Watt, architects; two dwelling-houses on the south side of Devonshire-road, for Mr. John Strachan, shipmaster, per Messrs. Cameron & Watt, architects.

BANK BUILDINGS, INVERNESS.—A new block of buildings is being erected for the Royal Bank at the eastern junction of Union-street and Drummond-street, Inverness. The new buildings comprise not only the bank's own premises, which form the ground floor and basement fronting to Union-street, but also four shops with basements fronting Drummond-street, and two suites of offices extending over the whole of the first floor. The two upper floors will be divided into a dwelling-house and caretaker's premises for the two suites of offices. The plans were prepared by Mr. W. L. Carruthers, architect. The building is, for the most part, built of Moray freestone, but for the first and second story Aberdeen grey granite has been utilised. The cost of the building in its finished condition is about 12,000l. Mr. William Fraser was clerk of works. The contracting firms were:—Mascals, Maclean & Sons; carpenter, A. Anderson & Son; plasterer, A. C. Fraser; plumbers, A. Thomson & Co.; painters, Fowler & Kennedy; electricians, Wm. Ross & Son; electric wiring, Wm. Barker & Sons, Glasgow; electric bells and telephones, Claud Hamilton & Co., Ltd.; grates and ironwork, Rose-street Foundry; fireproof floors, R. A. Stoiffert, Glasgow; heating, Mackenzie & Moncur, Edinburgh; terrazzo paving, the British and Italian Mosaic Co., Glasgow; strongroom fittings, Milners, Ltd.; bank fittings, Maciver & Co., cabinet-makers, Inverness.

THE NEW CENTRAL CRIMINAL COURT.—The foundation stone of the new Central Criminal Court, Old Bailey, was laid on the 20th inst. by the Lord Mayor. The architect is Mr. E. W. Mountford. By a system of mezzanine floors, considerable height is allowed for the larger rooms and offices without the waste of space incurred by giving the same height to the smaller rooms. The various rooms and floors are thus also brought into closer connexion with each other. On the principal (or first) floor the four Courts open upon a central hall to be approached by a grand staircase and surmounted by a dome. An important feature is the private corridor connecting the Court with the various retiring-rooms for judges and juries, and the apartments of the Lord Mayor, Sheriffs, Recorder, and Common Serjeant. A staircase leads from the corridor to the grand jury room below, giving private access for the grand jury to the Courts and for the Recorder to the grand jury room. The police cells are in direct communication with the dock in each Court, and are also wholly shut off from those portions of the building to which the public have access. The Lord Mayor's suite of rooms is upon the principal floor, grouped together at the head of a private staircase leading from the Lord Mayor's entrance, which is screened from the public streets by high gates. The offices for the clerk of the Court are upon the same floor. Upon the mezzanine floor beneath are the two rooms for the clerk of peace, and immediately beneath these again, upon the ground floor, are the indictment office and the rooms of the Public Prosecutor. All are connected with their private staircase, communicating with a separate entrance from the Old Bailey and the record-rooms in the basement. The public secondary staircase also affords ready access to any of these rooms. The principal entrance to the ground floor is from the Old Bailey, and is 12 ft. in width. The grand jury room is at the east end of the Newgate-street corridor, in the quietest part of the building. It is entered through the bailiff's room, and has a private stair leading to the judges' corridor and Courts above. A private entrance for counsel, with staircase and passenger lift communicating with counsel's rooms upon second floor, is provided at the north-west corner. The Lord Mayor's entrance is upon the lower ground floor. A staircase leads to the Lord Mayor's rooms above, and there is room for a passenger lift if thought desirable. Half way up the staircase is a landing with fireplace, which might be used as a reception hall or waiting-room. Two rooms for the police, with a room for the deposit of stolen property, are provided on the Old Bailey front; they have a separate entrance from the street, and communicate by the public secondary staircase with the upper floors. Upon the top floor is the robing-room for counsel; it is approached by a staircase and passenger lift from the private entrance on the ground floor. The various mezzanine rooms adjoin one another and the serving-room. The two kitchens adjoin and are practically one. The judges' corridor and the Lord Mayor's suite of rooms are quite cut off from the public, and the prisoners from the time they enter the yard are completely isolated. In regard to the general construction of the building, the walls will be built of brick, faced externally with Portland stone. The floors throughout will be fireproof, and the various staircases will be of stone. The two large Courts are 35 ft. high to the top of the main cornice, above which the dome rises an additional 5 ft. The two

smaller Courts are 19 ft high to the cornice, and 25 ft to the crown of the arched ceilings. The estimated cost of the buildings is given at 225,173*l*. The building was illustrated in our issue for June 30, 1900.

MUSEUM, CARDIFF.—The proposed new museum buildings for Cardiff are to be erected in Cathays Park. A feature of the building when completed will be the entrance hall and the grand staircase, which will be entered from a recessed portico of three arches. The central hall and staircase, together with the landing of the first floor, will be lighted from above, so that they can be used for the exhibition of works of art, sculpture, &c. From the hall, central doorways give access to wings on the east and west sides respectively, whilst in the rear of the chief staircase, approached from the hall, will be the index hall, which will be some 40 ft. in breadth and 65 ft. in length, and will be capable of being lengthened considerably in the future. Wings for the exhibition of natural history objects will flank this index hall. The hall will be fitted with top-lights and the floor space will be arranged with objects of natural history in cases so placed that they will represent some chief branch of study. The galleries for fine art, oil-paintings, water-colours, &c., will be on the first floor. The archaeological department will probably be accommodated in a sub-basement, which will be specially lighted for the exhibition of Cardiff's collection of inscribed stones and crosses illustrating Celtic workmanship. The buildings will be in freestone, and of a character to harmonise with the municipal buildings in Cathays Park. Mr. Edwin Seward is the architect.

FREE LIBRARY, LEICESTER.—A new Central Free Library is to be erected at Leicester from plans prepared by Mr. Edward Burgess, architect, of Leicester and London. The new building will be situated at the corner of Bishop-street and Bowling Green-street, and the style will, to some extent, be in keeping with the Town Hall. The building will be built partly of stone. There will be two stories and a basement, which is to be utilised as a juvenile reading-room and a juvenile lending department. This portion will comprise a room 32 ft. by 31 ft., and another part of the basement will serve as a patent library, and a place for the reception of bound newspapers, in addition to providing warehousing accommodation. A tea-room for the staff will also be provided, and the whole basement will be lighted from a raised-in-aisle from Bishop-street. The ground floor is approached from the main entrance in Bishop-street, the entrance hall measuring 26 ft. by 15 ft. On the right-hand side will be found the principal reading-room, 76 ft. by 31 ft., where newspapers and magazines will be provided for the convenience of both sexes. At the rear of the entrance hall two doors will give access to the lending library, a double room, 100 ft. in length, and providing space for something like 40,000 volumes. On the first floor, reached by a staircase from the entrance hall, the principal room will be the reference library and reading-room combined. The apartment will measure 76 ft. by 31 ft., and give space for 30,000 books. Arrangements will also be made for a ladies' room, 31 ft. by 21 ft., from which access can be gained to the reference department, and on the same floor will be the chief librarian's room and a committee-room.

BOARD SCHOOL, BRUNTSFIELD, EDINBURGH.—The warrants granted in Edinburgh Dean of Guild Court on the 11th inst. included sanction to the School Board to erect a new school at Viewpark, Bruntsfield. The school, which will be known as Boroughmuir Higher Grade School, will be a three-story building, providing class accommodation for 1,046 pupils. The classrooms will vary in size, from accommodating twenty-five pupils to sixty, and will be placed on the two upper floors, the ground floor being devoted to the laboratories and workshops. Physics and chemistry laboratories will each provide accommodation for thirty-six pupils working at the tables, and will have preparation-rooms adjoining, into which demonstration tables can be placed. There will also be a demonstration-room, suitable for lantern work, and a recreation-room on the ground floor. The workshops, two in number, will be so constructed that by means of a folding partition they may be transformed into one. The central hall of the first floor will cover 50 ft. by 42 ft., and from it access will be obtained to three passages, from which the various class-rooms will enter. Art rooms, fit on the north side, will be situated on the second floor, on which there will also be sewing and cookery-rooms. To the rear on the second floor, a large hall has been made for a large luncheon-room, with kitchen adjoining, and the building will have wide stairs and roomy corridors. It is proposed to ventilate the hall by mechanical means, and to heat it by hot-water pipes. The plans have been prepared by Mr. J. Carrara, architect, Edinburgh.

ST. CYPRIAN'S HALL, BROCKLEY.—This building, after having undergone complete transmutation, was opened on the 21st inst. A new entrance has been formed from the Brockley-road, and what were formerly entrances have been converted into exits. The hall generally has been considerably improved, the walls having been plastered, and a panelled dado, to a height of 4 ft., fixed round the hall. The roof has been treated in colour, giving it a lighter and loftier effect. The hall is lighted by

two large sunlights, by Messrs. Strode, and heated by gas radiators. The stage, which has been reconstructed, is lighted with footlights of rather novel construction for a hall of this kind. Cloak-rooms are provided, and ladies' and gentlemen's retiring-rooms, &c. Mr. Collingwood, of Brockley, secured the contract by competition, and the work has been executed by him from drawings prepared by the architect, Mr. John Jas. Downes, of Lewisham, and under his supervision.

WORKHOUSE INFIRMARY, LYNN, NORFOLK.—The western wing at the new infirmary at the Lynn Workhouse has just been opened. Messrs. Smith & Son were the architects, and the builder was Mr. Cracknell. The new wing is built of red brick. It is intended for the male patients, and contains on the ground and first floors thirty-seven beds in each. Electric light is fitted throughout. On the front of the building is a covered verandah.

ASYLUM BUILDINGS, BROOKWOOD.—The Bishop of Winchester dedicated recently the new buildings at Brookwood County Lunatic Asylum, which have been erected at a total cost of between 80,000*l*. and 90,000*l*. These buildings comprise additional men's and women's blocks, and a new chapel, the work having been carried out by Messrs. Rudd & Son, of Grantham, from the designs of Mr. Frank G. Howell, County Surveyor, Mr. Geo. Atlee acting as clerk of the works. The asylum now contains 435 male inmates and 640 female inmates, and a considerable number of Surrey patients are boarded out at similar institutions elsewhere. These patients will now be accommodated at Brookwood, the new male block providing accommodation for 146 inmates and thirteen attendants, and the female block for 201 inmates, ten attendants, and twenty-four nurses. Both are three-story buildings. The day-rooms, dormitories, and single-rooms are well-lighted and ventilated, and pleasant quarters are provided for the attendants and nurses, the latter having a block to themselves. The lavatories are contained in spurs, quite detached, except for a single entrance, from the main buildings. The accommodation on the women's side is more self-contained than on the men's, and includes a dining-room, 55 ft. by 30 ft., a sewing-room, and other conveniences. The additions are built of brick, with slated roofs, and are fitted throughout with electric light. The chapel is in the Early English style, capable of seating 850 people. It is built of yellow brick, relieved with red brick string courses and mouldings, and has a slated pitch pine roof, supported on columns of Portland stone. There are nave, north and south transepts, chancel, organ chamber, vestry, and ante-room at the west end, and the pews are of pitch pine on wood block floors. The aisles and chancel are tiled, and glazed tiles of art shades line the chancel walls. The reredos and font are of Caen stone, and the pulpit is of pitch pine, while the heating and lighting are the same as elsewhere. Lead glazing and cathedral glass are used throughout.

DUNDEE BUILDING TRADE.—The building trade in Dundee during the past year has been somewhat fitful; there has been a marked shrinkage as compared with the previous twelve months, tending, according to experts, to a period of depression, the extent and consequences of which, at the moment, can scarcely be determined. During the period under review, operations, generally speaking, have not been widely diffused, but in the main have concentrated on one or two large contracts without which the trade would have been badly off. Outside of these little new work, of a kind adding to the architectural features of the city, has been inaugurated.

COTTAGE HOSPITAL, RHYMNEY.—The foundations of a new cottage hospital for Rhymney have just been laid. The building, which will occupy a frontage of 93 ft. will be constructed of brick. On the ground floor there will be sixteen rooms, comprising two wards each fitted with four beds. The usual offices are attached to each ward. A corridor 7 ft wide runs along the main building, connecting the patients' receiving-room and the operating-room with the wards. There are also on the ground floor a committee-room, the matron's sitting-room, staff dining-room, kitchen, store-rooms, pantry, scullery, &c. On the first floor there are three bedrooms, attendants' room, bathroom, lavatories, &c. Intervening between the two main blocks of buildings is a building 31 ft. in length. The whole of the grounds will be enclosed by a boundary wall, having one main entrance and two minor doorways. The estimated total cost of the building is 2,285*l*. The contract is in the hands of Messrs. W. Williams & Sons, New Tredegar and Bargoed, the architect being Mr. Llewellyn Smith (Messrs. Llewellyn Smith & Davies), Aberdare.

SANITARY AND ENGINEERING NEWS.

BACTERIAL TREATMENT AT REIGATE.—Colonel Coke, R.E., held a Local Government Board inquiry on the 10th inst. into an application of the Reigate Corporation for a loan of 14,000*l*. for works of sewage disposal. The Town Clerk stated that it was proposed to adopt the bacterial system, and that method of precipitation followed by land treatment had given rise to serious complaints owing to the land having become sewage sick. Accordingly in 1898 an experimental bacteriological installation was laid down, various methods being tested, and

so satisfied were the Council with the results obtained from bacterial oxidation beds fed with the Candy sprinklers that they desired to carry out that system for the treatment of the whole of the sewage of the Borough. Samples of the effluent obtained from the system they proposed to adopt had been analysed by Dr. Jacob, Medical Officer of Health, and Dr. Stevenson, the eminent Home Office Analyst, whose reports were extremely satisfactory. Mr. F. T. Clayton, the Borough Surveyor, explained fully the details of the scheme, which comprises preliminary treatment of the sewage in catch tanks, followed by filtration through bacterial oxidation beds fed by Candy-Whittaker Revolving Sprinklers. The filtration will be double, firstly through coarse beds and then through fine beds with the oxidising material polarite, on the lines of the trial installation which has been in successful operation for four years, and with which the Borough Surveyor expressed himself fully satisfied. The new scheme, Mr. Clayton stated, would result in a direct saving of about 100*l*. a year to the Borough, and indirectly, in a further considerable economy. Dr. Jacob, Medical Officer of Health, gave evidence that he had examined samples of crude sewage and effluent. The crude sewage contained brewery refuse, and also a very large quantity of tannery refuse, yet the effluent was always perfectly satisfactory, odorless, and below the standard adopted by experts. The effluent was good enough, Dr. Jacob went on to say, to be turned direct into the stream. Dr. Stevenson's report, giving the chemical and bacteriological analyses of the effluent from the trial works, was read, and showed 94 per cent. of chemical and over 98 per cent. of bacteriological purification. It is interesting to note that there was a very marked reduction in the bacilli, coli communis, and in the spores of the bacillus enteritis sporogenes, while previous bacteriological investigations by Dr. Griffiths showed that the Candy Sprinkler system destroyed the typhoid bacillus. The Mayor, Ex-mayor, and Chairman of the Sewage Farm Committee all expressed their approval of the scheme, on which the Ex-mayor remarked the Council were unanimous. At the conclusion of the inquiry Colonel Coke complimented Mr. Clayton upon his plans, and then visited the sewage farm, and inspected the existing works and the bacterial installation.

FOREIGN.

FRANCE.—Among the important works which the Conseil-Général of the Seine has in contemplation is the complete opening out of the Palais de Justice, a work which will cost nine million francs; and a similar operation in connexion with the Halles Centrales, at a cost of eleven million francs.—M. Mercier, the sculptor, has at last completed the model for the monument to Alfred de Musset, to be presented by M. Gairin to the city of Paris, and to be erected on the Place du Théâtre Français. Musset is represented as at the age of twenty-five, seated on a bench with a cloak drawn round him; a female figure behind seems to symbolise his future fame.—M. Willette obtained the first prize in the recent "Signs" competition.—M. Moyaux has been elected President of the Société Centrale des Architectes for 1903. The Vice-Presidents are MM. Lucien Etienne, Ch. Gautier, and Frantz Blondel (of Versailles).—M. Guilbert, the architect of the memorial chapel on the site of the Charity Bazaar fire in Rue Jean Goujon, has been commissioned to erect, at the other end of the site, an Armenian church, which will be in some sort a pendant to the building. It will probably be completed in 1904. It will be in a severe Byzantine style, the centre roofed with an octagonal dome. The interior decoration will, according to the Armenian rite, be limited to some sculptured friezes and marble columns.—The new museum at the Petit Palais was formally opened on the 11th inst., and will now be open to the public from 10 to 4 every day, Mondays excepted.—A large new Post Office building is to be erected at Limoges.—The Hospice Debrousse, in the Rue de Bagnole, Paris, is to be enlarged, at a cost not to exceed 1,300,000 francs.—The following six architects have been awarded premiums by the jury selected to judge the annual competition in street fronts at M. Dupommereille (for house 201st Boulevard St. Germain); M. Fiquet (for 40 Rue Condorcet); M. Labro (for 6 Rue de l'Abbaye); M. Lavrotte (for 20 Avenue Rapp); M. Noël (for facade in Place des Saussaies); and M. Pasquier (for 199th Boulevard St. Germain).—M. Francois, a pupil of M. Moyaux, has obtained the prize founded by Americans at the French architecture.—The subject was "A Hotel for travellers in California."

—M. Israels has been elected a foreign associate member of the Académie des Beaux-Arts, in place of the late Russian sculptor Antolsky.—In the exterior galleries of the Trocadéro an exhibition is to be arranged of illustrations of foreign architecture, grouped according to epochs corresponding to the main epochs of French architecture.—The Municipal Council of Paris has voted a sum of 380,000 francs for the completion of the Mairie of Montmartre.—Local schools of architecture are to be opened at Lille, Rouen, Rennes, Nancy, Lyons, Bordeaux, Marseilles, and Toulouse.—M. Vibert

has just completed a fine statue of "Liberty" intended for the Federal Palace at Berne.—A monument to Erckmann, one of the joint authors of the well-known war romances, was inaugurated last week at Lunéville. It is the work of M. Busire, a Lorrain sculptor, and shows a portrait bust of Erckmann on a stele, in front of which is a young woman in Alsatian costume representing the heroine of one of his romances.—A new Fine-Art School is to be erected at Nancy. It will probably be the subject of a public competition.—Important works are to be taken in hand for the sanitation of Toulon, at a cost of 3½ million francs.—M. Gondonnier has been elected President of the 1903, of the Society of Architects of the North of France.—The death is announced, at the age of fifty-eight, of M. Emile Ullmann, Divisional Architect of the Department of the Seine. He was a pupil of Hippolyte Lebas and of M. Glinat, and obtained the Grand Prix de Rome in 1871. Though in bad health for some time back, he had kept in the service, and had just completed an important plan for the enlargement of the Palais de Justice.—We have also to record the death, at the age of eighty-seven, of M. Alfred Isidore Pibourg, architect, of Chartres. He had been a pupil of the Ecole des Beaux-Arts and in the atelier of Huyot, and from 1850 to 1875 had occupied the position of architect at Chartres, where he built the municipal theatre and the library. He was also architect for a good many important private works, notably the Château de Marcoville. He had been for exactly half a century a member of the Société Centrale des Architectes.

NEW ZEALAND.—The South Australian Government are about to construct a harbour at Light's Passage, Port Adelaide. The Act providing for the construction places the cost at half a million sterling. The tenders are to be made returnable on December 2.—Her Majesty's Theatre, Sydney, is to be rebuilt from designs by Mr. Pitt an architect of the City of Sydney. The plans have already been approved by the City Surveyor.—A return by the Legislative Assembly of New South Wales shows that the total expenditure in respect of roads in the metropolitan district of Sydney for 1901-2 was £63,361.—The Burns Memorial Committee in Sydney propose to invite tenders from Australian and British artists for the erection of a suitable memorial in honour of the Scottish poet, in that city.—A handsome memorial in white marble has been erected in Sydney Town Hall by the officers and men of the New South Wales Naval forces, to the memory of the members of the New South Wales Naval contingent who lost their lives on active service in China. The work was executed by Messrs. Ross & Bowman, of Pitt-street, Sydney.—Municipal buildings, from the designs of Mr. G. M. Pitt, jun., architect, of Pitt-street, Sydney, are to be erected at Narromine. They will consist of a large public hall, council chambers, and offices.—Large police buildings, on the site of the historic police offices, Phillip-street, Sydney, are about to be erected. The plans have been prepared by the Government Architect, and have been approved by the Minister for Public Works.

GERMANY.—Eight large statues are to be placed in the interior of the new Berlin Cathedral, by order of the Emperor. The cathedral faces the Royal Palace, and the subjects to be represented are Luther, Melancthon, Zwingli, Calvin, Frederick the Wise, Joachim II., Philip the Magnanimous of Hesse, and Duke Albrecht of Prussia, Grand Master of the Teutonic Order.

AUSTRIA-HUNGARY.—The Croatian-Slavonic Company are erecting large business premises in Agram, and have invited competitions from Austrian and Hungarian architects. Three premiums are offered, namely, 2,500, 1,800, and 1,200 kronen, and the competition closes on January 25.

GREECE.—Designs are invited by the Greek Consul-General in Vienna for a new church to be erected in Patras. The competition is open to architects in all parts of the world, and is to close on January 31. The premiums are 10,000, 4,000, and 2,000 francs for the first three selected designs.

INDIA.—The Viceroy recently presided at a meeting in the Calcutta Town Hall, which was held to discuss the question of the memorial to Sir John Woodburn, the late Lieutenant-Governor of Bengal. Amongst the suggestions most favourably received were a hospital and a statue.—A new railway station has been opened at Kalyanpur on the Eastern Bengal State Railway.—Surveys in connexion with irrigation schemes are to be undertaken in South Behar.—The Secretary of State has sanctioned the construction of the East Indian Railway from Shikhabad to Farukhabad, a distance of about sixty-six miles.—Office and house accommodation for the District Traffic Superintendent and District Engineer at Delhi are about to be erected at a cost of 35,000 rupees.—The India Government is about to erect a small-arms factory at Ishapur in Bengal, which is intended to make India independent of England, so far as the manufacture of small arms is concerned.—The Madras cement works have been considerably enlarged to meet the fast growing demand in the South of India.—Official investigations have shown that it will cost a crore of rupees to remove the bars

in the Hooghly river.—The authorities of the Southern Indian Railway have sanctioned the plans and estimates for a new terminal station at Egmore.—A sanatorium for the open-air treatment of military men suffering from tuberculosis is about to be established at Ranikhet.

MISCELLANEOUS.

SOCIETY OF ARTS.—The Council of the Society of Arts, acting on the recommendation of the judges appointed by them—Sir William H. Preece, K.C.B., F.R.S., Mr. Robert Kaye Gray, and Mr. Alexander Siemens—have awarded the Fothergill prize of 50l. together with a silver medal, offered for an essay on "Existing Laws, By-laws, and Regulations relating to Protection from Fire, with Criticisms and Suggestions," to Mr. T. Brice Phillips, Sanitary Inspector to the Uckfield Rural District Council, of 4, Ayleford-terrace, Uckfield, for the essay, bearing the motto, "Fiat Lux." The Council have also awarded the prize of 10l. with a bronze medal, to Mr. George H. Paul, Lydford, Cyprus-road, Finchley, N., for his essay bearing the motto, "Ariston Metron"; and a similar prize to Mr. W. Craig Henderson, D.S.E., 1, Brick-court, Temple, E.C., for his essay bearing the motto, "Sola Virtus Nobilitat." These two essays being considered to be equal in merit. They also consider the essay sent in by Mr. Captain Arthur W. Shaw, 15, St. James's-circus, E.C., bearing the motto "Fuego," to be worthy of honourable mention. The judges reported that the essays were on the whole of a meritorious character, and, generally, of a high class. It is proposed that the prize essay should be read as a paper at one of the ordinary meetings of the Society of Arts.

AN IMPROVED PROTRACTOR.—A labour-saving drawing instrument recently introduced by Mr. F. Seaton-Snowdon, is a circular protractor by whose aid the trigonometrical ratios of the angles measured may be read at a glance. For this purpose the protractor is divided into four quadrants, on the first being given the sines and cosines, on the second the tangents and cotangents, on the third the secants and cosecants, and on the fourth the versed sines and covered sines. It is contended by the inventor that the instrument not only saves the expenditure of time involved by the calculation, or by the hunting up of ratios in books of reference, but that its frequent use will help to impress such values on the memory of the operator.

INCORPORATED CHURCH BUILDING SOCIETY.—This Society held its usual monthly meeting on Thursday, the 18th inst., at the Society's House, 7, Dean's-yard, Westminster Abbey, S.W., the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of enlarging or otherwise improving the accommodation in the churches at Ravensthorpe St. Saviour, near Dewsbury, Yorks, 200l. in lieu of a former grant of 100l.; Field Dalling St. Andrew, near Holt, Norfolk, 30l.; Fordington St. George, near Dorchester, 30l.; Hoxton St. John-the-Baptist, Middlesex, 40l.; Maudes St. John-the-Evangelist, near Newport, Monmouth, 80l.; Skegness St. Matthew, 20l.; Toynton All Saints near Spilsby, 10l.; and Weston-on-the-Green St. Mary, near Bicester, 10l. A grant was also made from the Mission Buildings Fund towards enlarging May Hill Mission Church in the parish of Taynton, Glos., 10l. The following grants were also paid for works completed:—Crosshall Moor St. Barnabas, near Huddersfield, 200l. on account of a grant of 1,000l.; East Ham St. Bartholomew, Essex, 750l. on account of a grant of 1,000l.; Plumstead St. Mark, Kent, 500l. on account of a grant of 1,000l.; Gorehill St. James, near Rotherham, Yorks, 40l.; Landulph St. Diphne and St. Leonard, near Hatt, Cornwall, 30l.; Friern Barnet St. John, Middlesex, 140l. on account of a grant of 175l.; West Dereham St. Andrew, near Downham Market, Norfolk, 15l. on account of a grant of 25l.; Witton-le-Wear St. Philip and St. James, Durham, 50l.; and Leyton Christ Church, Essex, 100l. In addition to this the sum of 203l. was paid towards the repair of fourteen churches. The Society likewise accepted the trust of a sum of money as a repair fund for Holy Trinity Church, Marylebone, Middlesex.

ST. BARTHOLOMEW THE GREAT, WEST SMITH-FIELD.—Adverting to our recent "Note" upon the proposed rescue from destruction of the remains of the cloisters, we may mention that on December 12 last a petition was brought before the Consistory Court of London by the rector and churchwardens. In the result, Dr. Tristram, K.C., Chancellor of the Diocese, agreed to grant a faculty to sanction an agreement for the purchase of certain stables and land abutting on the south-western corner of the church for the purpose of reclaiming a portion of the alienated waterside, and of protecting the church from the risk of fire. Three sines of the cloister stand on the property of which the petitioners expect to secure the reversion, and when possession has been obtained they propose to connect the property with the church by means of the original cloister doorway, and to stipulate (with other provisions) that some new buildings which the owners of the adjoining property are about to erect shall be kept some 10 ft. away from the church. The price to be paid for the land is 684l., which includes the purchase of a ground-rent of 12l. per annum, and it is hoped that, by negotiation, possession will be obtained before the expiration in 1926 of the current lease of

the premises. The stables, which contain the original cloister arches, are now 7 ft. above the original level of the church. It was stated in court that a sum of 33,000l. has been expended during the last few years upon the restoration and rehabilitation of the fabric. The faculty will sanction the construction, from the height of 30 ft. to 52 ft., of four flights on each of two storeys of some buildings in the Close and overlooking the churchyard, and a covenant will be made to prevent the erection of any building against the tower.

CHURCH OF ST. THOMAS, CITY-ROAD.—A faculty will shortly be issued for enlarging the chancel, changing the position of the organ, choir vestry, and pulpit, and for other alterations and improvements, at an estimated cost of 1,000l. The church was built, for 800 sittings, after Sir G. G. Scott's plans and designs, and consecrated on April 11, 1848. It is distinguished by a fine steeple, and contains some good stained glass in a pair of lancets above the west window (by Clutterbuck), and in the east window (by Michael O'Connor, 1866). In 1866 Street improved the chancel and sanctuary, extended the porch, and made designs for the reredos.

CHURCH OF ST. GEORGE, CAMPDEN HILL.—A faculty has been granted by the Consistory Court to authorise the carrying out of some alterations and improvements of this church. The new works will include a side chapel for the use of small congregations. The church was built, upon the plans of Campden Hill, in 1863-4, after plans and designs in the French Gothic style by Keeling, and has sittings for 1,100 worshippers.

CHAPEL OF ST. PHILIP, REGENT-STREET, S.W.—Application will be made in the ensuing Session for leave to bring in a Bill for the compulsory extinguishment of all existing interests in the use of, with its pews, vaults, and cellars, now enjoyed by any persons other than the trustees, and for the vesting of the chapel and its site in the trustees solely. The Bill will also empower the trustees—the Bishop of London and the Rector of St. James's, Westminster (who are patrons of the incumbency)—to sell and dispose of the chapel and its site, and provides for the payment of the purchase moneys to the Ecclesiastical Commissioners, who will deal with claims for compensation arising out of the extinguishment of such existing interests. The chapel was erected in 1819-20, at a cost of about 15,000l., after G. S. Repton's plans and designs. The building is conspicuous for its Classic portico, and a tower copied from the Choric Monument of Lycistrates in the street of the Tripods at Athens, which is often, albeit erroneously, called the Lantern of Demosthenes. The west façade carries the, perhaps, strictly classical, but somewhat incongruous, sacrificial emblems of the skulls of oxen.

A MECHANIC'S ALMANAC.—We have received the thirtieth annual issue of Calvert's 'Mechanics' Almanac, a cheap little publication (4d.) which contains an almanac bound up with a good many short papers on practical subjects; tables of strengths, working loads, notes on gearing, belting, and many other subjects of mechanical interest.

POLYTECHNIC SCHOOL OF ARCHITECTURE.—On the 19th inst. Mr. Thomas Blashill presented the medals, book prizes, and certificates awarded by the Science and Art Department and the Board of Education to the successful students of the Polytechnic School of Architecture. Mr. Edward White, L.C.C., who presided, congratulated the pupils not only on their successes, but on the excellent teaching which they must have received. During the past session the number of attendances at the school reached the gratifying total of 47,216, a steady increase as compared with previous years. Among the recent successes are twelve honours science passes, eight national prizes, and silver medals for carpentry and joinery, masonry and brickwork, given by the City Guilds and the Carpenters' Company, and four out of the seven silver medals awarded by the Royal Academy schools. Through the instrumentality of Mr. Alfred Waterhouse, R.A., President of the school, and the Fellows of the Royal Institute of British Architects, a series of visits had been made by the students to the new Roman Catholic Cathedral at Westminster, the Post Office Bank buildings in Addison-road, and other large buildings in progress, for the purpose of enabling the latest phases of construction to be seen under the best conditions, while actual examples of Greek and Roman art had been inspected at the British Museum. One of the students obtained first place in the October open competition for draughtsmen in the surveying branch of the Board of Agriculture; in the two most recent examinations held by the Royal Institute of British Architects, twenty-one, six, and four places in the preliminary, intermediate and final stages respectively have been awarded to present or past Polytechnic students; and as showing the importance attached by the L.C.C. to the school, the value of the scholarships granted by that body to the students now in attendance amounts to 170l.—*Morning Post.*

ARCHITECTURE AND ART IN AUSTRALIA.—In regard to the position and employment of architects and artists in Australia, the *Year-Book of New South Wales* says:—"There appears to be a strange fascination in the study of architecture, for the number of architects in New South Wales is out of all proportion to the demand for their services, despite the

steadily increasing activity in the building trades. Most of the Australian architects have travelled a great deal, and have comparatively little to learn. They all have pupils of more or less promise, and many others are receiving instruction in the Sydney Technical College or in private classes. Hence professional architects intending to settle in the colony would find the ground almost wholly covered. Even in interior decorative work there is no lack of designers or artists, but the expenditure in this direction in Australian buildings is comparatively limited. Stained glass is mostly imported, but some is manufactured locally, although not to an extent sufficient to encourage the immigration of designers or skilled workers." In regard to art generally, the *Year-Book* continues:—"Although a taste for art is being rapidly developed in New South Wales, it has not reached that point at which it becomes the custom of the opulent classes to decorate the walls of their mansions with pictures specially painted for them, their expenditure being chiefly in the direction of costly artistic furniture and interior decoration. There are numerous teachers of drawing, painting, and the decorative arts, in Sydney and the leading cities and towns, but few obtain more than a modest competence. In Sydney there is an art society annually subsidised by the Government, several hundred works in oil and water-colour being displayed at the periodical exhibitions, but the number sold at even moderately remunerative prices is limited; hence there is a tendency on the part of the more talented members to quit the State and seek their fortunes in Europe or America."

ANGULAR DRILLING APPARATUS.—The "Kinemat Apparatus" is a simple and ingenious device for rapidly boring or drilling square and other angular holes in materials such as steel, iron, brass, wood, and stone, and it can easily be attached to any drilling machine or lathe. We have recently inspected an example of this invention as applied to a drilling-machine, and can therefore vouch for the facility with which square and other polygonal holes may be drilled in metal. In the ordinary way the most general method of making a square hole in metal is to drill a round hole, afterwards cutting or filing away material to secure the desired rectangular form. Punching-machines may also be employed, but the work performed by them is not particularly accurate, and punching is a naturally another useful aid for the formation of rectangular or polygonal holes, but the slotting process is necessarily slow and costly. In consequence of the trouble and expense attaching to the cutting of angular holes they are usually avoided as far as possible in engineering work, sometimes when their employment would be attended with distinct advantage. By the aid of the apparatus to which we now direct attention, square holes can be drilled as easily and as cheaply as round ones. The Kinemat apparatus comprises a clamp which is fitted to the spindle-bearing of a drilling machine, at the end of the clamp is fixed a drill-guide furnished with adjustable cheeks which partly control the size and form of the hole to be drilled. On the head of the drill spindle a cross-head is attached by screws, and on two friction rollers secured thereto, another cross-head is carried into which the drill is screwed. The latter cross-head, revolving with the drill, is free to move backwards and forwards in a horizontal direction, the movement being governed by the shape of the opening formed by the cheeks in the drill-guide, and by the form of the drill shank. Thus the drill continually changes its position with regard to the centre axis of the spindle, with the result that the cutting edges of the drill follow a course precisely coinciding with the form of the hole presented by the drill-guide. When the apparatus is used in connection with a lathe the drill is attached to the spindle of the poppet-head, the clamp and drill-guide are bolted to the face-plate, on which also is secured the work to be drilled. The invention is already being manufactured and used on the Continent, and it was awarded a gold medal at the Nuremberg Exhibition this year.

LEGAL.

STRAND IMPROVEMENT SCHEME—INSANITARY PROPERTY.

MR. CORRIE GRANT, on the 19th inst., moved, before a Divisional Court of King's Bench, composed of Mr. Justice Lawrence and Mr. Justice Ridley, on behalf of the London County Council for a rule for a mandamus directed to the High Bailiff of Westminster requiring him to summon a jury to determine the compensation to be paid to two claimants—Miss Elizabeth S. Burgess and Mrs. James Cross.

Mr. Grant said the point was whether the claimants could take the secret offer of the Council after the jury had given a part of their verdict. Under the Lands Clauses Act the promoter of an undertaking was bound to give to the claimants a sealed offer, such offer not to be disclosed to the sheriff—in this case the High Bailiff of the Liberty of Westminster or the jury. The reason of that was that, if the jury awarded the same or a less sum than that contained in the sealed offer, then the claimants were to bear half the costs of the inquiry. The case had

never yet been decided up to what point a claimant could go in the proceedings and then stop and take the sealed offer. In this case the London County Council, by the London County Council Improvement Act, 1899, were authorised amongst other things to make a new street from Holborn to the Strand, and were empowered to take a house, No. 19, Vere-street. Notice had been served upon the claimants to treat the property as insubstantial. The jury found the property to be insubstantial, and the claimants then desired to accept the sealed offer and the High Bailiff stopped the proceedings. The London County Council objected and, considering the question one of importance, applied for a rule.

Their Lordships granted the rule nisi asked for.

SERIOUS REVERSE FOR A TRADES UNION.

THE hearing of the case of the Taff Vale Railway Co. v. the Amalgamated Society of Railway Servants and others concluded before Mr. Justice Wills and a special jury in the King's Bench Division on the 19th inst.

The action was brought by the Taff Vale Railway Co. against the Amalgamated Society of Railway Servants, Richard Bell, M.P., its General Secretary, James Holmes its Organising Secretary, Philip Hewlett, George Alcock, and John Pücher, the Trustees of the Society. The plaintiff Co. claimed damages against all the defendants (except the trustees) for maliciously and unlawfully conspiring together to molest and injure the plaintiffs in their business, and for maliciously and wrongfully procuring certain of the plaintiffs' servants to break their contracts of service with the plaintiffs, and for maliciously and wrongfully watching and besetting the plaintiffs' works and approaches thereto and the places of residence of the workmen employed by plaintiffs or proposing to work for the plaintiffs, and divers other places, including the Great Western Railway station at Cardiff, for using violence and intimidation towards the plaintiffs and their servants, and for preventing persons from working for the plaintiffs and for otherwise committing violation of the legal rights of the plaintiffs. The plaintiffs also claimed an injunction restraining a repetition of any of the before-mentioned acts. The claim arose out of the alleged connexion of the defendant Society and its officials with a strike on the plaintiffs' railway in August, 1900, whereby it was alleged that the plaintiff company had suffered a loss of some 28,000l.

The trial lasted several days, and in the result the jury, in answer to questions left to them by the learned judge, found that the defendants did conspire together to molest and injure the plaintiffs by unlawful means; that all of the defendants did unlawfully persuade the men whose notices had not transpired to break their contracts; and that all of them authorised and assisted in carrying out the strike by unlawful means.

The assessment of damages was left by consent to the Judge, and this question, together with the questions of law were ordered to stand over till next term, the present injunction being continued until the further consideration.

Sir Edward Clarke, K.C., Mr. B. Francis-Williams, K.C., Mr. Eldon Banks, K.C., and Mr. Holman Gregory, represented the plaintiffs; Mr. Rufus Isaacs, K.C., Mr. S. T. Evans, K.C., Mr. Edmond Browne, and Mr. A. Clement Edwards, represented the defendant Society, Mr. Richard Bell, M.P., and the trustees; and Mr. Abel Thomas, K.C., Mr. R. Bowen, and Mr. Morgan Morgan represented the defendant, James Holmes.

NORTH WALES BOUNDARY-WALL DISPUTE.

THIS case of Mellor v. Heenan came before the Court of Appeal composed of the Master of the Rolls and Lords Justices Romer and Mathew, on the 19th inst., on the appeal of the defendant from an order of Mr. Justice Darling granting an interim injunction restraining him from proceeding with the erection of a boundary-wall, which he had commenced, till the trial of the action or further order.

Mr. W. H. Upjohn, K.C. (with him Mr. Hewitt), in support of the appeal, said that the plaintiff and the defendant were the owners of adjoining property at Colwyn Bay, North Wales. The defendant had just completed some additions to and alterations of his house, and he proposed to occupy the house himself. The house on the adjoining property was used as a lunatic asylum, and the defendant provided, not unnaturally, in the contract with the builder, that there should be a fairly high wall between his property and the plaintiffs'. Before starting the wall the defendant communicated with the plaintiff, and the evidence was that there was a meeting on August 16, at which an agreement was come to between them as to the exact site the wall was to occupy. This agreement was acted upon by the defendant, and the wall, which was to be about 10 ft. high, had, when this injunction was obtained, reached about 4 ft. Previously, a quick-set hedge had divided the property, and on the plaintiff's side of the hedge there was a ditch. That ditch had been filled up some time ago by persons on the plaintiff's side, and communication between the parties commenced with a complaint by the defendant of the filling up of the ditch and the use

by the plaintiff to some extent of the site of the ditch. The plaintiff did not deny that the ditch had been filled in, but said that the act was done because the defendant's predecessors in title had been negligent. The hedge had always been trimmed by the defendant's predecessor's gardener. On August 16 the plaintiff went with the defendant and the builder's foreman to examine the site. A site was staked out so as to have a straight wall, and it passed over the site of the hedge where the defendant desired to have a fire tree the plaintiff required should remain on her side of the wall, and the site was so staked out as to provide for this, thus for some distance giving the plaintiff some 2 or 3 ft. of land which in fact formed part of the defendant's property. The erection of the wall was proceeded with shortly afterwards, and everything went on perfectly well until the plaintiff came across her solicitor, who seemed to have persuaded her that she was being badly treated, and the writ in the action was issued on December 4 last. Since then the injunction to which the defendant now objected was obtained restraining him from proceeding with the erection of the wall until the action was disposed of. The defendant wished to move into his house with his family, but he could not do so until there was a suitable screen between his garden and the garden of the lunatic asylum. There was no reason why the defendant should not go on with the wall, and he would undertake that if at the trial he was ordered to pull it down he would do so.

In the result their lordships, after hearing Mr. Ellis Griffiths on behalf of the plaintiff discharged the injunction on the defendant giving the undertaking to pull down if ordered to do so at the trial, the costs of the appeal to abide the result of the trial.

Lord Justice Mathew suggested that the learned counsel should try and get the authority of their respective clients to come to some amicable arrangement. He said it would be deplorable if such a case as this had to be fought out.

APPLICATION AGAINST A RAILWAY FOR WORKING SO AS TO CAUSE A NUISANCE.

THE case of Roberts v. The Charing Cross, Euston, and Hampstead Railway Co. came before Mr. Justice Swinfen Eady in the Chancery Division on the 19th inst. on an application by the plaintiff for an interim injunction to restrain the defendant Company from working through the night.

It appeared that the plaintiff was the lessee and occupier of No. 186, Haverstock-hill, N.W., which is contiguous to the place where the defendant company are constructing their Belzize Park Station. The plaintiff's case was that a crane was working day and night continuously for the purpose of hauling out excavated material, and letting down material for the construction of the station, lifts and railway, and that the noise was a great nuisance, the steam crane being worked within a few feet of his bedroom. The defendants, by their defence, relied on their statutory powers, and said that it was absolutely necessary for them to work day and night, and that the nuisance having been authorised by Act of Parliament, the plaintiff's remedy was for damages under Section 68 of the Lands Licences Act.

In the result his lordship refused to grant an interim injunction, but directed the motion to stand over till the trial. He ordered that the parties should be expedited, and that the parties on terms to deliver pleadings within a limited time, in order that the action could be tried at the earliest possible moment—probably early next sittings.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

15,887.—MEANS OF TESTING DRAIN-TRAPS: *W. Riley*.—Testing operations are rendered easier by means of a seating for a plug, which is formed near the inlet of the trap. The eye of the trap is set horizontally, and is closed with a plug which has a sealing-flange. The seat of the latter plug is shaped as a cone.

16,847.—A SUPPORT FOR INCANDESCENT LAMPS: *R. O. Wright*.—For a hanging lamp-holder is devised a supplementary cord grip. Two screws clamp two grooved blocks on the conducting cord, metallic strips or wires join the blocks to a ring, or part of a ring, attached by the customary shade-holding nut on the lamp-holder, so that the ordinary cord-grip in the lamp-holder is not needed. In a modified adaptation, the top of the lamp-holder is fitted with two zig-zag grooved blocks screwed or bolted on to the cord.

16,864.—SOLDERING OF ALUMINUM ARTICLES: *C. P. Sörensen*.—A concentrated lye of soda or some such alkali is applied to the work, which is heated to about 300 deg. C., and is then wet with cold water, when the soldering material will be needed during the soldering. The inventor says that a brazing alloy of brass or tin filings and zinc may be advantageously used.

16,871.—HOT-WATER APPLIANCES (DOMESTIC): *W. Houghton and J. Cornes*.—The oven on one side of the grate faces one room, say, a kitchen, whilst the boiler on the other side faces another room, say, a washhouse or scullery, which contains a

bath. The boiler may be heated with a separate grate underneath it or the flames may be conducted under both the oven and the boiler; a water cistern fills the boiler and is connected with the bath. The inlet and outlet is placed at some height above the bottom of the boiler. The apparatus is intended for tenements, cottages, and similar buildings.

16,885.—A SUBSTITUTE FOR WOODEN PARQUETRY: *A. Lister*.—An imitation parquetry consisting of a compound of casein, 45 parts; sal-ammoniac or chalk, 25 parts; camphor, 5 parts; wood ashes or magnesia, 15 parts; linseed oil, 5 parts; and colouring matter, 5 parts, which is pressed and rolled into plates.

16,011.—PLUG AND SOCKET CONNECTIONS (ELECTRICAL): *F. W. Heaton and H. Smith*.—The inventors provide that the parts shall quickly spring apart whenever the circuits are opened. In one form springs force back the plugs, which slide in tubes. A casing, having a removable lid and a hinged door, encloses the base. When the door is open the movable part that carries the socket is inserted and a projection from the door holds it in position; when that part has been drawn out the plug is drawn out with it until it is snapped back again by the spring as the latter overcomes the friction. In another shape the sockets are fitted with springs or are spring-controlled, and the plugs are fixed.

16,916.—TILES FOR ROOFS: *W. B. Heath*.—Both sides of the tiles, which are curved lengthwise, have cross ratchet ribs, or recesses and ribs, in order that one may lay them with variation of the amount of over-lap, and with breaking joint with the courses above and below, whilst inclined or V-shaped interlocking ribs and recesses obviate any movement side-ways of the tiles.

16,922.—AN APPLIANCE FOR GAS-METERS: *G. E. Wright and A. G. Sutherland*.—A small diaphragm head is devised for a diaphragm or dry meter, and is placed concentrically on a flexible flat disc of skin, leather, or other material, which is clamped between a stationary ring and a loose metallic band so as to secure it to a rigid neck, a bearing being placed over the outer end upon the band for clamping purposes.

16,930.—A PAINT REMOVER: *G. Wilcock*.—For removal of paint from woodwork and other surfaces; the compound is made up of soft soap, glycerine, caustic soda, and lime.

16,935.—AUTOMATIC TACKLE AND LOAD-SUSPENDING GEAR: *R. Skene*.—A brake-drum that rotates in a wedge-shaped hollow between two blocks is mounted on the shaft of the chain wheel. From the cross-head of a lever which is journaled on the shaft hang slotted links that carry rollers which will jam between the drum and the block, for hanging the load, when the lever arm is in the middle position. The pulling side of the arm with a rope liberates the roller upon the jamming side, and the load will then be lowered. An oval pin, working between the free ends of brake-blocks, which a spring normally forces together, may, in some cases, be fitted at the upper end of the lever arm.

16,950.—A COMBINED WALL-PLUG AND SWITCH: *T. H. Smith and C. D. Lucas*.—A drum for the switch-mechanism is set inside a base or block and carries a bridging-piece for the connection of plunger contacts. A push-rod sliding in the base carries a pawl for turning the drum by means of its ratchet teeth. A snap action is effected through the engagement of a spring with one of the four faces of an external drum. The base of the block, a socket part of a wall-plug is adapted to hold the switch, and has terminals and sockets for the plungers and the plug.

16,954.—TOPS FOR VENTILATING-SHAFTS AND CHIMNEYS: *J. Keane*.—A squared head has outlets at its corners, and in the space between its sides and a middle tube are set some radial and oblique baffles. In a variant shape the head is made with a cross-shaped section adjusted to openings in the inner tube or pipe, and is fitted with baffles arranged horizontally.

17,016.—A STOVE FOR USE WITH HOT-WATER APPARATUS: *R. Herberg*.—Closely coiled pipes placed against the walls of the combustion-chamber and other pipes set along or across that chamber conduct the water. A hopper, roller, and jet supply the fuel which the latter pipes distribute evenly over the grate, and there are channels for heating the air supply for combustion.

17,020.—FLUSHING APPARATUS: *R. G. Howson*.—The flushing-pipe is trapped at its lower end and has an upper pipe open to the outer air. Another pipe communicates between the flushing-pipe and the crown of the principal siphon beneath the closet-basin; the flushing action is started by the exhaustion of air from the latter siphon through the pipe into the basin.

17,070.—INCANDESCENT LAMPS AND FILAMENTS: *A. L. Reinmann*.—Loops or cemented joints on wires support the filament at one point or more in its length. In the glass base of the lamp is set a middle stem of wire that carries a glass bead, in which the first-named wires are fused. In one form glass or some such equivalent material may be used for the middle stem, and that stem can be utilised for holding up the filament at its middle point.

17,080.—MEANS OF FEEDING CIRCULAR SAWS: *N. Taitby*.—Friction gearing serves to vary the rate of speed of a radial feed appliance. Bevel gearing

drives a disc at a constant rate of speed from a belt pulley. A worm-shaft carries a friction wheel, around which are springs that bear against the face of the disc. A screw and nut wheel regulate the distance of the friction wheel from the centre of the disc.

17,101.—A COMBINED SINK AND WASHTUB: *W. J. Minns*.—The sink, which is hinged at the back to obviate splashing, is hinged in order that it may be turned up out of the way, and the outlet is directed into a stand-pipe that acts as a waste. A draining-board is fitted over the other division of the tub.

17,102.—A GUARD FOR KEYHOLES: *L. Lacroix and H. Brisset*.—A cover that turns about a pivot pin is pivoted on to a base-plate, which is pierced for the key of the lock, and is fastened to the door, &c. A sliding bolt, having a hook in engagement with a recess cut in the base-plate, locks the cover when the closed position. Projections from the cover engage with grooves in the bolt, and springs on the cover that engage with notches on the bolt keep the bolt in the locked position. The springs are forced back for releasing the bolt with a key having grooves and projections which register with those on the bolt and the cover. A spring disengages the bolt from the base-plate. For an easy removal of the cover, its pivot-pin can be joined to the base-plate by fashioning the hole of the pivot as a key that engages with a hole in the plate when the cover is turned off the face of the plate.

17,148.—A FASTENING FOR FRENCH WINDOWS, DOORS, &c.: *W. Crick*.—The appliance comprises plates with top and bottom pieces interposed, and is lever pivoted between the plates at one end of which is a knob and a hook at the other. The hook is kept in engagement with the catch with a spring, and becomes disengaged when the knob is pressed downwards. A shield or plate affixed to the door, &c., is slotted for the working of the lever. The contrivance, of which there are other adaptations, is described as being available for a single door, or for double doors that interlock.

17,193.—A CONTRIVANCE FOR CUT-OUTS AND SWITCHES: *E. M. Hewlett*.—In order to minimise arcing the inventor encloses the main contacts or auxiliary or sparking contacts in a chute and subjects them to a field formed by the arc and conductors; impedance is thereby lowered and blow-outs are discarded. In one form for a cut-out a toggle which will be tripped up by means of an armature under the influence of a coil upon one of the contacts holds up the bridging-piece. A chute made of iron plates joined with a cross-piece encloses the main contact and the auxiliary contacts as well. In the case of very heavy currents the iron plates need not be used, as the conductors, &c., will set up the field. An additional contact is fitted near the outer portion of the chute so that the arc shall not be expelled downwards.

17,217.—A BAND HINGE FOR GATES AND DOORS: *F. Doman*.—The band, or strap, is joined to a double conical pin. When the screws are slackened one can turn back the top socket and then raise the pin out of the bottom socket. Various other forms of the pin and the top socket are specified.

17,272.—DIFFERENTIAL GEARING FOR HOISTING-CHAINS, &c.: *W. J. Jenkins*.—The object of the invention is to automatically equalise the tension in a pair of driving-chains. A fixed and a loose spur-wheel are carried by a shaft that is geared with a spur-wheel, upon the diameter of which are mounted two pinions which engage on one side with a bevel-wheel upon the shaft, and on the other side with a bevel-wheel secured to the loose sprocket-wheel, so that the loose sprocket-wheel is thereby free to move in respect of the shaft until the tension on the two chains has become equalised.

17,296.—PROCESS OF MOULDING TILES FOR ROOFS: *H. Strube*.—The frames that carry the moulds are independently mounted upon a middle pivot, and their rollers run upon a round track or table. A workman fills the moulds, and takes out the moulded tiles at one side of the table. Another workman at the other side finishes, colours, and oils them. A profile-bar is fixed to the mould, and held up by a projection from a lever, rounds off the front edge of the tile. Spring catches or handles fasten the frames to the table.

17,310.—STOVES FOR COOKING PURPOSES: *G. L. Scott*.—A gas or oil burner is put at the base of a heating-chamber in the casing of the stove. Flues convey the products of combustion around the oven, suitable inlets and outlets being provided. The heating-chamber can be placed either between an oven and a boiler or between two ovens.

MEETINGS.

SATURDAY, DECEMBER 27.

Royal Institution.—Professor H. S. Hele-Shaw on "Locomotion on the Earth, through the Water, and in the Air." 11. 3 p.m.

TUESDAY, DECEMBER 30.

Royal Institution.—Professor H. S. Hele-Shaw on "Locomotion on the Earth, through the Water, and in the Air." 11. 3 p.m.

THURSDAY, JANUARY 1.

Royal Institution.—Professor H. S. Hele-Shaw on "Locomotion on the Earth, through the Water, and in the Air." 11. 3 p.m.

FRIDAY, JANUARY 2.

Institution of Junior Engineers.—Mr. H. M. Rennett, on "Marine Boilers: A Consideration of the Relative Values of Different Types." 8 p.m.

SATURDAY, JANUARY 3.

Royal Institution.—Professor H. S. Hele-Shaw on "Locomotion on the Earth, through the Water, and in the Air." 11. 3 p.m.

SOME RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

December 11.—By STIMSON & SONS	
Bermundsey—4, 5, and 6, Alfred-st., u.t. 131 yrs., g.t. 6d. 12s. w.r. 10s. 4s.	6,340
Old Kent-rd.—Herman-rd., warehouse premises and yard; also 1, Rodley-st., u.t. 31 yrs., g.t. 3d. 12s. w.r. 10s. 4s.	465
Holloway—106, Marlborough-rd., u.t. 73 yrs., g.t. 6d. 6s. w.r. 5s. 12s.	480
Highbury—30 and 32, Highbury New Pk., u.t. 40 yrs., g.t. 27s. 6d. w.r. 17s. 6d.	1,060
Calford—29, Honey-rd., u.t. 70 yrs., g.t. 6d. 10s., e.t. 4s.	450
Bermundsey—60 and 61, Lerovest, f.w. 63d. 12s. Leytonstone—49, Union-rd. (S), u.t. 63 yrs., g.t. 7d. 7s. w.r. 3s. 6d.	990
December 11 and 12.—By BEAUMONT & GLOVER (at Wakefield)	395
Crigglestone, &c., Yorks.—The Chapelthorpe Estate, area about 1,000 acres, f. (in numerous lots)	37,175
December 12.—By H. P. ANLEY & CO.	
Tottenham—Earlsmead-rd., f.g.r. 5d., reversion in 81 yrs.	122
Brixton—353, Brixton-rd., u.t. 49 yrs., g.t. 12s. 10s., w.r. 8s.	720
Wimbledon—74, Southey-rd., f.y.r. 3s. 6d.	550
By C. H. BROWN.	
Tottenham—205, Park-lane, u.t. 61 yrs., g.t. 6d., w.r. 2s.	175
By FRANCIS DOD & CO.	
Stoke Newington—16, Darville-rd., u.t. 72 yrs., g.t. 7d. 6s. 4s.	495
Clapton—50, Avenue-rd., f. 6r. 3s.	470
Hornsey—31 and 33, Campsbourne-rd., u.t. 74 yrs., g.t. 12s. 12s. w.r. 8s. 8s.	450
By EDWIN EVANS.	
Willesden—74 to 92 (even), Deacon-rd., u.t. 96 yrs., g.t. 8d., w.r. 6s. 8s.	3,560
Chiswick—20 to 10 (even), 14 and 16, Quick-rd., and 27 to 45 (odd), Fraser-st., u.t. 93 yrs., g.t. 6d. 10s. w.r. 5s. 12s.	3,000
Bermundsey—34 and 35, Ambrose-st., u.t. 34 yrs., g.t. 8d., w.r. 7s. 12s.	430
By OLIVER, SONS, & CO.	
Fulham—Star-rd., f.g.r. 16s. reversion in 29 yrs.	495
Fane-st., f.g.r. 12s. reversion in 93 yrs.	275
By A. J. SHEPHERD.	
Stratford—24, Water-lane, and 57, Manby-rd., with stable premises, &c., adjoining, u.t. 81 yrs., g.t. 5d., w.r. 5s.	740
December 13.—By DAVIES.	
Finsbury Park—110 to 125 (even), Palmerston-rd., u.t. 63 yrs., g.t. 47s. 5s. w.r. 37s. 12s.	1,950
71, Lennox-rd. (S), u.t. 62 yrs., g.t. 6d., w.r. 5s. 12s.	550
By RUTTER.	
Tooting—177, Longley-rd., f. p.	600
Cowleaze, Isle of Wight.—The Lynch and 2 a. 1 r. 16 p., u.t. 92 yrs., g.t. 4s. 6s.	900
By SELFE, BAILL, SMITH, & CO.	
Battersea—49 and 17, Ilminster-gdns., u.t. 77 yrs., g.t. 16s. 8s. w.r. 8s.	950
By GEO. STOCKINGS.	
Caterham, Surrey.—Childen's Park House, f., y.r. 3s.	530
Beechwood-rd., a freehold building site, 2 a. 2 r. 8 p.	390
December 14.—By CHURCHILL, GALSORTHY, & CO.	
St. James's—69, Jermyn-st. (S.), u.t. 16 yrs., g.t. 3s. 6d., w.r. 10s.	1,480
By DEHNHAM, TREVOR, & CO.	
Barnet, Herts.—Mayes-lane, Moxons building estate, 20 a. 0 r. 7 p., f. p.	3,500
Chiswick—Turnham Green-rd., Leigh House, f. p.	2,000
By DAVID BURNETT & CO.	
Willesden—Shewsbury-rd., f.g.r. 3s. 6d., reversion in 77 yrs.	1,340
By W. B. HALLETT.	
Finsbury—39, 41, 43, and 45, Park Hall-rd., u.t. 80 yrs., g.t. 25s. 4s. w.r. 13s.	1,320
49, Park Hall-rd., u.t. 55 yrs., g.t. 7d., w.r. 4d.	440
By HIBBARD & WHITTINGHAM.	
Wood Green—Coburg-rd., f.g.r. 16s. reversion in 79 yrs.	395
Palmer Green—Meadowcroft-rd., a plot of building land, f.	230
Stoke Newington—Albion-rd., f.g.r. 7d. 10s., reversion in 64 yrs.	800
71, Church-st., u.t. 34 yrs., g.t. 5s. 9s., w.r. 5s.	580
By MATTHEWS, MATTHEWS, & GOODMAN.	
Tottenham—30 to 51 (even), Avondale-rd., and 1 to 11 (odd), Clarendon-rd., u.t. 35 yrs., g.t. 8d., w.r. 5s. 12s.	3,200
By RICHARD SMITH & CO.	
Edgeware-rd.—No. 43 (S), u.t. 42 yrs., g.t. 9d., w.r. 2s.	745
By WARNER, SHEPPARD, & WATTS (at Leicester).	
Desford, Leics.—The Sherlocks Farm, 127 a. 2 r. 18 p., f., y.r. 17s. 3s.	2,680
By R. GREY & SONS (at Whitby).	
Slights, Yorks.—Freehold closes of land, with freestone quarry, 34 a. 0 r. 34 p., y.r. 16s.	751
Eldon-leas, Yorks.—Freehold farmhouse and 31 a. 2 r. 35 p., y.r. 16s., with common rights	700
By ORRILL, MARKS, & LAWRENCE (at Masons' Hall Tavern).	
East Ham—High-st. North, the Cock Hotel, u.t. 52 yrs., y.r. 10s., with godswill	35,000

CONTRACTS, COMPETITIONS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Designs for University Buildings, Cape of Good Hope	Agnt.-Gen. for Cape of Good Hope	400l., 300l., 100l.	Jan. 31
*Proposed Town Hall, &c.	Chipping Wycombe Corporation	100 guineas and 25 guineas	Mar. 4
*Extension of Town Hall	Hull Corporation	300l., 200l., and 100l.	Mar. 31
*New Free Library	Kettering U.D.C.	600l., 400l., and 250l.	No date

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Sewage Outfall Works	Wendstone U.D.C.	C. N. Lacey, Civil Engineer, 6, The Sanctuary, Westminster	Dec. 30
Street Works, &c.	Sale U.D.C.	W. Holt, Engineer, Council Offices, Sale	do.
Water Supply at Upton Workhouse, Sanderson	Oxford Corporation	City Engineer, Town Hall, Oxford	Dec. 31
Street Improvement Works, Clarendon-rd., Didsbury	High Wycombe Guardians	A. H. Mountain, Civil Engineer, Town Hall, Widdowson	do.
Water supply works	Warrington U.D.C.	W. B. Purser, Civil Engineer, 4, Worthing-road, Mursam	do.
Twenty-seven Artisans Dwellings	West Sussex County Council	J. O. Allen, North Brunswick-street, Dublin	do.
Paving Works	North Dublin R.D.C.	J. T. Brade, Borough Surveyor, Town Hall, Blackpool	do.
Well sinking, Haysbridge	Blackpool Corporation	P. M. Beaumont, Engineer, Maidon	do.
Iron fencing (4 miles)	Salmon Hospital Board	D. Grant, Grantown, N.B.	Jan. 1
House, Glenville, Co. Cork	Bilston U.D.C.	S. F. Hynes, Architect, 21, South Mall, Cork	do.
Pipe trench, &c., The Green, Trysull	Peysont (Wales) R.D.C.	J. E. Wakford, Civil Engineer, Town Hall, Bilston	do.
Water supply works	Walsley U.D.C.	J. & F. J. Hurley, Engineer, 10, Bridge-road, London	Jan. 2
school, superstructure, Limerick	Walsley U.D.C.	I. Cox, Architect, 11, Dale-street, Liverpool	do.
Street Works	Walsley U.D.C.	City Surveyor, Town Hall, Walsley	Jan. 3
Road Works, Underhill road, East	Walsley U.D.C.	A. S. Fisher, Surveyor, Town Hall, Felixstowe	do.
Rebuilding Dooley Bridge, Walsley	Walsley U.D.C.	J. Hulley, Architect, 7, Lowthorpe-street, Kendal	do.
Rebuilding Melbourn Bridge, Haverhill	West Suffolk County Council	A. A. Hirs, County Surveyor, Sudbury	do.
Works at school, Bridlington	Bispham (Lancs) Town Council	J. Woodmauser, 24, Cambridge-street, Bridlington	do.
Sewage Works (contract 1)	do.	A. Hindle, Civil Engineer, 44, Abingdon-street, Blackpool	Jan. 5
Pipes, &c.	do.	do.	do.
Pier Works	Falmouth U.D.C.	W. H. Tresidder, Borough Surveyor, Falmouth	do.
Laying out Water Pipes (2 miles)	Kettering U.D.C.	T. B. Smith, Engineer, Market-place, Kettering	do.
Sewage Disposal Works	Leung U.D.C.	W. H. & Co., Engineers, 5, Leung-ry, London	do.
*Engine and Boiler House, &c. (Electricity Works)	Chelton U.D.C.	W. H. Trenchard, 3, Victoria-street, N.W.	do.
Street Works, Spring Bank, &c.	Waterloo (Lancs) U.D.C.	E. S. Yates, Engineer, Town Hall, Waterloo	Jan. 6
Road Works, H. Mansow	Heston U.D.C.	F. O. Parkman, Civil Engineer, Town Hall, Heston	do.
Additions to Victoria Infirmary, Northwich	Lowestoft Corporation	J. Moland, Architect, Bayham-street, Northwich	do.
Tramway Works	Sheffields Economic Society, Ltd.	W. C. C. Hawtayne, Engineer, 9, Queen-street-place, E.C.	Jan. 7
*Building for Bakery	Chelton U.D.C.	Office of the Sheffield Economic Society, Ltd., Sheffield	do.
*Electric Light Station	McMulland & Son, Ltd.	Uffman & Co., 52, Victoria-street, Westminster, S.W.	Jan. 12
*New Hotel and shop	Lubbe Corporation	Hunter & Woodhouse, Architects, Belper	Jan. 13
*Public Free Library	Devonport Town Council	J. F. Burns, Borough Surveyor, 20, Ker-street, Devonport	Jan. 14
Septic Tanks, Fish Pond	York Asylum Visiting Committee	A. Vreut, Architect, Guildhall, York	Jan. 16
Lunatic Asylum	Lancashire Railway Co.	J. Blackburn, 33, Buchanan-street, Glasgow	Jan. 19
Station Buildings, Wemyss Bay	do.	do.	do.
Station Buildings, Liverpool	Wiltshire County Pauper &c., Asylum	County Surveyor, Trowbridge	Jan. 20
*New Ward at Asylum, Devizes	Margate Corporation	E. A. Borg, Borough Surveyor, Margate	No date
*Iron Gates, &c.	Lanarkshire (Yorks) School Board	W. E. Richardson, Architect, Kethwell, near Leeds	do.
Drainage Works, Carlton and Robin Hood Schools	Dunfermline School Board	H. Higgins, Architect, Dunfermline	do.
Additions to schools, Grampian	do.	do.	do.
Road Works, Freshfield-road, Brighton	do.	do.	do.
Heck Channel	do.	do.	do.
House, Kewchich	do.	do.	do.

Those marked with an asterisk (*) are advertised in this Number. Competitions, iv. Contracts, pp. iv. vii. & x. Public Appointments, —

Leyton.—High-rd., the Lion and Key p.h., f. p. with goodwill. — By ALDRIDGE'S. £31,700	Highbury.—100, Grosvenor-rd., u.t. 47 yrs., g.r. 104, w.r. 80d.	By FRANK JOLLY & Co.	Clapton.—7, Pembury-rd., u.t. 47 yrs., g.r. 104, w.r. 80d.	£710
Notting Hill.—75, Clarendon-rd., u.t. 37 yrs., g.r. 124, 108, e.r. 80d.	Forest Gate.—125, Chestnut-av., u.t. 93 yrs., g.r. 64, 155, e.r. 50d.	By M. ROBINSON.	Holloway.—9, Wray-cres., u.t. 74 yrs., g.r. 81, 105, y.r. 45d.	45c
Slington.—St. Philip-st., &c., i.g.r. 186d, 125, 1d., u.t. 244 yrs., g.r. 94d.	Edgaston, Warwick.—Willow-av., a plot of building land, area 2,002 yds., f. a plot of 64 and 65, New John-st., u.t. 78 yrs., g.r. 27d.	By SPENCER, SANTO, & Co. (at Masons' Hall Tavern).	Acton.—18 and 26, Grafton-rd., u.t. 90d, g.r. 124, y.r. 195d.	665
Arlington-sq., i.g.r. 54d, 125, u.t. 244 yrs., g.r. 124, 155.	Handsworth, Staffs.—59 and 74, St. Peter's-rd., u.t. 76 yrs., g.r. 124, 165, 3d., y.r. 80d.	By G. F. LOCKWOOD (at Kirkstall).	19, 23, and 27, Perry-rd., u.t. 86 yrs., g.r. 33d, y.r. 195d.	1,825
Caledonian-rd.—Pembroke st., i.g.r. 31d, 108, u.t. 47 yrs., g.r. 34.	Kirkstall, Yorks.—The Airefield Carriage and Wagon Co.'s manufacturing premises, foundry, workshops, and sidings, area 2,470 yds., u.t. 244 yrs., g.r. 16d (as a going concern).	By BEALE & CAPES.	3, Shad-rd., u.t. 86 yrs., g.r. 54, 58, y.r. 76d.	750
Kenilston Town.—Prince of Wales-rd., i.g.r. 59d, 58, u.t. 38 yrs., g.r. 22d.	Notting Hill.—74, 74, and 76, South-row, l. w.r. 72d.	By HAWKINGS & SON.	By FULFORD, MOORE, & SON.	395
Kensington.—Douro-pl., i.g.r. 36d, u.t. 244 yrs., g.r. 124.	27, 29, and 31, West-row (laundries and stabling), u.t. 74 yrs., g.r. 16d, 155, e.r. 50d.	By HAWKINGS & SON.	Thornton Heath.—Langdale-rd., two plots of land, f. 100d.	145
Tooting.—127, Drakefield-rd., u.t. 80d yrs., g.r. 81, 105, p.	21, 3, and 5, Swinford-rd., u.t. 64 yrs., g.r. 21d, w.r. 163d, 165.	By HAWKINGS & SON.	Farley-rd., a plot of land, 4 acres, f. 100d.	2,250
Hornsey Rise.—12, Trinder-rd., u.t. 73 yrs., g.r. 64, p.	2, 3, and 4, Tavistock-mews, u.t. 44 yrs., g.r. 124, 105, w.r. 81d, 185.	By HAWKINGS & SON.	Belvedere-rd., f.g.r. 54d, reversion in 71 yrs.	3,635
Dalston.—74, Greenwood-rd., u.t. 49 yrs., g.r. 64, 65, e.r. 45d.	44, 155, w.r. 32d, 105.	By HAWKINGS & SON.	7 and 9, Denmet-rd., f. w.r. 42d, 28d.	630
Forest Gate.—30 to 40 (even), Avenue-rd., f. w.r. 200d, 60.	Cavendish-square.—48 and 50, Wigmore-st. (Norfolk Mansion Hotel), u.t. 34 yrs., g.r. 96d.	By HAWKINGS & SON.	Kensington.—Netherwood-rd., f.g.r. 178d, 105, reversion in 65 yrs.	4,870
Dalston.—3, Gayhurst-rd., u.t. 44 yrs., g.r. 54, e.r. 36d.	244 yrs., y.r. 350d, also 85 and 87, Wigmore-st., and upper part of 86, Wigmore-st. (Queen Anne Mansions), u.t. 16 yrs., y.r. 650d, as a going concern (in one lot).	By HAWKINGS & SON.	Wargrave, Berks.—High-st., f.g.r. 16d, reversion in 87 yrs.	520
38, 40, and 42, Graham-rd., u.t. 48d yrs., g.r. 16d, 105, y.r. 124d.		By HAWKINGS & SON.	Bayswater.—10, Sutherland-pl., u.t. 43 yrs., g.r. 11d, y.r. 50d.	450
Dethnal Green.—79, Hare-st. (S), y.r. 35d.		By HAWKINGS & SON.	Fulham.—67 to 77 (odd), Wardo-av., u.t. 94 yrs., g.r. 21d, w.r. 195d.	1,410
By WAGSTAFF & SONS.				
Islington.—35d, Gibson-sq., u.t. 244 yrs., g.r. 24, e.r. 4.				

By R. N. STOLLER (at Barbican Repository).
 Arlington—64, High-st. (Dairy), with stabling and
 yard adjoining, area 29,000 sq. ft., at 22 yrs.,
 y.r. 2001. £998

Contractions used in these lists.—F.g.s. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; l. for line; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdn. for gardens; yd. for yard; gr. for grove; b.h. for beer-house; p.h. for public-house; o. for offices; s. for shops.

PRICES CURRENT OF MATERIALS.

* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.	
£ s. d.	
Hard Stocks	13 0 0 per 1,000 alongside, in river.
Gravel	2 10 0 "
Paving Stocks	12 0 0 "
Shippers	8 5 0 "
Flintons	1 7 6 " at railway depot
Red Bricks	2 12 0 "
Best Fareham Red	3 12 0 "
Best Red Pressed	5 0 0 "
Knabon Facing	5 0 0 "
Best Blue Pressed	4 5 0 "
Staffordshire	4 11 0 "
Do. Ballnose	4 11 0 "
Best Stourbridge	4 8 0 "

GLAZED BRICKS.	
£ s. d.	
Best White and Ivory Glazed	13 0 0 "
Stretchers	13 0 0 "
Heads	13 0 0 "
Quoins, Bullnose	17 0 0 "
Double Stretchers	13 0 0 "
Double Heads	16 0 0 "
One Side and two Ends	19 0 0 "
Two Sides and one End	20 0 0 "
Spalls, Chamfered	20 0 0 "
Squints	20 0 0 "
Best Dipped Salt Glazed Stretchers and Heads	12 0 0 "
Quoins, Bullnose, and Flats	14 0 0 "
Double Stretchers	15 0 0 "
Double Heads	14 0 0 "
One Side and two Ends	15 0 0 "
Two Sides and one End	15 0 0 "
Spalls, Chamfered	14 0 0 "
Squints	14 0 0 "
Second Quality White and Dipped Salt Glazed	8 0 0 "
Thames and Pit Sand	7 0 0 per yard, delivered.
Thames Ballast	6 0 0 "
Best Portland Cement	30 0 0 per ton, delivered.
Best Ground Blue Limes	21 0 0 "

NOTE.—The cement or lime is exclusive of the ordinary Grey Stone Lime. — 10s. 6d. per yard, delivered. Stourbridge Fire-clay in sacks, 27s. od. per ton at rly. depot.

STONE.	
£ s. d.	
Ancoaster in blocks	11 11 per ft. cube, deld. rly. depot
Bath	2 7 "
Farleigh Down Bath	2 8 "
Beer in blocks	1 8 "
Grinshill	1 10 "
Brown Portland in blocks	2 4 "
Darley Dale in blocks	2 4 "
Red Cornhill	2 5 "
Closeburn Red Freestone	2 0 "
Red Mansfield	2 4 "

YORK STONE—Robin Hood Quality.	
£ s. d.	
Scrapped random blocks	2 10 "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3 per foot super.
6 in. Rubbed two sides	2 4 "
Ditto, ditto	2 6 "
6 in. sawn one side slabs (random sizes)	0 11 1/2 "
2 in. to 2 1/2 in. Sawen one side slabs (random sizes)	0 7 1/2 "
2 1/2 in. to 2 in. ditto, ditto	0 6 "
BEST HARD YORK—	
Scrapped random blocks	3 0 per ft. cube
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 8 per ft. super.
6 in. Rubbed two sides	2 9 "
Ditto	2 10 "
6 in. sawn two sides slabs (random sizes)	1 10 "
2 in. self-cased random	0 5 "
lags	0 5 "
Hopton Wood (Hard Bed) in blocks	3 3 per ft. cube, deld. rly. depot.
" " 6 in. sawn both sides landings	2 7 per ft. super, deld. rly. depot.
" " 3 in. do.	1 2 1/2 "

PRICES CURRENT (Continued).

SLATES.

in. in.	£ s. d.
20 x 10 best blue Bangor	13 2 6 per 1,000 of 2000 at rly. dep.
20 x 12 " "	13 17 6 "
20 x 10 best seconds	12 15 0 "
20 x 12 " "	13 10 0 "
16 x 8 best	7 0 0 "
20 x 10 best blue Portmadoc	12 5 0 "
16 x 8 best blue Portmadoc	6 0 0 "
20 x 10 best Eureka un-	15 0 0 "
16 x 8 best Eureka un-	12 0 0 "
20 x 12 " "	12 10 0 "
16 x 8 " "	8 7 6 "
20 x 10 permanent green	10 10 0 "
16 x 8 " "	9 0 0 "
16 x 8 " "	6 5 0 "

TILES.

£ s. d.	
Best plain red roofing tiles	42 0 per 1,000, at rly. depot.
Hip and valley tiles	2 7 per doz.
Best Broseley tiles	50 0 per 1,000
Do. Ornamental tiles	53 6 "
Hip and valley tiles	4 0 per doz.
Best Rushton Red, brown or brindled Do. (Edwards)	57 6 per 1,000
Do. Ornamental Do.	60 0 "
Hip tiles	54 0 per doz.
Valley tiles	3 8 "
Best Red or Mottled Staffordshire Do. (Peakes)	57 0 per 1,000
Do. Ornamental Do.	54 0 per doz.
Hip tiles	54 0 per doz.
Valley tiles	3 8 "
Best "Rosemary" brand plain tiles	48 0 per 1,000
Do. Ornamental Do.	50 0 "
Hip tiles	4 0 per doz.
Valley tiles	3 8 "

WOOD.

BUILDING WOOD—YELLOW.

At per standard.	£ s. d.	£ s. d.
Deals: best 1 in. by 11 in. and 4 in. by 9 in. and 11 in.	15 10 0	16 10 0
Deals: best 3 in. by 9 in. and 3 in. by 11 in. and 8 in.	14 10 0	15 10 0
Battens: best 2 1/2 in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	11 10 0	12 10 0
Battens: best 2 1/2 by 6 and 3 by 6	10 0 0	less than 7 in. and 8 in.
Deals: seconds	10 0 0	less than best
Battens: seconds	9 0 0	2 in. by 4 in. and 2 in. by 6 in. and 2 in. by 4 in. and 2 in. by 5 in.
Foreign Stems	10 10 0	more than battens.
3 in. by 11 in. and 4 in. by 11 in. or Menel (average specification)	10 0 0	per load of 50 ft.
First timber: best middle, Danish or Menel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (6 in. to 10 in.)	3 10 0	3 15 0
Small timber (6 in. to 8 in.)	3 0 0	3 10 0
Swedish balks	2 15 0	3 10 0
Pitch-pine timber (30 ft. average)	3 5 0	3 15 0

JOINERS' WOOD.

At per standard.	£ s. d.	£ s. d.
White Sea: First yellow deals, 3 in. by 11 in.	23 0 0	24 0 0
3 in. by 9 in.	20 0 0	21 0 0
Battens, 2 1/2 in. by 7 in. and 3 in. by 7 in.	17 0 0	18 0 0
Second yellow deals, 3 in. by 11 in.	18 0 0	19 0 0
3 in. by 9 in.	17 0 0	18 0 0
Battens, 2 1/2 in. by 7 in. and 3 in. by 7 in.	13 0 0	14 0 0
Third yellow deals, 3 in. by 11 in.	15 0 0	16 0 0
Battens, 2 1/2 in. and 3 in. by 7 in.	12 0 0	13 0 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0	22 0 0
Do. 3 in. by 9 in.	18 0 0	19 0 0
Battens	13 0 0	14 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0	17 0 0
Do. 3 in. by 9 in.	14 0 0	15 0 0
Battens	11 0 0	12 0 0
Third yellow deals, 3 in. by 11 in.	13 0 0	14 0 0
Do. 3 in. by 9 in.	12 0 0	13 0 0
Battens	10 0 0	11 0 0
White Sea and Petersburg:		
First white deals, 3 in. by 11 in.	14 0 0	15 0 0
3 in. by 9 in.	12 0 0	13 0 0
Battens	11 0 0	12 0 0
Second white deals, 3 in. by 11 in.	13 0 0	14 0 0
3 in. by 9 in.	12 0 0	13 0 0
Battens	9 0 0	10 0 0
Pitch-pine: deals	16 0 0	17 0 0
Under 2 in. thick extra	20 0 0	21 0 0
Yellow Pine—First, regular sizes	33 0 0	upwards.
Oddments	23 0 0	24 0 0
Seconds, regular sizes	24 0 0	25 0 0
Yellow Pine Oddments	22 0 0	23 0 0
Kauri Pine—Planks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs		
Large, per ft. cube	0 6 0	0 7 0
Small	0 5 0	0 6 0
Wainscot Oak Logs, per ft. cube	0 5 0	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 7	0 0 8
Do. do.	0 0 6 1/2	0 0 7
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 0 6	0 0 8
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 0 12
Teak, per load	16 10 0	17 0 0
American Whitewood Planks—		
Per ft. cube	0 4 0	0 5 0

PRICES CURRENT (Continued).

WOOD.

Prepared Flooring—	£ s. d.	Per square.
1 in. by 7 in. yellow, planed and shot	13 6 0	0 17 6
1 in. by 7 in. yellow, planed and matched	14 0 0	0 18 0
1 1/2 in. by 7 in. yellow, planed and matched	16 0 0	0 1 6
1 in. by 7 in. white, planed and shot	12 6 0	0 13 6
1 in. by 7 in. white, planed and matched	12 0 0	0 14 0
1 1/2 in. by 7 in. white, planed and matched	14 6 0	0 16 6
1 in. by 7 in. yellow matched and beaded or V-jointed boards	11 0 0	0 13 6
1 in. by 7 in. do. do. do.	10 14 0	0 18 0
1 in. by 7 in. white do. do. do.	10 10 0	0 12 6
1 in. by 7 in. do. do. do.	10 12 6	0 13 6
6-in. at 6d. to 9d. per square less than 7-in.		

JOISTS, GIRDERS, &c.

In London, or delivered	£ s. d.	£ s. d.
Railway Vans, per ton.	8 6 0	8 5 0
Compound Girders	6 5 0	7 5 0
Angles, Tees and Channels, ordinary sections	7 17 6	8 17 6
Flitch Plates	8 5 0	8 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 2 6	8 5 0

METALS.

Per ton, in London.	£ s. d.	£ s. d.
Common Bars	7 15 0	8 5 0
Staffordshire Crown Bars, good merchant quality	8 5 0	8 15 0
Staffordshire "Marked Bars"	10 0 0	10 0 0
Mild Steel Bars	9 0 0	9 10 0
Hoop Iron, basis price	9 5 0	9 10 0
" galvanised	16 0 0	0 0 0
(* And upwards, according to size and gauge.)		
Sheet Iron, Black—		
Ordinary sizes to 30 g.	10 0 0	11 0 0
" 24 g.	11 0 0	12 0 0
" 20 g.	12 0 0	13 0 0
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes, 6 ft. by 3 ft. to 3 ft. to 20 g.	12 15 0	13 15 0
" 22 g. and 24 g.	13 5 0	14 5 0
" 20 g.	14 5 0	15 5 0
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 30 g.	16 0 0	17 0 0
" 22 g. and 24 g.	16 10 0	17 10 0
" 20 g.	17 0 0	18 0 0
Galvanised Corrugated Sheets—		
Ordinary sizes, 6 ft. to 8 ft. 30 g. and thicker	12 15 0	13 15 0
" 22 g. and 24 g.	13 5 0	14 5 0
" 20 g.	14 5 0	15 5 0
Best Soft Steel Sheets, 6 ft. by 3 ft. to 3 ft. by 30 g. and thicker	12 0 0	13 0 0
" 22 g. and 24 g.	13 0 0	14 0 0
" 20 g.	14 0 0	15 0 0
Cut nails, 3 in. to 6 in.	9 5 0	9 15 0
(Under 3 in. usual trade extras.)		

LEAD, &c.

Per ton, in London.	£ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	13 5 0	14 5 0
Pipe in coils	13 15 0	14 15 0
Cast Pipe	16 5 0	17 5 0
Compo Pipe	16 5 0	17 5 0
ZINC—Sheet—		
Ville Montagne	25 0 0	26 0 0
Silesian	24 10 0	25 10 0
COPPER—		
Strong Sheet	0 10 0	0 11 0
Thin	0 11 0	0 12 0
Copper nails	0 11 0	0 12 0
BRASS—		
Strong Sheet	0 0 9	0 10 0
Thin	0 0 10	0 11 0
Tin—English Ingots	0 1 3	0 1 4
SOLDER—Plumbers'	0 0 8 1/2	0 0 9
Timmen's	0 0 8 1/2	0 0 9
Blowpipe	0 0 9 1/2	0 0 10

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	24d. per ft. delivered.
fourths	34d.
21 oz. thirds	34d.
fourths	34d.
26 oz. thirds	34d.
fourths	34d.
32 oz. thirds	34d.
fourths	34d.
Fluted sheet, 15 oz.	41d.
22 in.	41d.
1/2 Hartley's Rolled Plate	41d.
1 1/2 in.	41d.
2 in.	41d.
2 1/2 in.	41d.
3 in.	41d.

OILS, &c.

Raw Linseed Oil in pipes or barrels	per gallon	£ s. d.
" " in drums	0 2 4	0 2 4
Boiled " in pipes or barrels	0 2 4	0 2 4
" " in drums	0 2 4	0 2 4
Turpentine, in barrels	0 3 3	0 3 3
" in drums	0 3 5	0 3 5
Genuine Ground English White Lead	per ton	21 0 0
Red Lead, Dry	21 0 0	21 0 0
Best Linseed Oil Putty	per cwt.	0 8 6
Stockholm Tar	per barrel	1 12 0

[See also next page.]

PRICES CURRENT (Continued).

VARNISHES, &c.	Per gallon.
Fine Pale Oak Varnish	8 0
Pale Copal Oak	10 6
Superfine Pale Elastic Oak	12 6
Fine Extra Hard Church Oak	10 6
Superfine Hard-drying Oak, for Seats of Churches	14 0
Fine Elastic Carriage	12 6
Superfine Pale Elastic Carriage	16 0
Fine Pale Maple	16 0
Finest Pale Durable Copal	18 0
Extra Pale French Oil	1 10
Eggshell Flattening Varnish	18 0
White Copal Enamel	1 4
Extra Pale Paper	12 0
Best Japan Gold Size	10 6
Best Black Japan	16 0
Oak and Mahogany Stain	9 0
Brunswick Black	8 6
Berlin Black	16 0
Knotting	10 0
French and Brush Polish	10 0

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

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[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under seal, unless in some exceptional cases and for special reasons.]

* Denotes accepted. † Denotes provisionally accepted.

BRIGHTON.—For new telephone room at the Royal Pavilion, for the Corporation of Brighton. Mr. Francis J. C. May, F.S.I., M.Inst.C.E., Borough Engineer and Surveyor:—
Longley & Co. £1,140
Satin & Evershed .. 1,084
Box & Turner .. 1,057
Payne, Norman & Co. £984
Field & Co., Brighton* 930
A. Croxhurst .. 907

HARROW-ON-THE-HILL.—For the erection of the new Magistrates' Courts at Greenhill, Harrow, for the Middlesex County Council. Mr. H. T. Wakelam, County Architect:—
R. L. Tonge, Watford .. £6,950

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LONDON.—For heating and hot-water supplies to the old pavilions at Plaistow Fever Hospital. Mr. Edwin T. Hall, architect, 24, Bedford-square, W.C.:

Dargue, Griffiths, & Co.	£1,480 3 6
J. King, Ltd.	1,441 10 0
Troup, Curtis, & Co.	1,237 0 0
R. A. Croxhurst ..	1,203 0 0
Korting Bros.	1,200 0 0
Crittall & Co.	1,173 17 6
Werner, Pleiderer, & Perkins ..	1,150 0 0
Wood & Sons ..	1,140 10 0
Simpson & Co.	1,135 0 0
J. & F. May ..	1,100 0 0
Dawson & Co.	1,095 0 0
West Ham Works Department ..	1,088 0 0
J. Metcalf ..	1,064 15 0
Potter & Sons ..	987 0 0
Moorwood, Sons, & Co.	980 0 0
Herring & Son ..	975 0 0
Mather & Platt ..	934 4 0
Wenham & Waters ..	852 0 0
Lancashire Heating Co.	825 0 0
Brightside Foundry Co.	810 0 0

SOUTHAMPTON.—For the erection of a fire-escape staircase at the workhouse, St. Mary's-street, for the Southampton Board of Guardians. Messrs. Youings & Thomas, architects, 74, Abchurch-lane, Southampton:—
Jenkins & Sons. £117 0 0
Sanley & Co. 102 0 0
Lancaster & Son .. 91 12 6
Hayward Bros. 89 10 0
& Eckstein .. 89 10 0
St. Pancras Iron-work Co. 85 2 6
Dowdall & Son .. 84 0 0
T. Williams .. £81 15 0
Herring & Son .. 75 10 6
F. & J. Young, Southampton* 74 10 0
Wood & Co. 69 17 0
Lion Foundry, Kirkintilloch .. 63 15 0

WILLESDEN.—For the erection of a new assembly-hall, physical and chemical laboratories, &c., at the Polytechnic (Technical Institute), Willesden, for the Middlesex County Council. Mr. H. T. Wakelam, County Architect:—
Chambers Bros., Ealing .. £9,403

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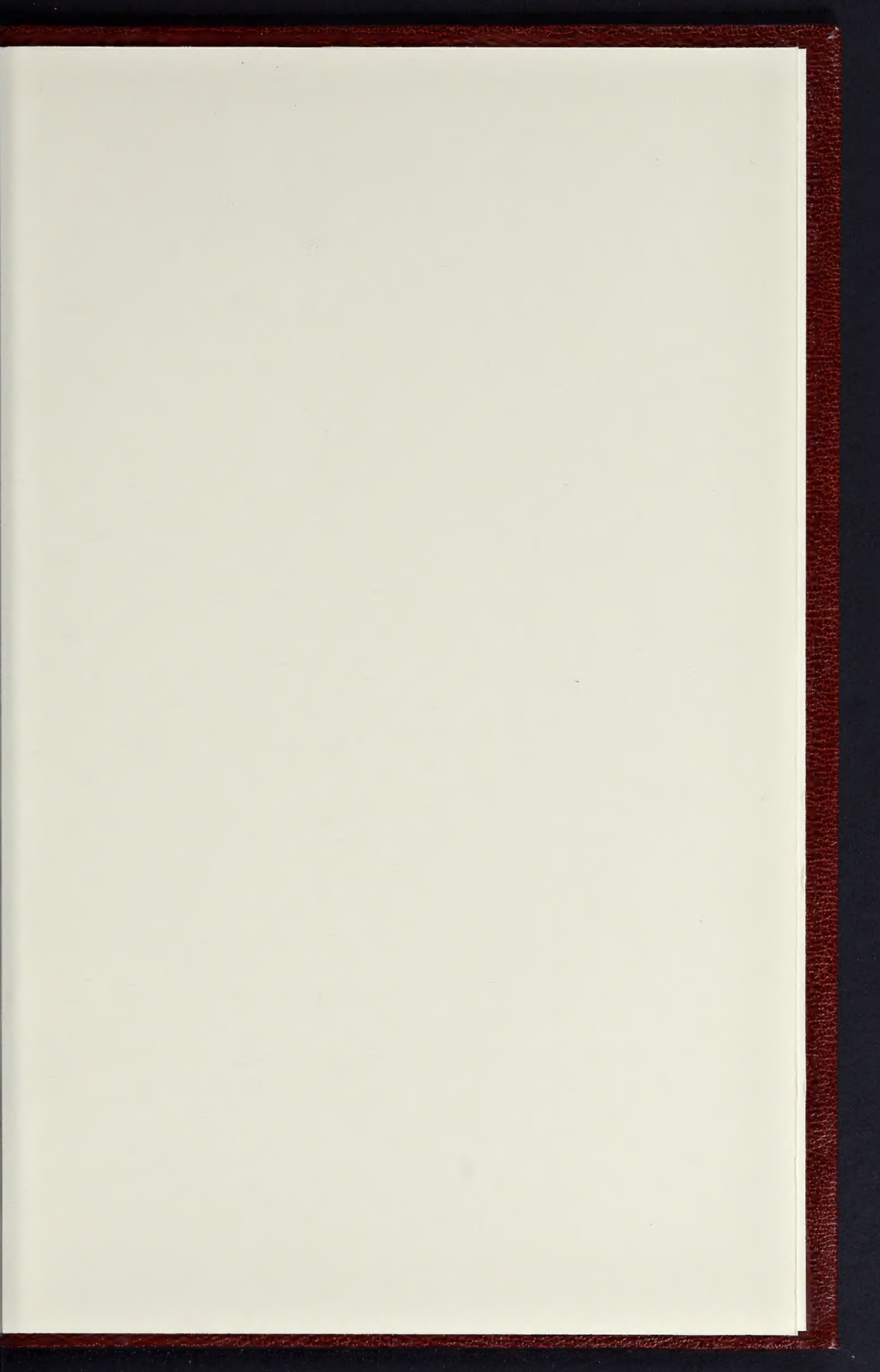
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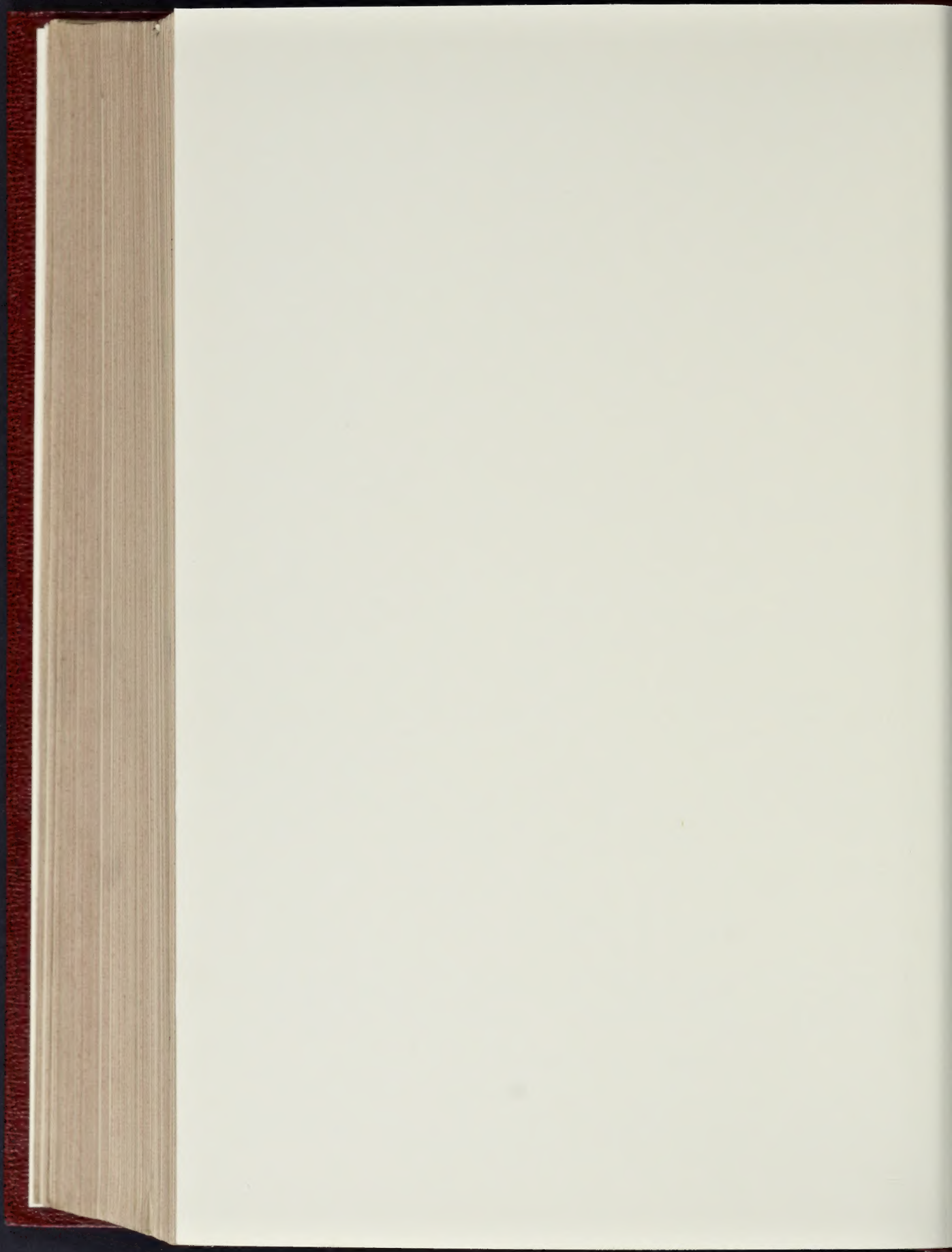
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